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Improved Current Water Wheel.

The means of utilizing the power afforded by the current of a river, where sufficient fall cannot be obtained to run a turbine wheel successfully, have been brought to comparative perfection within a few years by the improvements which have been made in this class of devices. Necessarily, where even the best form of current wheel is used, the application of the power of the stream is made in but an imperfect degree as regards economy, a large proportion of it running to waste, and only the effect of the water directly in contact with

the wheel being gained; but as no other expense than that of constructing and setting the wheel is incurred, the investment is often a very profitable one. To obtain all the power which the volume of water in the stream would afford would require the building of a dam, and consequently the employment of capital, frequently to a very liberal extent, in securing the primary facilities for doing business; and where this capital is not at command, or a large business is not contemplated, an ample return may be realized on a moderate investment by putting in a current wheel of the most approved construction. Such a wheel is illustrated in the accompanying engraving, which shows a basin made in the bank at right angles with the stream, its sides being protected by planking, for which stone may be substituted, if cheaper or more convenient. In this basin floats the raft which carries the wheel, the frame of the raft being so made as to balance the weight of the wheel. The basin or slip is dug deep enough to float the raft and wheel at low water, and extends into the bank a distance equal to the length of the whole apparatus, which may thus be drawn back entirely out of the current. This is a point of special value, as by means of this arrangement the wheel and raft can be withdrawn out of reach of drift wood and thus be protected from injury when the stream is swollen by heavy rain or melting snows.

The wheel, which is an undershot, is shown projecting into the current and in operation, its motion being communicated through the gearing A, to the horizontal shaft B. On this shaft slides a loose pulley, C, having on the left hand side of its hub an annular recess and a clutch, by which, when desired, it is engaged with the shaft B. The annular recess receives one end of the shipper lever D, the other end of which is made fast on the bank, and by means of a hinge the lever is rendered adaptable to the position of the raft at any stage of water. The shaft E, which is rotated by a wheel at one end as shown, has chains wound around it, leading to the opposite ends of the raft; and thus, by turning the wheel toward the bank, the raft is drawn in, while by turning in the other direction it is moved out into the stream. When the raft is run out, the wheel is held in position by a pawl which drops into a recess in the shaft E. The rollers F, on the sides of the raft, only one of which is shown in the engraving, facilitate the moving of the raft by their contact with the plank-

ing of the basin, preventing the friction which would result from the raft being forced by the current against the side of the slip.

It will be seen that when the raft is moved out, the lever D will draw the clutch into action, and the motion of the shaft B, received from the water wheel, will be transmitted through the loose pulley, C, and its belt to the machinery of the mill. On the other hand, when the raft is drawn in, the lever D, remaining rigid, will push the parts of the clutch asunder and the loose pulley will cease to turn. By this arrangement, the same appliances by which the raft is moved in and out serve to regulate the transmission of power and the starting and stopping of the machinery.

More Rain Wanted.

The immediate want of rain is not urgent, according to such information as we can obtain from correspondents, exchanges and other sources, but serious apprehensions are looming up in connection with the prospect of a dry winter which many now predict. We have no sympathy with croakers; and one of the regrets growing out of the present unpropitious aspect of the season, is a sort of mortification at the satisfaction which these evil prophets manifest over the seeming truthfulness of their pre-

Rosita Mining District.

The Rosita or Hardscrabble mining district is located in the southwestern part of Fremont county, Colorado, and is one of the most accessible silver mining districts in Southern Colorado, being fifty miles southwest from Pueblo, and 30 miles north of Cañon City. The communication with both places is made over excellent wagon roads.

W. H. Holmes kindly sends us the following information concerning this district: The mining town of Rosita is the center of the rich-

est mines that cover the surrounding hills in every direction. It has a population of 500—mostly miners—and contains three hotels, four stores, school and "meeting house." It is a wide awake, growing town and one of the most orderly and respectable mining communities in the Territory. Rosita is at an altitude of 8600 feet above the level of the sea, being situated on the southwestern slope of the Wet mountain range, and protected by the mountains from the prevailing winds. The winters here are mild, the temperature corresponding with that of Denver, 150 miles farther north. Mining can be prosecuted here during the entire winter.

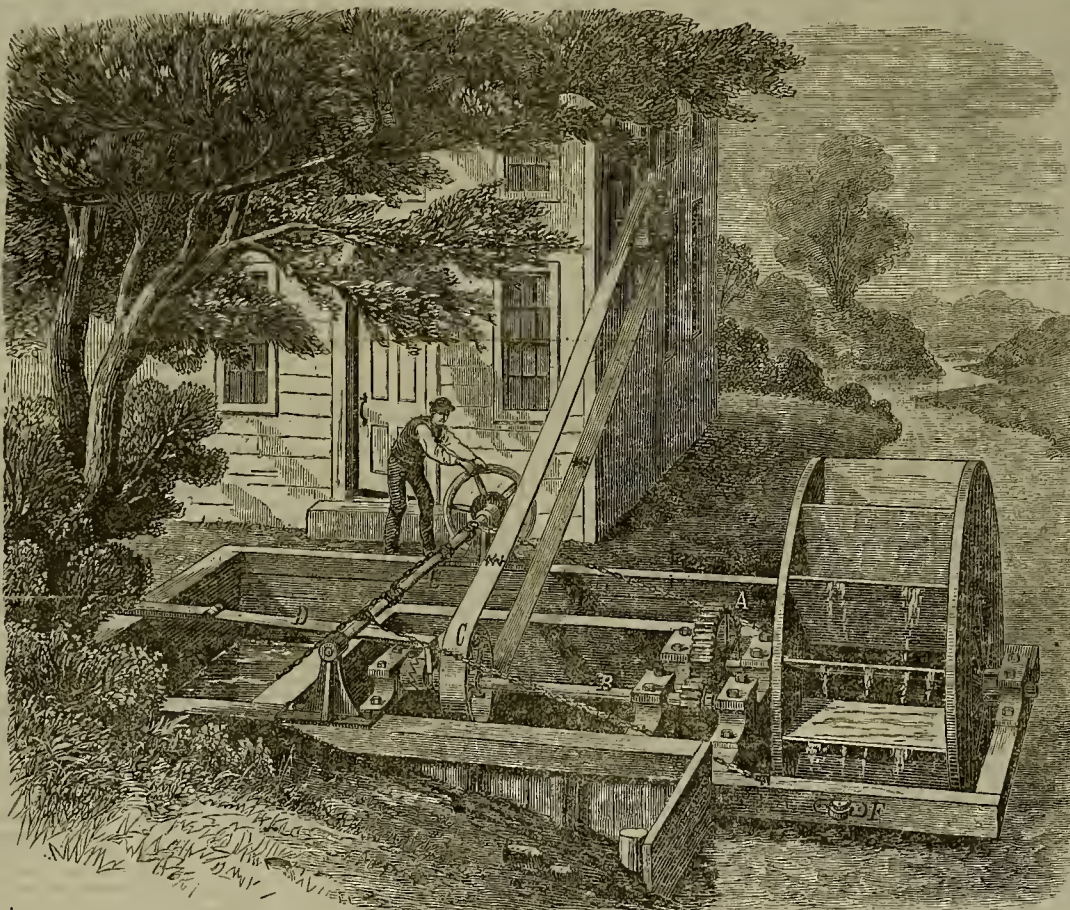
The first work on these mines began about two years ago. Since that time the work of prospecting and developing these mines has gone steadily on, though for the want of capital the development of some of the best mines has progressed slowly. Capital for the development of these mines and the erection of reduction works at this place for the treatment of the lower grade ores is greatly needed. The best authorities on mines in the Territory have stated that the precious metals here will undoubtedly develop it into one of the richest silver mining districts in Colorado. Prof. Hayden and Lieutenant Wheeler's parties visited this district during the summers of 1873 and '74, and give the most favorable report of them.

The veins throughout the district are well defined, and show high grade silver ore, specimen assays running up from \$35 to \$15,000 per ton, notwithstanding that 100 feet is the greatest depth to which any shaft has been sunk. Several mines are now shipping ore to Black Hawk, Golden and other points that sells for \$300 to \$400 per ton. It is reported that some of it sells for a much higher sum.

JOE SEALEY, Deputy County Surveyor for Inyo county, is engaged in chaining and mapping a road from Panamint via Darwin city and New Coso, to the point of connection with the Cerro Gordo and Lone Pine road at Swansea.

The improvements now going forward at the Savage hoisting works are being pushed to completion with all speed. They are of a substantial character, like all the improvements made about the mines of late years.

Within the past few weeks \$100,000 has been invested in the mines of Bingham, Utah, by California parties.



MCCARTY'S CURRENT WATER WHEEL.

Any additional information concerning this improvement may be obtained of the inventor and patentee, Mr. M. McCarty, Pueblo, Col.

THE SACRAMENTO "UNION" SOLD.—The Sacramento Union, according to previous announcement, was sold to the highest bidder, in the street in front of that office, on Monday last. There were but two bidders Messrs. Larkin, (who was the party desiring to sell out) and Mr. Morrill, who represented the remaining interest. The first offer was \$50,000, which was followed by \$60,000; \$62,500 and \$65,000 at which latter price it was knocked down to Morrill, who represented the majority interest in the proprietorship. Hence the paper will be continued without any change in the manner or tone of its management.

WISCONSIN is the latest location of our Eastern mining excitement. Two California miners are reported as having struck a quartz lead there which assays \$1,700 to the ton. Those two California miners may fool some of the Wisconsin people into buying the whole thing on the basis of \$1,700 per ton, and do well with the claim.

It will be remembered that on the appearance of the first rains of the season, which were unusually early and copious, fears were entertained that they would be followed by a dry winter; and at the present time there is, it must be confessed, too near a prospect of those fears being realized.

While we do not believe in gauging our operations or allowing our feelings to be swayed by the predictions of those who are continually prophesying evil, we are not disposed to close our eyes to anything that is so near an approach to disaster as the present scarcity of rain renders imminent. We might as well face the music at once, as to wait until the din becomes confusing.

In many localities in the mining districts, the weather is too cold to work anyhow. In other places they were not quite ready at the time of the last storm; but have their claims all prepared to go ahead on now. Most of the miners are hopeful of a good water season, and a plentiful harvest of yellow dust. It is to be hoped that a good supply of snow will store itself up on the mountains for summer use, so that the ditches and pipes will run full until late in the season.

The Big Mill.

About three months ago the Consolidated Virginia mine, on the Comstock, commenced the erection, in connection with their hoisting works, of an immense steam mill, for the reduction of silver ore. It is the largest steam silver mill on the coast, and from the completeness of its arrangements and its conveniences for handling and reducing ores, it will be found to excel more in capacity than in size and dimensions and the number of the stamps. The *Virginia Independent*, in describing this big mill, says: The ground where the mill stands is admirably adapted to its present uses. The site is to the north and east of the hoisting works, and between the two the descent is such that the ore can be run from the level of the surface of the hoisting works, and reach the mill at its very pinnacle. The ground covered by the mill also descends very rapidly to the east, so that the ore falls naturally to the stamps; from the stamps, by distributing sluices, the pulp drops to the tanks, from the tanks to the pans, and so on down by a gradual descent to the agitator room. Some idea of

The Dimensions of the Mill

May be gained from the following particulars: The battery building is 110 feet long, by 48 feet wide; the pan building is 195 feet long by 92 feet wide; the engine room is 58 feet by 92 feet, and the retort house 25 feet by 60 feet, the whole covering over 26,000 square feet of ground. Besides these buildings there is an office 20 by 30 feet, fronting on G street.

The Engine

Is a compound condensing, or low pressure engine, of 600 horse power, with cylinders 24 by 48 and 48 by 48 inches respectively. The steam is admitted into the 24 by 48 cylinder and cut off at the half stroke. It is then taken into the expansion cylinder, which is 48 by 48, and contains four times the cubical contents of the smaller one, and thus an expansion of eight times is gained. After leaving the expansion cylinder the steam exhausts into the condenser. This gives the vacuum power or the power resulting from the atmospheric pressure at this altitude in addition to the expansive power of the steam.

The Engine Shaft

Is 14 inches in diameter, and carries a band wheel 18 feet in diameter, weighing 33,000 pounds, which drives the battery part of the works. This shaft itself weighs 15,000 pounds, and the approximate weight of the whole engine is 100,000 pounds, or 50 tons. The foundation of this ponderous piece of machinery contains 450 cubic yards of masonry, laid in cement, and weighs 600 tons. This engine shaft is coupled to an extension 11 inches in diameter, which drives the amalgamating part of the works.

The Boilers, Etc.

The boilers which supply this monstrous motive power with steam, consist of four pairs, 54 inches by 16 feet, so arranged as to run a single pair at a time, or all together. The smoke-stacks are 42 inches in diameter, and stand 90 feet from the ground. There are also, in connection with the boilers, two steam pumps, for feed and fire purposes; to these a water-hose is constantly attached and ready for use in case of fire. The roof of the engine room rises to the height of 50 feet; the western earth or embankment wall is 22 feet high, built of brown trachyte rock, and, with the other embankment walls, contains 4,000 perch of stone. We will now commence and trace

The Ore from the Mine through the Mill.

The mill is connected with the hoisting works by means of a covered trestlework, 44 feet in height at the mill end. The same cars used in the mine will be run in trains by mule power from the mine, 278 feet to the mill. The trains will consist of from six to ten cars. It will take a car-load every five minutes to empty the demands of the mill. These cars are dumped into shutes, one on each side the center, from which the fine ore sifts into the ore bins below. The part of the ore first dumped is carried back from the center by shutes, and thus becomes equally distributed into the feed bins. From the feed bins the ore is taken by Tulloch's self-feeders and given to the batteries as it is required.

The Batteries

Are driven from a counter shaft propelled by the large band wheel below, the connection with which is made by a belt 24 inches wide and 160 feet long. From this counter shaft the batteries are driven by 14-inch belts, 60 feet long. The batteries are run in sets of 10 stamps each, and clutches are so arranged as to stop any ten without interfering with the working of the other machinery. The batteries consist of 60 stamps of 800 pounds each. The mortars are so arranged as not to interfere with putting shoes and dies into the batteries, as they discharge at one side and are two nearly together instead of separately and in the center. From each division of 30 stamps there are

Distributing Sluices

Which convey the pulp into the settling tanks. From the tanks it is shoveled out upon the platform in front of the pans. There are 16 pans on each side. These are flat-bottomed, 3 feet in diameter and calculated to hold about two tons each. The pans have steam bottoms,

and are arranged to admit live steam into the pulp or under the bottom. There is a settler to each pair of pans, making 8 on each side. These are 9 feet in diameter and 3 feet deep. From the 15 settlers the pulp is discharged into four agitators, and these discharge in turn into the tail sluice which is placed at the end of all the other appliances. The heavy stuff in the agitators will be cleaned out twice every 24 hours and subjected to further working by four more pans and two settlers placed in the agitator room.

The Quicksilver

Tank is placed in the store-room under the ore bins, and will come down pipes to the distributing tanks in the pan-room. From these tanks it will be distributed through pipes to the charging bowls of the pans. After passing through the pans and settlers it is discharged from each settler direct into each strainer. A pipe leads from the bottom of each strainer to the main receiving tank, which is placed below everything and in the center of the pan-room to catch all; and from that it is pumped up into the main distributing reservoir again. There are two of these reservoirs—one on each side.

The Amalgam

Remains in the strainers, and is taken by an amalgam car, holding about twenty tons, which runs through the center of the pan building to the retort room. The same car takes retorted silver back into the mill circulation. Each pan and settler can be stopped without interfering with the other machinery. Each row of pans and battery has a traveling tackle for convenience of handling the stamps and pan millers. The strainers are provided with locks and covers for protecting the amalgam.

The Retort Room

Is built of brick and contains four retorts, each of which is calculated to hold 2,000 pounds. These are so arranged that any one or more of them can be run. The flues lead into a brick chimney fifty feet in height. Back of the reduction works is a

Cooling Reservoir

About 200 feet square, where the water from the condenser can radiate its heat and attain the required temperature to be used again. And the controlling mind which mastered all these details, and so admirably arranged everything with an eye to convenience and business is

W. H. Patton, Designer and Superintending Engineer

At the works. He it is who has planned and arranged it all. He is the master designer of all the vast complications of machinery, all of which has been constructed according to his directions. The arrangements are ample, yet compact. There is no waste room and no more room needed. There is no superfluous machinery, and none wanted which is not in place. Everything is economized, yet of the best material and put down to stay. As to the quality of materials used, no expense has been spared to get the best. What was needed was got. The cost of the mill is about \$250,000, including the grading. A few years ago it would have cost half a million. This economy could not have been secured, except Mr. Patton had known just exactly what was wanted, and how much of everything would be needed.

The work will be so far progressed that steam will be got up about Christmas, and the month of January will see this largest and best silver mill in successful operation. Many a whole town on the coast is maintained by the patronage of a much smaller institution.

Mining Theories.

Recent developments have set those persons who have their peculiar theories about the course of the Comstock lode all at sea. Millions of dollars have been expended in tracing the ledge, and millions more will be spent in finding its direction north and south. The many-ledge theory which was much in vogue in early days, and on which many important suits were decided, but which subsequently gave way to the one-ledge theory, is being adopted again. Others take the ground that several ledges on the surface come together like the leaves of a book thousands of feet below. Some think that at the divide the Comstock breaks into three branches, one extending through American flat, one down through Gold hill and another further east. Experts from Freiberg, and miners from Mexico and Peru, have given their opinions on these points on the witness stand, and been subjected to a rigid examination, but after the cases were submitted the jury knew about as much about the question as they did about the volcano in the moon. In scarcely an instance has actual development shown any of the theories upon which men staked their reputations, and sometimes lost their lives, to have been correct. The thousand abandoned prospecting shafts and tunnels that honeycomb the sides of Mount Davidson, Cedar hill and the surrounding country for miles, speak for themselves, and show the uncertainty of mining. What has been shown by prospecting is known, and nothing more. Who knows but that far east and west of the present developments rich bonanzas exist, which will hereafter be discovered? Theorizing on croppings and the course of ledges is about played out, and experienced mining superintendents no longer place confidence in what is not in sight.—*Virginia Chronicle*.

The Iowa Hill Canal,

A correspondent writes to the *Placer Argus* giving an account of the season's work on the Iowa Hill canal, from which we make the following extracts: The right of route is one of the best in the State; the cost of construction so far, for so large a work, taking as a basis of comparison the figures given in Langley's Pacific Coast Directory of all the canals in the country, amounting together to over 6,000 miles, is I am safe in saying, far less than any similar work in the State; the water shed is simply enormous; the expense of repairs, and attendance, from the favorable character of country it passes through, except the upper end, will be trifling; the territory it commands is inexhaustible in wealth and extent, for by a judicious system of reservoirs, which is the cheapest process in the end, the water supply, without going farther than Sailor and New York cañons, can be delivered over the whole of the upper portion of the county, from Iowa hill to Michigan bluffs, in abundance, for seven or eight months in the year, and that is long enough. I might with advantage mention several more salient points this great work possesses over its competitors in other parts of the State, only I am afraid of being too lengthy.

As a matter of course, those at a distance having an interest in the matter, either peculiarly or otherwise, will like to hear about the progress of the work this season. I believe I may say it has been satisfactory in every way. I have already expressed through the columns of a San Francisco paper the respect I felt for the leading men of the company for the vast amount of work they have accomplished during the first season under the most pressing difficulties. Financially, the present season has been equally harassing; but with true California pluck, they kept economically and steadily at work, and the results as they stand to-day, rather increase my admiration than otherwise. The hardest part of their labors is over; the remainder is easy. There are now 26 miles of canal, seven feet on the bottom, with reservoir, waste gates, and flumes to Tadpole lake, complete. The main ditch in its original capacity, stops about four miles from town, and is hence divided into two branches, somewhat smaller, going respectively to Iowa and Wisconsin hills, and covering all the claims on either side of Indian cañon. Some of these claims are now fixing up on an extensive scale, having in all cases not less than 500 feet pressure.

The main reservoir eight miles from town, has been raised from 32 to 50 feet, widened 10 feet and extended from hill to hill bounding the valley, making the total length of wall 286 yards. The amount of dirt put in the reservoir this season by 10 Chinamen and four horses was 17,000 cubic yards, besides doing 34 days outside work in the neighborhood. Since the horses were drawn off on account of storms, a railroad has been put on the entire length of the reservoir, and two large cars will be kept running all winter. The track rises the wall an additional two feet, so that the entire available capacity of the reservoir is now from 48 to 50 feet of water in depth at the main trunk, 286 yards in width, with an overflow of somewhat over 100 acres. Basing my calculations upon the amount of water discharged to Judge Spears claim, for six consecutive weeks, last season without any supply coming in, I make the cash value of such filling about \$7,500. Now if as some contend, it can be filled four times in an ordinary season, we see at once the respectable sum the company will realize this winter; but whether it can be filled four times or not, for I admit there is a difference of opinion upon the matter, one thing is certain, the company will realize enough to place them beyond all external pressure in the future. This I mention as a final victory secured beyond controversy.

The demand for water this season is about 5,000 inches a day, but the company will not attempt to supply more than 3,000. Can they really supply this large amount? Let us see. On the first of the current month, there were 25 feet of water in the reservoir, with a daily supply of 400 inches, besides 2,000 inches turned off at Tadpole, owing to a break in the flume at that place, but which will be repaired before you receive this letter. Here then in solving the question of supply one finds this startling fact; in two seasons' work the company is in a position on the 1st of December, 1874, to supply 2,400 inches a day, a fact unprecedented in the history of this divide, and I believe unlooked for by the most sanguine. Of course this supply at so early a period, will be greatly reduced, perhaps stopped altogether when frost and snow set in at Tadpole. Well, never mind that, what we want to get at is the actual and possible supply, that is, what can really be done under ordinary circumstances. It is a money calculation, and must be free from all bosh and exaggeration. In this spirit I hold the facts as we find them to-day, settle the question of supply in the affirmative, and just a little more; they silence forever the miserable croakers who in turn, are glad enough to take the pay and feed of the company when they can get it, but who in turn, foolish and ungrateful to the extreme, can never give them a well earned word of praise or encouragement.

From the reservoir to the Secret house, the canal has been cleaned and widened, and put in perfect condition, except in one place, which the early break in the weather prevented being finished thoroughly. These few rods however, will not materially interfere. It would simply have been better if the cement at this place

could have been cut down a little. From the Secret house to Tadpole, a fine substantial flume one mile and a half long, six feet and a half wide, and five feet deep, round an almost inaccessible point of rocks has been built, and is, perhaps, the most creditable portion of the whole work. It has certainly been the most tedious and difficult. This ends the season's work. Next season all that is required will be to reach Sailor canyon, if possible, and to build a couple of reservoirs. That done, and Placer county may be proud of the Iowa Hill canal, for in every respect, it will be a magnificent property, and reflect the highest credit, both as regards the time and cost of construction, upon all who have been entrusted with its management.

Coso—The New District.

We take the following from the *Inyo Independent*: After a close inquiry as to the real facts in the case, and careful consideration of the united testimony of a great many of our citizens who have visited and examined the recent discoveries in the new Coso district, we are forced to the conclusion that the mines are simply enormous in their extent and value. Their discovery in the month of October last, was brought about as follows: Prof. Wm. D. Brown, a gentleman having large experience in the study of mines and minerals—and who, as early as 1867 made an examination of the Cerro Gordo mines as an expert—concluded, since the discovery of Panamint, that the country between Cerro Gordo and Panamint was rich in mineral wealth. Leaving San Francisco early in October, well prepared for a thorough prospect of that country, accompanied by his brother, he arrived at Coso late in that month. There he found specimens of lead ores in the possession of native Californians, but could get no clue to the locality from whence they came. He immediately ascended the highest point near by, and took a view of the surrounding country, and following his judgment, proceeded at once to the mountain in which the rich mines have since been opened. Here he found the "Promontorio" mine, with a notice of location upon it by "Rafael Cuervo." He then made a careful examination of the ores and formation, and found the hills composed of lime rock on the west and porphyry on the east, and concluded that mineral must lay at the juncture of the two formations. Following and tracing he soon discovered some wonderful deposits of mineral, and the "New York" location was at once made, which produces very rich carbonate ores. To say that the mine is forty feet in width, and traceable 2,000 feet, sounds wild, but comes near the truth. Following further these formations the Browns made other locations of carbonate mines, almost duplicating the New York—i. e., the "St. Louis," the "Grand" and others. The latter, located on the 3d of November, cleaves a bill and lays between the limestone and porphyry; it is traceable for about 3,000 feet, and in many places is 30 feet in width. Bentura Beltran, an old and well known prospector, early in November, located a truly wonderful mass of wealth, its general description being the same as the Promontorio, New York and Grand ledges.

Besides this class of mines, there has also been discovered and located some remarkably rich fissure veins. Cropping out bold and distinctly, these veins cleave both the porphyry and limestone. They bear chloride and sulphuret ores, of the same description as those found in the earliest openings of the Comstock. We have authentic reports of but two of these, though there are many others perhaps equally deserving of notice. The "Mount Ophir" and "Solomon's Ophir" are two locations apparently on the same vein. These ledges crop out to a width of 20 feet, and although requested not to give the figures, we may state that the ore assays immensely rich. The hills would appear to be full of minerals on every hand, and almost daily there arrive reports of new and very valuable discoveries. There are now about 150 men in the mines and more panning, in daily.

For the benefit of the outside public we will give the locality of these mines: They are 40 miles southeast of the foot of Owen's lake; seven miles east of the Independence and Panamint stage road, and about eight miles west of the head of Darwin cañon. They are easily accessible by wagon, and Dodge's passenger stage run within ten miles of the new town which is forming at the new mines, the proposed name of which is "Darwin." The essentials, water and wood, are found in far greater abundance than ever at Cerro Gordo. In conclusion we can only repeat to our citizens the advice proffered us by all of our informants. "If you doubt our statements go and see for yourselves and be convinced."

REMOVING HAIR FROM FIBRES.—A canny Scotchman has discovered that if a hide is immersed for four or five days in a mixture of vegetable or animal charcoal and water, of the consistency of a thin paste, the hair is entirely removed and the leather made from a hide thus treated is of superior quality.

STOVE LUSTER when mixed with turpentine and applied in the usual manner, is blacker, more glossy, and more durable than when mixed with any other liquid. The turpentine prevents rust, and when put on an old rust stove, will make it look as well as new.

MECHANICAL PROGRESS.

Cork as a Non-Conductor of Heat.

A company has been organized in Paris for the purpose of thoroughly testing the well known remarkable non-conducting property of cork. It appears that a number of steam pipes at several important establishments had been covered with this substance; but the test of continued application was wanting. More recently, however, it has been stated that, after standing 18 months, the cork covering has remained intact, and is as perfect a non-conductor as on the day it was laid. Although the durability of this substance had been proved before by the buoys, which are partly immersed and partly exposed to the weather; its being able to stand such high temperature as those of surfaces heated by steam at from seven to eight atmospheres had not hitherto been shown.

Now, felt, which is a good non-conductor of heat when first laid, deteriorates very rapidly; although retaining its original appearance, it ceases to be effective after a few weeks, and ultimately tumbles into dust.

A fear of the same result occurring in the case of cork would, no doubt, be entertained by those who are unacquainted with its nature, but not by those who know the composition of this remarkable wood-like substance. To set all misgivings at rest, however, nothing is so satisfactory as actual experience, and there is no doubt that cork is now firmly established as the non-conductor par excellence. Its lightness, the readiness with which it yields so as to surround the cylinders or pipes it may be destined to encase, the facility with which it is put in its place, taken down and put up again in the case of an inspection or repairs to a boiler or steam-pipe, and above all, its non-conducting power, effecting so great a saving of fuel, assure for it the highest place in the eyes of all manufacturers who regard their own interests.

The engineers of the French navy have made experiments on cork employed as a non-conductor, and have reported thereon to the Admiralty (French), which body has requested the manager of the company to appoint, at the five military ports, agents charged with attending to any orders which may be given. This *cachet* given by men so reserved as the French naval engineers at once places cork in the first rank as a non-conducting substance.

FREEING CAST IRON FROM PHOSPHORUS.—The new German process of freeing cast iron of phosphorus is represented as yielding superior bar iron from phosphureted cast iron, at practically no increase of cost. The method is very simple. Chloride of calcium and common salt, fused together in about equal proportions, are intimately mixed with the molten iron in the puddling furnace, either by adding gradually, in two-pound water tight paper packages, or placing the whole quantity required upon the bed of the puddling furnace at first, and, in either case, very thoroughly working it with iron. The puddling process is generally so much shortened that the consequent diminution of the waste iron almost affects the cost of the material added. The quantity of the mixed chlorides required is about three times that of the phosphorus present in the cast iron. The presence of other chlorides, as of manganese, iron and magnesium, interferes with the process, and renders a large excess of chloride of calcium necessary.

METALLIC PENS.—It was a fortunate thought which led some genius to substitute metallic pens for those obtained from the gray goose quill, for if to-day we had to depend upon these sagacious birds for our supply of writing materials, quill pens would be at a premium. So rapid has been the increase of knowledge, and so greatly has cheap postage promoted the desire and the power to write, that all the quills in the world would not furnish one-tenth of the necessary supply of pens. If, therefore, it had not been for the invention of gold and steel pens, our schools, our counting rooms, and our editors would have had hard times, during the time that has elapsed since quill pens were displaced by metallic ones, the form and material of these useful substitutes has been greatly varied, but notwithstanding the many forms which have been introduced, there is still great room for improvement, as every writer knows.

THICK AND THIN SAWS.—It is said that the manufacture of mortar, beton, and concrete, from the waste lime of gas purifiers—a discovery or invention announced only a short time ago—has already commenced on an extensive scale in England. The method of thus utilizing what has hitherto been considered an almost worthless refuse, consists, in this case, of simply grinding it up in an ordinary mortar mill, or mixing it as common lime with sand, ashes and similar material. The addition of Portland cement to the mixture is found to render the product—brick, slabs, etc.—much harder.

STEEL RAILS appear to be everywhere excluding those of iron. All of the contracts lately given out by the Belgian Government for the State line are steel. It is stated that steel rails are about as cheap now as iron rails were two or three years ago.

Belting and Gearing.

As regards the transmission of power, the Americans, says a French writer, aim at achieving two important things which are correlative—the lightest possible weight and the highest possible speed. Hence the universal substitution of belting for gearing, and the general adoption of light shafting and small pulleys, which are conspicuous features of their system of transmitting power. The first mover is usually a gear, but after that all transmission is obtained by belting. The belting is a little study in itself, but it will suffice to say here that belts of the latest improved pattern run for wonderful lengths of time without picking. The ease and durability of the system, would, I think, astonish the advocates of gearing. The light shafting and small pulleys in general use are said to save twenty-five per cent. of the power. The shafting is run twice as fast, and hence the pulleys can be smaller, yet the fly wheel of a powerful engine may be large. For instance, I have seen one twenty-seven feet in diameter going, as I was informed, a mile a minute. The pulleys are cast, but it is expected that wrought pulleys much lighter will soon come into general use. Hollow shafting is finding favor. If shafting and pulleys could be advantageously constructed of steel, the saving of power would probably be greatly increased. Engines and their equipments, and belting, shafting, and pulleys, are all made in the United States.

AIR PRESSURE IN WIND INSTRUMENTS.—Dr. W. H. Stone in a paper before the Physical Society, of London, describes some experiments on the wind pressure in the human lungs during the performance on wind instruments. About 6 feet of water or 13 pounds pressure per square inch was the ordinary maximum when a small tube was inserted between the lips. When the lips were supported by a capped mouth piece, as in brass instruments, a much greater pressure could be sustained, and lip muscles invariably gave way long before the expiratory power of the thoracic muscles was exhausted. The following pressures were sufficient to produce an orchestral tone: The oboe requires an air pressure of from 5 to 10 ounces per square inch, the clarinet, 8 to 14 ounces; horn, 2½ to 5 ounces; cornet, 5 to 18 ounces; euphonium, 1½ to 23 ounces; bombardone, 1½ to 20 ounces. It will be noticed that the clarinet, in this, as in some other respects, differs from its kindred instruments, and also that some of the pressures are small, not exceeding or indeed attaining the pressure of a fit of coughing. They are, therefore, very unlikely to injure the lungs, or to produce the emphysema erroneously attributed to them.

SPRINGS AS MOTORS.—The method of propelling cars, omnibuses and velocipedes by coiled springs is being tried in England, and with good prospects of success. The motor used is an arrangement of powerful springs encased in cylinders like watch springs on a very large scale. A car worked by these springs is shortly to be tried on the tramway at Greenwich. The services of French machinists have also been called into requisition, and steel bands capable of being coiled and of exerting great pressure have been made in lengths of one hundred yards each. In Sheffield some of the steel manufacturers have turned out springs fifty and sixty feet long, and said to be capable of a pressure of eight hundred pounds. To wind up these springs of course requires more power than could be obtained by hand, and the English experimenter proposes to have them wound at certain intervals by means of stationary engines. The result of the experiments will be looked for with much interest. Some of the English patents have a combination of spiral or helical springs.

PULLING UP FOREST TREES BY STEAM.—Some interesting experiments in the clearing of wooded lands took place lately in Scotland. The experiments were carried out under the auspices of the Canadian Land Reclamation Company and were intended to demonstrate the ease with which the forests of Canada could be cleared by means of this process. A traction engine of twelve horse power is stationed some distance off from the wood, and a wire chain is fastened to the tree. Steam is then put on, and the tree is pulled out by the roots. An objection to the adoption of the process was that it would injure the wood by splitting the tree; but the experiments showed that, with proper precautions, there was no fear of such a result. In five hours upward of 300 trees, in a plantation nearly 100 years old; were pulled out. Of that number not above half a dozen were broken, and in these cases the result was wholly due to the inexperience of the men engaged in the work, who placed the chain too high up on the tree.

COMPUTING THE SPEED OF GEARING AND PULLEYS.—The following simple rule for calculating the speed or gearing of pulleys is, doubtless, in familiar use by many mechanics. We give it, however, for the convenience of those of our readers who may not happen to be acquainted with it, and who have found the need in practice of a uniform rule, applying to all cases. To find the speed of a driven wheel, when the number of teeth of both wheels and the number of revolutions of the driving wheel are given: Multiply the number of teeth of the driving wheel by the number of its revolutions; divide the product by the number of teeth of the driven wheel, and the quotient will be the number of revolutions of the driven wheel.

SCIENTIFIC PROGRESS.

The Transit and Its Probable Results.

The full result of the patient watchings of the various parties deputed to observe the transit of Venus, will not be made known to the world for several months, perhaps not in a year from now; and they will probably be affected with a larger possible error than is generally anticipated. It will be some weeks before the telescopic measures taken at all the stations can be known, even if transmitted by telegraph, because many of those stations are far removed from any ocean cable at present in existence. At many of the stations the chief dependence will be on photographic views, and the negatives cannot be transmitted by means of the lightning flash; they can only be carried by the slower agency of steam to the observatories where they can be submitted to measurement with the micrometer. Then all the results obtained at separate stations must be compared, and many laborious calculations be made before the value of the solar parallax can be known.

Mr. E. Colvert, in some remarks at a late meeting of the Chicago Academy of Sciences said: "I have called your attention, at former meetings to the difficulties which will be encountered in the attempt to reconcile these observations; difficulties arising from, 1, the irregular shape of the earth, which is not a true oblate spheroid; 2, the irregular contour of the sun, its surface being in a state of perpetual commotion; and, 3, the errors of observation, which may be regarded as an external kind of 'personal equation.' Summing the probable average of these three factors of error, I conclude that the astronomical world will be fortunate if it is able to reconcile all the observations so as to make it certain that the accepted average is not more than 100,000 miles in error, or one part in 900 of the whole distance.

There is no reason to doubt that we already know the distance of the sun to within 300,000 miles. I speak not now of my own calculations of the quantity, but of the extremes claimed by others. If we assume 91,700,000 miles as the average, this estimate will not be more than 200,000 miles, from the 92,000,000 miles of Newcomb, or the 91,480,000 of the English computers. This is one part in 300 of the whole distance. Hence the probability is that observations of the transit of Venus in 1874, on which more than \$1,000,000 have been expended, and involving the equivalent of not less than 200 years of labor on the part of one man, will only reduce the uncertainty to about one-third of its present magnitude. But this will be no mean achievement. It is not saying too much to claim that this result will be worth at least ten times the money and labor expended in obtaining it."

PEAT CHARCOAL AS A DEODORIZER.—The extraordinary deodorizing power possessed by that variety of charcoal known as bone-black is generally attributed to the earthly matter with which it is mixed. It was therefore to be expected that peat charcoal should be specially valuable in this direction, and in some parts of England and Scotland it is now extensively used for mixing with the excreta of households on account of its value as a deodorizer. Peat charcoal is one of the most porous of all forms of impure carbon, and its powers of absorption when dry are very great. Thus, in some experiments tried in the town of Leamington, England, recently, it was found that two or three ounces of newly-made peat charcoal were sufficient to deodorize six gallons of ordinary sewage. The actual proportions employed, according to the report, were about one part of charcoal to 150 of sewage by weight; and in a few minutes after the charcoal was mixed with the rich aluminoid sewage, a peculiar sweet smell was noticed, but in less than a quarter of an hour all smell had disappeared, and the constant addition of fecal matter did not permanently restore the odor. A closet arranged for the purpose was devoted to the use of some forty laborers, but even during the hottest weather, on no occasion, was any offensive effluvia noticeable, although the amount of peat charcoal daily made use of did not equal the proportion already stated.

THE TELEMETER IN SURVEYING.—Captain W. H. Dall, in some remarks recently made before the Civil Engineer's Club, of New York, said that he had used the telemeter for four years on the coast and interior of Alaska. He had even more simple than Mr. French's, and he found that he could depend on his surveys being almost accurate, and in some cases much more so than if measured with the chain or tape. On rocky shores, the telemeter was invaluable, and in a few months he had, with the assistance of a common sailor, as rodmann, made surveys that by the ordinary methods would require fully five years to complete. He discovered after a time that for correct results an accurate focus was necessary, and to every observation the following correction or error in measurement was to be added, viz.: to the distance of the eye-piece from the object glass add the distance of the object glass from the diaphragm, which in the case of his instrument was exactly one foot. This subject of surveying with the telemeter is a very important one, and worthy of careful investigation.

The Development of Natural History and Science.

Mr. W. W. Calkins, recently before the Chicago Academy of Sciences, read a very interesting paper on "The Development of Natural History as a Science," of which the following digest is given in the *Engineer and Architect*:

The great lamented Agassiz said, "I have devoted my whole life to the study of nature, and yet a single sentence may express all that I have done." This confession reveals to us a degree of simplicity and grandeur not often witnessed. It suggests that the grace of modesty might be cultivated by most people with great propriety. Since man was first created he has been engaged in studying the world of animate and inanimate objects around him. As the first rude efforts seem to us like childish displays, so, when the present era shall become antiquity, our attainments in knowledge will no doubt appear small indeed in comparison with the advances that shall mark future ages.

Aristotle was the first prominent naturalist, and the founder of the science. As evidence of this, we have his "History of Animals." In Aristotle's time, 2,000 years ago, text-books of natural history were in common use, and the study was pursued with vigor. We are still without elementary works of this kind adapted to the young beginners. We are, however, working up to the point [when the study of natural history in the school will be indispensable and popular. After 1800, Linnæus resumed the work where Aristotle had left it. Pliny added but a little to what had been done by Aristotle. The Middle Ages, with an intellectual pall dark as night, followed the enlightened period of Roman and Grecian history, and gave us nothing. The sixteenth century witnessed a temporary revival in this and other branches of learning. The naturalists were mainly occupied in studying local species, and in disputing over ancient authors. The seventeenth century witnessed remarkable advances in general knowledge, but men had not yet done wondering over the successful revolt of the Netherlands, or the brilliant military career of Gustavus Adolphus, Wallenstein, and Tully.

It was reserved for Linnæus, in the last century, to break the spell that had for so many ages been hung over the pursuit of the natural sciences, and strike the key-note that aroused the scholars of Europe from their lethargy. Aristotle had given us genera and species; he divided the animal kingdom into *Enaima* and *Anaima*, or blooded and bloodless animals. Linnæus, beginning where Aristotle left off, formed, in addition, classes and orders. He divided the animal into six classes—mammalia, birds, reptiles, fishes, insects and worms. The classification at once aroused the attention and provoked the criticism of other naturalists. The defects were pointed out, and the important principle of classification founded upon the internal structure, and noting animals upon common structural characters, was established. The magnitude of the work of classification will be appreciated when we consider that the species now number 230,000. The confusion that existed before Linnæus' time on account of the different names and languages employed by naturalists was counteracted, and in fact done away with by the use of one language by him—the Latin.

Linnæus' classification, however, did not meet with entire success. Its effects did not escape criticism. All, with the exception of the great Cuvier, failed to strike the grand principles of classification. When he announced his theory dividing the whole animal kingdom into four classes—Vertebrates, Mollusks, Articulates and Radiates—the scientific world stood amazed, as though a revelation had been made from Heaven. The founder of comparative anatomy was not one who skimmed over the surface of things. Cuvier went deeper; he examined the internal organization and revelations of animals. He tells us the comparison was the secret of his success. The result embodied the four plans of creation already mentioned. The views of Cuvier, which have withstood criticism for nearly three-quarters of a century, lead to three conclusions: First, that Cuvier's four classes embrace all known animals. Second, that there is thought and harmonious law as the basis of all, the whole directed by one will—the Creator. Third, that the numerous subdivisions of the four great groups mentioned, such as classes, orders, families, genera, species and other subdivisions of these subdivisions, should be formed in accordance with characters expressed in nature to be of value. Otherwise they are artificial distinctions tending to lead us away from what we seek, and that which is the basis of all science—the truth.

Another great discovery hardly less important than those mentioned was that of Von Baer in embryology—or the fact that all animals originate from eggs, and though all alike at first, grow to maturity on four different plans. Embryology is yet in its infancy. Agassiz made some of his greatest discoveries in this science, and it furnishes one of the most attractive and promising fields open to the explorer. The progress of natural history for 50 years has been rapid. The latter part of the last and the beginning of the present century were particularly marked by great discoveries. The present century has produced hosts of distinguished naturalists who have labored successfully in their particular departments, but Agassiz, before his death, probably ranked first among living contemporaries.

Mr. Calkins closed by saying that the study of natural history should be popularized.

convey water to the Red Hill claim. When inaugurated this will be one of the most notable gravel mining enterprises in the county, and we believe it will prove among the most remunerative. Work is being pressed forward as rapidly as possible with a view to having everything in readiness for active operation shortly after the holidays.

WEST POINT DISTRICT.—Mina Rica continues to hold solid promises.—The former Thores mill was bought by parties, last week, who are now repairing mill and ditches.—Mr. Gilbert, "the last of the Modoca," bought out the Indians. Mr. Gilbert is now engaged in putting up a whim on the mine.—Loose Star is turning out fine ore again.—A working shaft has been commenced on the Josephine. At the depth of 12 feet the vein contains milling ore 4 feet thick.—A fine head of water has been tapped in the Good Faith tunnel.

CONTRA COSTA COUNTY.

MR. DIABLO QUICKSILVER.—*Contra Costa Gazette*, Dec. 26th: It is said that the new Quicksilver Mining company organized to work the ground of the old Welch company, near Clayton, have an ample working capital, and they are now putting up furnaces calculated to smelt 12 tons cinnabar rock a day. From the report of reliable parties who have been on the ground recently, we learn that the company have a large amount of rock awaiting the completion of the furnaces, all of which contains quicksilver, and some of it very rich. It is claimed that the rock now ready for smelting, although composed of croppings, or taken from near the surface, holds an average of from 30 to 50 per cent. of quicksilver, some of it going as high as 80 per cent. We are inclined to doubt if so good a return will be realized from the smelting, but there is still reason to believe, from the reports of disinterested persons who have inspected the rock already gathered, and that which has been uncovered—though no regular working has yet been opened, as we understand that the company have a valuable quicksilver claim which can be very profitably worked.

INYO COUNTY.

COSO DISTRICT.—*Inyo Independent*, Dec. 19th: Geologically, the formation is just right to give assurance of deep mines with immense chimneys of very high grade ores. Some of the mines, with croppings perhaps 20 feet wide and assaying over \$250 to the ton, are found near the crest of the hill or mountain, lying between a hanging wall of limestone and upon a foot wall of porphyry, the latter being the country rock to the eastward, and the other to the west. These mines all run nearly north and south, as does the mountain upon which they are situated. The recorder's book shows seventy-seven locations, all of ledges, except a few water rights. Of this number there are about thirteen, either one of which is considered of more promise than the famous Union of Cerro Gordo at the same stage of development. Taking the mines in the aggregate, there is abundant evidence that the bullion productions of New Coso can easily be made to more than double that of Cerro Gordo at any period up to the present. The ores, likewise, assay much higher, and are fully as easy of extraction, while the locality and the several mines are much easier of access.

MARIPOSA COUNTY.

FIRST SHIPMENT TO THE NEW MINING CAMP.—*Mariposa Gazette*, Dec. 26: The first shipment of supplies for "Reynold's Cove" passed through Mariposa on the "Flying Dutchman" prairie schooner last Tuesday, being 5000 pounds of freight. It consists of provisions, mining tools, a general assortment of supplies necessary for the commencement and prosecution of mining and other projected enterprises at the new locality.

REYNOLD'S COVE.—This place is situated on the main or middle fork of the Merced river, across the divide and opposite Hite's Cove, named from the discoverer of the celebrated Hite mine. From the statements of Mr. Angeline Reynolds, which are confirmed by the official map of County Surveyor Thomas, it appears that all the quartz veins cropping out at Hite's Cove are pitching at an angle of 35 to 60 degrees toward the main river—it being, in an air line, about a mile and a half from river to river; consequently, a tunnel run in from the main fork, commencing at a point about 2,000 feet from the river, as contemplated by the Reynold's company, would cut several veins of rich ore within a distance of 1,500 feet. At the adit or mouth of the proposed tunnel is an outcrop, of about 60 feet in length, of a vein showing a thickness of two feet, upon which the company propose running and extracting ore forthwith. In connection with the mining location the company has secured a water right and mill privilege, which, in point of convenience and advantages, cannot be excelled in any of the mining districts of California. Mr. P. C. Learned, the managing agent of the company, has been purchasing a complete outfit of supplies necessary for going on with the contemplated work, which will probably be commenced on or about the first day of January. With the favorable adjuncts of an abundance of wood and timber and an excellent water power, together with an excellent outlook for extracting paying ore, the prospect is rather encouraging.

MENDOCINO COUNTY.

THE AMARRILLO MINE.—*Napa Reporter*, Dec. 26: John L. Cook, the locator of the Oakland mine, writes us from Mendocino county, whether he has been called to superintend the opening of the Amarrillo mine in that county, and from which he has had the glory of ship-

ping the first flask of quicksilver ever sent from that county. The mine is owned by Mr. Wise, a capitalist of Cloverdale, and bids fair to turn out a very remunerative one to its proprietor, especially, we think, as he is so fortunate in a superintendent. Three tunnels are already in, and the developments of rich cinnabar are large in each. They have one retort up, and will shortly erect more. This new district is showing some fine ledges, and many claims are being located, with every prospect of proving as rich as those in Lake, Sonoma or Napa county. The Amarrillo mine is situated about twelve miles north of Cloverdale, on the Ukiah road.

NAPA COUNTY.

MINING ITEMS.—*St. Helena Star*, Dec. 24: We have the following from a friend, who has just returned from a visit to Pope valley and its mines of quicksilver. The Phoenix has dropped into a No. 1 deposit of ore, of a character before unknown in the mine. It is rich cinnabar, interspersed with native quicksilver to a large amount. On the part of the Etopa mine, they are for the present at rest as regards the furnace, but are getting ready to work their rich deposits in the early spring, both in the Valley mine location and also in the Silver Bow, where they have a large body of extra ore, as good as any that has ever been worked in the course of mining done in that valley. Geo. Porter and Harry Vivian have a splendid prospect on the Out hills at the head of James creek, and from specimens in our possession we judge they are all right. They have now two sixty foot tunnels and good bodies of ore in both.

CALISTOGA MINES.—Mr. Stuart, of the Knight's Valley ranch, is going to work on a new plan to save the disintegrated cinnabar at the Yellow Jacket mine. It is nothing more nor less than hydraulic mining just as they work placer diggings for fine gold. Everything will be ready for a trial of the machine in a few days, and then down comes the mountains in the vicinity of Stuart's ranch. This is, as we understand it, an entirely new thing in quicksilver mining, if successful, will be the inaugural of a new era in that branch. Calistoga has reason to be proud of her success as a mining town. During the month of November there has been shipped from this place over 40,000 pounds of quicksilver, and, as yet, the business has only begun.

NEVADA COUNTY.

NEW YORK HILL.—*Foothill Tidings*, Dec. 25: Last Friday night after our issue had gone to press, a rich strike was made in the New York Hill mine. Pay rock has been coming out all along for three or four hundred feet in the lower tunnel. This strike was made in a cross-cut from this tunnel and at a point beneath, on the incline, a body of good ore in the upper tunnel. Here are several hundred feet of good licks that may be considered "in sight," and as the richest of the rock now found was at the bottom, there's something big to go for below. On Saturday we examined a lot of specimens, weighing a hundred pounds or over, taken from the first car load of the strike, and placed on exhibition at the banking house of A. Delano. It was nearly all so filled with gold as to be more valuable for jewelry than for milling. The lot was estimated to be worth from \$1,500 to \$2,000. Much fine ore has been taken out since, and the mine is now considered past all doubt as to its future. The benefit to Grass Valley of this assurance of a good mine in New York Hill, may be better appreciated after reading over the Idaho reports in this number of *Tidings*.

Too cold for quicksilver to work well in amalgamating; the gold—in the news from above and throughout the county. As we intimated last week, an early supply of water is seldom advantageous, as, for the reasons above given, miners can't work much before February.

The Omaha mine is said to be turning out good milling rock from a fair sized ledge, and the stockholders feel in good spirits.

NEW QUARTZ MILL.—*Nevada Transcript*, Dec. 25: Hon. Jack Pelham and Mr. McDonald, of Grass Valley, some time since bought the Gaston Ridge mine, located midway between Washington and Eureka, in this county. The ledge was worked several years ago, and although the rock was good, it failed to pay dividends, from the fact of the imperfect facilities for working the rock and saving the gold. The present company have, during the past two months, had a new ten-stamp mill erected, and will thoroughly test the mine. We are informed by Mr. T. Looney, who will take charge of the mill, that the ledge is large and the rock looks well. The mill is completed, but will not start until after New Years. There is a large number of ledges in the vicinity of this mine, and if it pays will be the means of starting up work on many of them.

PLUMAS COUNTY.

NEW PLUMING OPERATIONS.—*Plumas National*, Dec. 16: Mr. Charles Hambley informs us that a company has been organized to work Soda creek, above Soda bar, and work has already been commenced. They will start at the river, put in a four-foot flume, and clean the creek as they go. The company will put up a portable sawmill, which will be used for manufacturing flume lumber, blocks, etc., and also to furnish the general demand for lumber in that section. Soda creek is thought to be very rich in places, and the new company propose to "sweep it clean."

SAN LUIS OBISPO COUNTY.

CAMBRITA ITEMS.—*San Luis Tribune*, Dec. 19: The quicksilver interests still increases. Sev-

eral parties are here from the city in search of mines; among whom is our former townsman, George Mowatt. George is a lively lad, and evidently means business. Some parties are negotiating for the Gibson and Phillips. This mine has one of the finest prospects in this district. The company have, however, been very unfortunate in allowing third-rate men to dabble with its mine.

SIERRA COUNTY.

SLOC CANYON.—*Mountain Messenger*, Dec. 26: The owners of Sloc canyon quartz mine have engaged a force of men to put their tunnels in order. There is undoubtedly a fine body of ore in this mine, if it were only properly developed. A tunnel not to exceed 400 feet in length, would top the ledge several hundred feet in depth.

ORO.—A considerable amount of stock in the Oro Gold Mining company has already been sold to parties in this place. There is no doubt but that enough will be disposed of to enable the building of a suitable mill. The company has a large amount of ore in sight, ready to be taken out when they have any way for reducing it.

CLAIM SOLD.—Col. Baker, of Gardiner's Point, has sold his mining claim, including the Pioneer ground and several other claims, making the purchasers sure of having one of the best hydraulic mines in the State.

CHINA MINING.—The China companies, three in number, are doing well.

NEW PROSPECT.—Henry Von Millen has struck a good prospect on Lafayette ranch.

Nevada.

WASHOE DISTRICT.

PHIL SHERIDAN.—*Gold Hill News*, Dec. 24: West drift in to-day 155 feet from the shaft. The face of the drift has been driving into blue clay and quartz the last few days, with a constant increase of the quartz, and yesterday afternoon still more favorable material was met with. In the upper tunnel of this mine, 750 feet above the level of the present workings, a large strong vein of solid quartz or low grade ore was developed, and this lower drift is probably about cutting the same vein.

CONSOLIDATED VIRGINIA.—Daily yield, 425 tons. The ore breasts of the 1300 and 1400-foot levels, especially the latter, are looking splendidly. The winze below the 1550-foot level is sunk to a depth of 72 feet. This winze is now passing into the western formation, leaving the ore body to the eastward. The north drift on the 1550-foot level is advancing toward the northern boundary line through ore of the highest grade. On the 1500-foot level, cross-cut No. 1 has already penetrated the ore body a distance of 65 feet. The quality of the ore exposed in this drift is very fine for the entire length of the opening. Cross-cut No. 2 on this level is extended 265 feet through ore of steadily increasing value, and has not yet reached the east wall. Throughout the mine the ore stopes are yielding well and the quality of the ore is rich.

HALE & NORCROSS.—The prospecting operations in this mine are confined to the lowest levels—the 2000 and 2100-foot levels. On the 2000-foot level the cross-outs have been carried almost entirely across the ore vein without exposing good ore in sufficient quantity to justify its extraction. On the 2100-foot level the north drift is advancing in the ore vein, and is now approaching a locality in which ore is supposed to exist.

JULIA.—The shaft is now being sunk at the rate of 4 feet per day. It is now 1113 feet deep and the bottom in excellent working ground requiring no blasting, the material being quartz, porphyry, and clay.

FLORIDA.—Sinking at the bottom of the shaft is resumed and making good progress, the ground working well and water not interfering. The machinery works excellently, but a heavier engine, with the requisite boiler, is ordered for deeper working.

SAVAOR.—Sinking the main incline makes the usual good progress, and some little improvement is noticeable in the prospecting developments at the 2000-foot level.

GOULD & CURRY.—On the 1700-foot level the north drift is advancing to unite with the winze in order to improve the ventilation, and thereby allow of the thorough exploration of that level. The volume of water flowing from the east drift on the 1500 foot level does not increase and is easily removed.

JUSTICE.—The main drift is giving a fine showing of ore at present, with continued improvement. Excellent assays are obtained from the face, and very high ones from the west side of the drift.

ORIGINAL GOLD HILL.—The northwest drift at the 340-foot level has assumed a north direction, and shows low grade ore and porphyry in its face. A cross-cut east, from it, is now in six feet, and shows pretty fair ore in its face, which improves as further advance is made.

CROWN POINT.—Daily yield, 500 tons, from the old ore-producing levels. Nothing new in the way of ore developments in those sections; the breasts and stopes hold out excellently, and bid fair to do so for a long time to come. Prospecting is resumed at the 1500-foot level, east, in the south and middle cross-cuts, running farther east in order to see if pay ore cannot be found in that direction.

CHOLLAR-PODSOL.—Daily yield, about 50 tons per day. The old ore sections show improvement in quality, with plenty of ore in sight as yet. Average car samples assay \$30 per ton.

EAST BELCHER.—The large new three-compartment working shaft is being sunk at a good rate of progress.

YELLOW JACKET.—The drifts both north and

east at the 1740-foot level are making good progress, and the north winze below the 1740-foot level is considerably encumbered with water.

SUTRO TUNNEL.—Progressing at a very lively rate—about 15 feet per day. Rock works easily and water does not interfere. Those Burleigh drills do splendid execution. Total length of tunnel from mouth in header, 8013 feet to-day.

WOONVILLE.—The mill is kept steadily running on ore from the 200 and 300-foot levels, and new ground is being opened below the 300-foot level.

UTAH.—Grading for the new pumping machinery is progressing favorably. Sinking the shaft will not be resumed until the new engines shall have been placed in position.

BELCHER.—Daily yield 450 tons of ore. The drift east from the 1500-foot station of the main incline, to open that level, is also going ahead well. Sinking the main incline goes ahead as usual, and it is to-day 50 feet below the 1500-foot level. The new air shaft is down 220 feet from the surface, and the npraise portion of it, from the 850-foot level, is up 120 feet.

OPHIR.—Daily yield, 240 tons, from the ore breasts and stopes of adit between 1300 and 1645-foot levels, keeping 4 mills steadily running. The cross-cut from the winze below the 1645-foot level, near the California line, continues in splendid ore; in fact there is plenty of rich ore in sight in the Ophir, and all the cross-out and winze explorations simply go to show that the great bonanza extends downward and northward. The quality of the ore extracted during the past week was better than heretofore, giving much higher assays; therefore, the milling returns will be much better.

IMPERIAL EMPIRE.—The cross-cut at the 2000-foot level is apparently near the ledge. Occasional flows of hot water are met with, and the drift is kept well timbered in anticipation of any heavy body of water that might be tapped in cutting through the wall of the ledge.

ROCK ISLAND.—The indications thus far met with in this mine are very flattering, and show very plainly that depth only is needed to find a good body of pay ore.

SIERRA NEVADA.—Daily yield, 60 tons, principally from the old upper workings, keeping the company's mill running.

OVERMAN.—The 1100-foot station for a new level and drift to the ledge is now being opened. As soon as the 1100-foot station is well advanced, sinking at the bottom of the shaft will be resumed.

LEO.—The face of the north drift shows some stringers of very good ore, indicating that a large body of ore may be soon developed.

BALTIMORE.—At the 750-foot level the seams of quartz in the face of the drift are widening and give high assays.

SILVER HILL.—The face of the south drift at the third level is in fine looking quartz carrying considerable metal. The face of the south drift on the second level is in low grade red quartz ore the full width of the drift and still widening.

SUCCESS.—The pump has been doing effective service, and the water being lowered sufficiently, work is resumed in the drift.

LADY BRYAN.—New shaft down to-day 373 feet. The new pump is in place, and assists progress very materially. The drifts for the ledge are going ahead well.

CALIFORNIA.—A shaft has been started in connection with the adjoining mine, the Consolidated Virginia, at a point 1,040 feet east of the shaft of that mine. In the California, cross-drifts are now advancing towards the ore body on the 1400-foot level, at a point 200 feet north of the south line of the mine, and on the 1500-foot level, 100 and 200 feet northerly from that boundary. It is expected that the ore body will be reached by these transverse drifts early in January. The richest ore developments in the Consolidated Virginia are very close to the southern boundary of this mine, and their extent is yet undetermined.

MINT.—Sinking the shaft for another level is making good progress.

NEVADA.—The good yield of ore from the old chimney of the upper workings continues, and the face of the lower tunnel is in low grade ore.

MEXICAN.—The drift from the 1465-foot level of the Ophir to prospect this mine is going ahead, with nothing interesting to report as yet.

A New ledge with a very promising appearance has been found on the south-western side of the ridge back of Pioche. The owners are, Murphy, Jones & Co.

The necessary machinery for working the Amador quicksilver mine has been purchased, and will soon be put in active operation.

It is estimated that the shipments of bullion from Utah Territory the past year amounted to \$7,000,000.

A Bed of coal has been discovered on Chambers' creek, near Stellacom, Washington Territory.

An inexhaustible supply of potter's clay has been discovered at Whatcom, Washington Territory.

Advices from Banner mining district, San Diego county, say all the mills are running, and times are lively.

The South Mountain Consolidated Mining company have contracted for 3,000,000 bushels of charcoal.

The railroad company is negotiating for Moore & Parker's coal mine, near Carlin.

Development of the Iron Interest.

A project for the development of the iron interests of this State says the *Calaveras Citizen* has at last assumed definite shape, and as soon as the necessary arrangements can be perfected active operations will be commenced. A company of Eastern capitalists have purchased an iron mine in Shasta county, and their agent is now making preparations for putting up the necessary works for manufacturing purposes. The company propose to erect their works—rolling mills, etc.—in Sacramento, provided the city will donate a site. A meeting of the citizens of that place was held a few evenings since, to consider the matter, at which money enough was subscribed to ensure the purchase and donation of the location desired by the company. It is intended to manufacture steel rail as well as all other different varieties of iron for which there is a demand on this coast.

The successful prosecution of this enterprise will result in incalculable benefit to the State. Besides giving employment to a great number of skilled hands and laborers, it will be but the beginning of the development of an industry that is certain to become one of the leading interests of the coast. But few people have a correct idea of the quantity of iron annually consumed in this State. It is estimated that \$5,000,000 will not more than cover the yearly expenditure for that article—every pound of which is now imported—\$1,500,000 being paid out for the single item of nails. This vast amount of money is taken out of the State to pay for that which can and ought to be produced at home, a mode of doing business that for years has told heavily against the prosperity of California. The inauguration of iron manufacturing here will stop importation, in at least one very important particular, and encourage the building up of a general system of manufactures that the State can never reach its full measure of prosperity without. We are not yet wholly acquainted with the purposes of the Eastern company. We do not understand whether they intend transporting the ore to Sacramento for reduction, or whether they will make pig at the mine and work the metal, simply, in the city. The cost of transportation will undoubtedly have much to do with settling that question, which, however it may be determined, will in no way detract from the importance of the enterprise.

We regret that Calaveras was not selected as the initial point for iron making. This county possesses a number of advantages over Shasta for the prosecution of that business which the Eastern company must have overlooked in choosing their location. An analysis of the Shasta and Calaveras ores proves that the latter are the richer of the two, a fact that cannot be too strongly emphasized when it is considered that transportation is the chief item of expense connected with manufacture. There are unlimited quantities of hematite ores in this county that assay as high as sixty per cent. iron, while the best specimens from the Shasta field do not show above thirty-five per cent. This difference in the quality of the ore is an advantage in favor of Calaveras, that can be scarcely be over-estimated, and it is strange that so important a fact was lost sight of by those seeking the best place to engage in the manufacture of iron. Further than this, Calaveras is much more favorably located than Shasta for the successful production of iron, being nearer a market and closer to main thoroughfares of transportation. So far as the question of fuel is concerned no county in the State possesses advantages superior, if equal to Calaveras, and all other requisites for iron-making are to be had in abundance. While we are sorry that Calaveras is not to have the honor of making the first ton of iron produced in the State, we have all the faith in the world that the time is not far distant when the county's resources, in that respect, will be developed. The success of the Shasta enterprise will stimulate research, and the great advantages of this county cannot be much longer overlooked. Calaveras needs but the unfolding of its latent resources to place it in the front rank of prosperous counties, and we believe the development of the iron interest will be the first step taken in that direction.

BARTLETT CREEK.—The *Silver State* says of this district: At present there are one hundred or more prospectors in the district, nearly all of whom have interests in one or more mining locations. The hills abound in ledges, and new discoveries are made daily. A cut or trench 40 or 50 feet long at right angles with the course of the veins is certain to strike one. But few of them crop out on the surface, the veins generally being what are called by miners "blind ledges." Bartlett creek at all seasons of the year is capable of running six or eight ten-stamp mills, all of which can be built within a few hundred yards of each other, as the stream runs through a steep cañon and is exceedingly rapid. As a general thing the veins as far as developed are small but exceedingly rich. The town of Varyville recently laid out contains three saloons and one store. Mr. Merchant is of the opinion that the mines are permanent, and that Columbia district will be one of the liveliest in the country next spring. Eight or ten miles from Varyville is the newly located Saw Creek district.

The celebrated Jersey mine, in Jersey district, has been sold for \$31,000 to Sacramento smelting works. Jersey district is situated in Humboldt county, about forty miles southwest of Galeana.

Columbia District.

The following, from G. F. Harris, a practical assayer, relative to Columbia mining district, in this county, we find in the *Modoc Independent*, a new paper just started at Dofris' bridge, Modoc county, California: The 'Badger mine, owned by Messrs. Vary, Keating & Merchant, is fast developing into a valuable mine. The ledge has been tepped all along for a distance of 1,000 feet, and in each place exhibits a fine body of paying ore. Two shafts sunk on the ledge to a depth of about 60 feet only, strengthen the conclusion that the mine is one of immense wealth. An arastra belonging to the Badger has successfully worked 80 tons or more, yielding a return of about \$4,000, and the tailings which remain are of efficient value to pay for re-working. Mr. Vary has sold a one-third interest to a man named Bolinger, for \$7,500, and the last named gentleman has gone to San Francisco to procure a quartz mill, which he intends to put upon the ground at once, and his return was daily expected when I left (on the 15th instant). Mr. Johnson, from Silver City, as I was informed, was en route for the camp with his two-stamp mill, and has arrived ere this if he met with no mishap. Messrs. Geary & Mathews, of the Rosedale, No. 1, had made a good strike in that claim, and had shipped about one ton of ore to the Winnemucca mill as a test. Judging from several assays made of the rock by myself, I place its value at from \$40 to \$60 a ton. The Rosedale claim, No. 2, owned by Mr. Keating, Campbell, myself and others, is of very much the same character of ore as the claim described, and is beyond gainsay a true fissure. The vein has been uncovered at intervals of a few yards for several hundred feet, and shafts show it properly in its casing. The encasement of the vein on its eastern or hanging wall, is a soft micaceous granite which the gorge follows, while the western or foot-wall is a quartzose granite of a more stubborn nature. The gouge or vein ribbon that follows the hanging-wall, is a calyx patty or clay, which we are led to believe never exists except in true fissures.

The base metals, copper, galena and antimony, appear in small quantities, and the most remarkable feature of this ore consists in these metals always appearing separate and distinct from each other, and from the gold. The galena and antimony, however, seem to carry the greater part of the silver. Thus an expert can easily separate the free milling ore from the baser with his eye. There are several other claims which might be mentioned as of promising value, and in fact may prove the most valuable of all, but as the development of each has not gone far enough to admit of an opinion, I will in this connection only express a wish for their future prosperity.

New Oregon Mines.

An excitement is raging with regard to a recently discovered quartz ledge, situated in Josephine county, Oregon, at or near the junction of Galice creek with Rogue river. This place is a little to the west of Jacksonville, and distant therefrom about fifty or sixty miles. The Jacksonville *Times* has the annexed on the subject:

"The excitement consequent upon the discovery of the quartz mines at Galice creek seems to be on the increase. Several of our citizens have left for that section to see what prospect there is of 'making their pile.' Parties from other parts of the State are also arriving upon the scene, among whom are Judge J. H. Reed and W. H. West, of Portland. Judge Reed formerly owned some placer mines on the creek, but, we believe, sold them a short time ago. The ledge is of immense proportions, some saying it can be traced for twenty-five miles, while its width is estimated as high as two hundred feet, with a depth of 500 feet in sight. The assays of ore from this ledge, made by various assayers on this coast, speak favorably for its richness. We understand that it is the intention of Mr. Courtney, one of the persons interested, to ship lead for milling a few tons of this rock, so as to fully test its value and ascertain if the ore is refractory or not. This movement will be necessarily retarded some time, as, owing to the rough roads, it is impossible to do so now. Should these discoveries prove as rich and extensive as we have cause to believe, money will be more plentiful than ever before, for there is enough for all. Jackson and Josephine counties cannot be benefitted more by any enterprise than by the successful working of these mines.

PANCAKE MOUNTAIN COAL.—A large specimen of coal from Panake mountain was brought by G. D. Howell to this office to day. The specimen is of a good quality, and we should judge far superior to the Mt. Diablo article. It burns freely and leaves a clear, white ash. It is evidently a combination of anthracite and bituminous, and for the manufacture of coke is said to equal the best Pittsburgh candle coal. At the depth of 400 feet the vein is 34 inches in width, well defined and solid, and appearance indicate an extensive and valuable deposit. There are seventy-five tons already on the dump, and the pile is being increased at the rate of about four tons per day. Experiments in the manufacture of coke have been entirely successful, and arrangements are being made by the company for the manufacture of the article upon an extensive scale.—*Eureka Sentinel*.

City Mining.

The *Mountain Democrat* says: There are very few town lots in Placerville proper but have been mined out and filled in once, twice, thrice or oftener, but within the past week we have noticed quite a lively revival in this line. Chinese companies pay an agreed sum for the privilege of mining out a town lot, leaving the buildings thereon intact by underpinning and propping them up, and after the gold is all washed out the lots are filled up by turning in the water and depositing the sediment from other mines above. For these mining privileges in town lots, very respectable prices are sometimes paid. Companies are now at work in the lumber-yard lot of Jones & Co., lower Main street, in Limpinsel's lot, on Main street, above Bedford Avenue, and in the Burns' dwelling-house lot, on Main street, just above Limpinsel's. The privilege of mining the Jones lot sold for \$1,000; the same privilege on the Burns lot sold for \$350, and Limpinsel also obtained a good price, though he has not made it public. Negotiations are pending for a lot 107 by 167 feet at the lower end of Main street, \$2,000 being the present owner's bed-rock price. If the code and the law officers of the county would permit it, there are well posted old residents, principally business men, who would give a handsome sum for the privilege of mining out Main street from Jones' corner to the Central House, Coloma street, from the upper corner of our office to Main street, and Sacramento street from the corner of Main to a short distance above Dunn's blacksmith shop. This would include the width of the streets for a distance of about 300 yards. Responsible parties have offered \$10,000 for the privilege of mining out this ground, obligating themselves to leave the streets in an improved condition, with a large and substantial sewer the whole distance, which would much improve the adjacent property. From results obtained in digging cisterns and otherwise, those best qualified to judge are confident that not less than \$100,000 could be made in thus mining out the portions of streets above indicated.

Prospecting Northward.

Already are our prospectors pushing northward, as we a few days since predicted would be the case. Making the Ophir mine the center of the Comstock, there has as yet been but little real prospecting done to the northward. Southward we see lines of fine hoisting works extending a distance of two or three miles, while to the northward we have only the works of the Sierra Nevada and the Utah companies. These are the only companies north of the Ophir where steam hoisting works are in operation, and are the only companies that have shafts of any considerable depth. The grand rush of prospecting companies has always heretofore been to the southward. Now it seems that the north end of the lead is to be looked after. In taking a drive to the race-track, three miles north of town, yesterday, we observed men at work in several places. Even out beyond the toll house, where we turn from the Geiger grade to go down into the valley in which the race-course is situated, we saw men at work in long, open cuts, throwing dirt right and left, like so many gophers. They seemed bound to head off the big bonanza should it be found to be coming in that direction. Still, beyond these, were to be seen on the hill-sides signs of mining operations. Next spring we shall doubtless see work resumed and earnestly prosecuted in all the old shafts and tunnels, and some valuable discoveries may result. It is beginning to be apparent that just when we thought we knew all about the great mineral belt in which the Comstock lode is the principal feature, we knew next to nothing of the Comstock itself. Had we known three months ago what we now know, many of us might now be in possession of millions where we have not dollars. This being the case the work of sinking shafts and making explorations in the mineral belt should be encouraged. The surface looks the same to the northward, where men are now just beginning to dig, as it does over the Ophir, California and Consolidated Virginia claims. The ground that meets the eye as we walk over it looks equally common and valueless. In the silver-bearing belt valuable discoveries are liable to be made, even in excavating a cellar or digging a well.—*Enterprise*.

THE NEW MINE.—The new Mexican mine on the Comstock, though still a portion of the original Ophir ground, has no connection with the old mine of the same name, but is simply the north division of the Ophir. This heretofore comprised 1,275 feet, but it is now divided, giving the Mexican 600 feet, and the Ophir 675 feet. The Mexican has 168 shares to the foot, and Ophir 150, or 149 shares and a fraction to the foot. By this division, the holders of Ophir receive a stock dividend of one share of Mexican to each of their shares of Ophir. The Ophir has the cream of the thing, that is to say, it has all the ore thus far discovered and belonging to the recent rich developments; but this is expected to extend into, and perhaps beyond the Mexican. The name of the new stock as it appears on the quotations of the Board, has a familiar look to old residents, who remember the time when in describing the discovery of ore of the highest grade, it was only necessary to say "it is almost as rich as the Mexican."

Napa County Mines.

The *St. Helena Star* says: The year approaching to a close has been one of general prosperity to Napa county. The returns from the agricultural and new mining districts of the county have been of a much more satisfactory character than anticipated, which is well, because it is seldom that we get more of this world's goods than we expected. Crops of all varieties have been abundant, and prices, as a general thing, have ranged liberal and in some cases high, thereby acting as a blessing to the producer, and also standing off the backs of previous bad years, and encouraging him to make the coin "doat," conferring, as it were, to the community at large a general benefit. Indications for a continuance of our mining and agricultural prosperity, to say the least, are actually of that character, wherein one is apt to say "you flatter me." As yet there is no evidence to dispute the assertion; we have had copious rains, promising excellent pasturage; an important advantage to live-stock holders at this season of the year, while a large area of soil has been turned up for seeding, which, in many cases, has already been done. With the rains, common to this month, crops will get an earlier start, thus lessening the contingencies at the tail end of the season. The condition of things thus assured is an item of vast importance.

The mining industries of the county have, to no little degree, contributed to our general prosperity. By close figures we find that, since spring, there has been something like \$300,000 brought into the county in the shape of mining machinery, and that over \$2,000,000 of dollars has been paid to our mining population, much of which has found circulation in this county, in a general way benefitting everybody. Of course not directly, but like the air we breathe, we feel its life.

A knowledge of this state of facts inspires encouragement to all classes. The more plentiful supply of money has already the effect of producing lower rates of interest. One per cent. per month is now quite sufficient, where, last year at this period, one and a half ruled as easy.

The amount of building and improvements consummated and going on surpasses anything of the kind that has in one year been attempted, affording constant employment to mechanics and laborers at remunerative prices, which, in turn, has stimulated all branches of trade. Trade throughout the county was never on a more healthy basis. Merchants are laying in large stocks to meet the prospective demand of the holidays, and all this comes of the prosperity enjoyed during the year and the kind indications which foreshadow the next.

OF DOUBTFUL PRACTICABILITY.—The main feature of a new plan for raising sunken ships is closing hermetically the hatches and all openings in the upper parts, and then pumping down air through tubes inserted through the bottom. The air thus introduced rises toward the under side of the deck, and not being able to escape, presses the water down and out through the holes in the ship's bottom. The vessel by this means will be rendered buoyant and rise to the surface. It is obvious, however, that in order to insure success, it will be necessary to seal up the deck and upper part of the vessel so thoroughly that no air can escape. We do not believe that this can be done at moderate cost, and if it were done we feel certain that the straining and racking of the vessel would open the seams, let out the air and undo all that had been done.—*Indus. Monthly*.

BULL RUN AND CORNUCOPIA.—From Ben. Painter, a Nevada pioneer, who arrived here a few days ago from Bull Run, we learn the following: The Blue Jacket mill is rapidly approaching completion. The mine has been tapped by a tunnel several hundred feet lower than the old works, and at the point of intersection carries two feet of high-grade ore. At Cornucopia the new mill had steamed up for the first time, last Wednesday, though the mill will not commence crushing ore for eight or ten days yet. Painter came down for a load of provisions, and expects to start homeward tomorrow. He says the roads are in excellent condition.—*Silver State*.

FASTENING IRON IN STONE.—A writer strongly recommends the use of zinc instead of lead for fastening iron railings into stone. It is well known that iron cemented with lead is consumed by rust very rapidly and destroyed. The zinc, however, establishes a galvanic circuit with the iron, and being positive to the iron, constrains all the chemical action and becomes oxidized, while no rust forms upon the iron. With lead the opposite takes place. It makes also with iron a galvanic combination, but the iron being positive compared with the lead, it undergoes the chemical action, is oxidized, and protects the lead at its own expense.

MARKING TOOLS.—Much trouble can often be saved by marking tools with their owners' names, which can easily be done in the following manner: Coat over the tools with a thin layer of wax or hard tallow, by first warming the steel and rubbing on the wax warm until it flows, and let it cool. When hard, mark your name through the wax with a graver, and apply aquafortis (nitric acid); after a few moments, wash off the acid thoroughly, and wipe it off with a soft rag. The letters will be found etched into the steel.

GOOD HEALTH.

Washing Out the Stomach.

Dr. C. Ewald, of Berlin, describes a method of washing out the stomach, which, on account of its great simplicity seems likely to make the topical treatment of diseases of the stomach, especially in cases of poisoning, much more common: "A piece of ordinary India rubber tubing, such as is used for gas-lamps, about six feet long, is used. One end is rounded with scissors, and, if necessary, two holes are cut at a short distance from the end. This tube possesses quite sufficient rigidity to be pushed without difficulty into the stomach. To the outer end a funnel is fitted, into which can be poured either water or a solution of soda, etc., according to circumstances. If the contents of the stomach are to be removed the outer end of the tube must be sunk to the level of the pube, or even lower; then the patient must make a short but forcible contraction of the abdominal walls. By this means the tube is filled to its highest point with the contents of the stomach, and becomes a siphon; the liquid continuing to flow until there is no more, or till the tube is stopped.

This last seldom occurs, if the tube be of a moderate calibre. Should it, however, happen, or the abdominal pressure be insufficient to fill the tube in the first instance, or the patient be insensible, or any similar difficulty arise, it can, in general, be readily overcome by fitting a common syringe to the end of the tube, one stroke from the piston of which is generally sufficient to remove the obstacle.

THE HOURLY DEATH RATE.—Dr. Lawson, an English physician, has recently published some curious observations regarding the time of the day when the greatest and least number of deaths occur. He finds, from the study of the statistics of several hospitals, asylums, and other institutions, that deaths from chronic diseases are most numerous between the hours of eight and ten in the morning, and fewest between like hours in the evening. Acute deaths from continued fevers and pneumonia take place in the greatest ratio either in the early morning, when the powers of life are at their lowest, or in the afternoon, when acute disease is most active. The occurrence of these definite daily variations in the hourly death rate is shown, in the case of chronic diseases, to be dependent on recurring variations in the energies of organic life; and in the case of acute diseases, the cause is ascribed either to the existence of a well marked daily extreme of bodily depression, or a daily maximum of intensity of acute disease.

SIMPLE DYSPEPSIA REMEDIES.—Dyspepsia arises from a great variety of causes, and different persons are relieved by different remedies, according to the nature of the disease and condition of the stomach. We know of a lady who has derived great benefit from drinking a tumbler of sweet milk—the richer and fresher the better, whenever a burning sensation is experienced in the stomach. An elderly gentleman of our acquaintance, who was afflicted for many years with great distress after eating, has effected a cure by mixing a tablespoonful of wheat bran in half a tumbler of water, and drinking it half an hour after his meals. It is necessary to stir quickly and drink immediately, or the bran will adhere to the glass and become pasty. Coffee and tobacco are probably the worst substances persons troubled with dyspepsia are in the habit of using, and should be avoided. Regular eating of nourishing plain food, and the use of some simple remedies like the above, will effect in most cases quicker cures than medicine.—*Scientific American.*

NELATON'S TREATMENT OF BOILS.—A French medical journal says that Nelaton for more than 20 years prescribed the use of alcohol for the prevention of these smaller abscesses which are so common among young people and which so seriously impair the beauty of the face. It appears that this treatment is now extending. In speaking of boils and outward abscesses, and other inflammations of the epidermis and of the derma, he observes that as soon as the characteristic circular redness appears on any part of the body, whatever may be its size, with a point rising in the middle, making it a grayish white, a thimbleful of camphorated alcohol should be poured into a saucer; the palm of the hand should be wetted with it and this should be rubbed with gentle friction over the affected place. The fingers should be again steeped, and the friction continued as often as eight or ten times every half minute. The place should be well dried and before covering it up a little camphorated olive oil should be applied to prevent the evaporation of the fluid.

REN WALL PAPER DANGERS.—To the dangers due to the arsenic entering into the pigment used in staining green wall paper, must now be added others produced by coralline dye employed in the coloring of red hangings. It appears that the poisonous symptoms (extending to acute eruptions of the body, when under garments thus dyed are worn, and to eye diseases in papered rooms) are owing not directly to the coralline, since recent experiments have proved the substance to be harmless, but to an arsenical mordant used to fix it. This last acts as a poison, both topically upon the skin, through contact with garments, and also by its dust and vapors, disengaged from the stuffs which it colors.

Health and Marriage.

Mr. Francis Galton, of the Royal Institution (Eng.) in some late remarks before that body on the healthy nature of scientific work, made a brief allusion to the importance of regard to constitutional health on the part of parties contracting marriage. "It is positively startling," said Mr. G. in referring to certain special health returns, "to observe in them statistics of the strongly hereditary character of good and indifferent constitutions." He finds reason to believe that marriages of unhealthy men and women are not infrequent; and he adds: "These returns seem to show that the issue of such marriages are barely capable of pushing their way to the front ranks of life. All statistical data concur in proving that healthy persons are more likely to have healthy progeny; and this truth cannot be too often illustrated, until it has taken such a hold of the popular mind that considerations of health and energy shall be of recognized importance in questions of marriage, so much so as the more immediately obvious ones of rank and fortune."

Mr. Galton is quite right, and the truth which he thus puts forward is one of the highest importance. If people would only remember that for the most part they may choose whether their families shall be healthy, active and energetic, or not, much of the helplessness and misery which now afflict the nations of the earth would disappear.

HOW TO AVOID COLDS.—An editorial in the *British Medical Journal*, on catching cold, concludes thus: "The practical considerations which are the outcomes of this review of pathology of colds are these: Never wear wet clothes after active muscular exertion has ceased, but change them at once; to meet the loss of the body heat by warm fluids and dry clothes; to avoid long sustained loss of heat which is not met by increased production of heat; to increase the tonicity of the vessels of the skin by cold baths, etc., so educating them to contract readily on exposure, by a partial adoption indeed of the "hardening" plan; and to prevent the inspiration of cold air by the mouth by some protecting agent, as a respirator. We can readily understand how a respirator should be an effective protection against winter bronchitis in those so disposed.

USEFUL INFORMATION.

Reduction of Obesity.

An exchange says: "Obesity is made the subject of an interesting article in the *Journal des Connaissances Médicales*, by Dr. Corlieu. Dr. Banting's system of cure consists, as is pretty generally known, in abstaining from bread, butter, milk, sugar and potatoes; taking about five ounces of beef, mutton, fish, or bacon, for breakfast, with a large cup of tea without either milk or sugar, and with an ounce of biscuit or toast; for dinner, about six ounces of any fish except salmon; of any kind of meat exclusive of pork, and of any vegetables save potatoes. Game, fowls, pudding, champagne, port and beer, forbidden.

Another method is described in the article before us as tried by a physician, Dr. Philbert, who was himself the patient. At the age of twenty-six he weighed three hundred and ten pounds, and measured four feet ten inches around the abdomen. His sleep was heavy, his pulse irregular at seventy-two per minute, his appetite and digestion were good. Having placed himself under the care of Dr. Schiudler, at Marienbad, Bohemia, he treated him as follows: Get up at six in the morning; from half-past six to seven take three glasses (six ounces each) of the Krentzbrunn spring; from half past seven to eight, two boiled eggs and a cup of tea, and a small roll; from nine to ten, a vapor bath daily, the first perspiration being followed by friction with a gloved hand and a cold *douche*; the second by rubbing with a soft flesh-brush; the third, by flagellation with a bundle of poplar twigs with their leaves on, then a second *douche* of cold water. On leaving the bath rubbing the body with vinegar. After the bath, a walk. At eleven A. M., two dishes of meat or fish, one of vegetables, boiled fruit without sugar, half a bottle of wine, and two small rolls. From noon to six a permanent stay in the forest surrounding the town, walking as much as possible without fatigue. At six, a dish of cold meat, boiled fruit as above, half a bottle of wine and a roll of bread. A walk after this dinner. At eight, shampooing with soap; half an hour later to bed. Morning and evening, five alkaline pills.

The treatment lasted six weeks, at the end of which he had lost thirty-five pounds. He then continued the cure at home, with the Marienbad waters for a fortnight, and afterward went to Fontainebleau in order to eat two pounds of grapes gathered on the spot, every morning fasting. At the end of two months he had reduced his weight to two hundred and fifty-six pounds, and has since come down to one hundred and eighty pounds, enjoying excellent health.

NATURAL ANTISCORBUTICS.—General Sherman says that the *agaya Americana*, or Spanish bayonet, the fruit of the common prickly pear, and the succulent leaves of some of the varieties of the cactus that abounds on the deserts of Texas, New Mexico and Arizona, furnish excellent specifics for that horrible disease, the scurvy.

Structure of a Cow's Horn.

It is very frequently the case that in the commonest, most uninviting of objects, we may see (if we like) beautiful examples of engineering skill. A few days since, says Mr. Frank Buckland in *Land and Water*, I was inspecting the large tanneries of the Messrs. Hamlyn at Buckfastleigh, on the River Dart, Devonshire. In one of the back yards was a mountain of the skulls and horns of cows of all sorts and kinds. Here there was a treasure worthy of investigation; so I got on to the mountain of horns and skulls, and picked out some beautiful specimens which Mr. Hamlyn kindly gave me, in order to make sections, etc. I find that over the brain of the cow a strong roof of bone is thrown in the shape of an arch, so as to form a substantial foundation for the horns. This roof is not solid, but is again strengthened below by a series of bony arches, that are so distributed as to form a series of hollow chambers, thus forming a structure uniting strength with lightness.

The problem now is, how to fasten the horn on each side on to this buttress. The horn itself must of course be formed of horn proper, i. e., hardened hair. In the rhinoceros, we find a horn composed entirely of a solid mass of what is really a bunch of hair agglutinated together; but this kind of horn would have been much too heavy for the cow's convenient use. What is to be done? Why, hollow out the center of the horn of course; but stay—this will not do, because how is the horn to be supplied with blood-vessels?—in fact, how is it to grow? Let us see how it is done by the great Designer.

Cut the horn right across with a saw, and you will find inside another horn, only made of bone. If the section is made about one-third of the way down the length of the horn, you will be able to pick out a piece of bone in the shape of a cone, on which, or rather round which, the horn proper has shaped itself. This bone fits the cavity with the greatest accuracy; it is as light as the thinnest paper, and yet as strong as a cone of tin. It is everywhere perforated with holes, which in life contained the nerves, the veins and arteries, and we know a cow has all these in her horns; nerves proved by the fact that cows do not like their horns touched, and that they can scratch a fly off their hides with the top of the horn; arteries and veins, proved by the fact that a horn when broken will bleed, and that the horn of a living cow feels quite warm when held in the hand, besides which the nerves and arteries form a union between the internal core of bone and the external covering of horn proper.

If we now cut the rest of the horn into sections we shall find that the inside of the bony part is really hollow, but that very strong buttresses of bone are thrown about every inch or so, across the cavity of the horn in such a manner as to give it the greatest possible support and strength. I have cut a cow's horn and skull into several sections to show these buttresses of bone, and now that the preparation is finished I have another specimen to show that there is design and beauty in all created objects.

Chinese India Ink.

Although the Chinese prepare their ink from the kernel of some amygdalaceous fruit, yet, by the aid of our present chemical appliances we are able to produce a composition in no way inferior to the best Chinese ink, by the adoption of a formula which is given in Riffault's treatise on the "Manufacture of Colors." The following is the formula:

Calcined lampblack, 100 parts; hoghead shale black, in impalpable powder, 50 parts; indigo carmine, in cakes, 10 parts; carmine lake, 5 parts; gum arabic (first quality), 10 parts; purified oxgall, 20 parts; alcoholic extract of musk, 5 parts.

The gum is dissolved in 50 to 60 parts pure water, and the solution filtered through a cloth. The indigo carmine, lake, lampblack and shale black are incorporated with this liquor, and the whole ground upon a slab with a muller, in the same manner as ordinary colors; but in this case the grinding takes much longer. When the paste is thoroughly homogeneous the oxgall is gradually added, and then the alcoholic extract of musk. The more the black is ground the finer it is. The black is then allowed to dry in the air until it has acquired sufficient consistency to be molded into cakes, which in their turn are still further dried in the air, out of the reach of dust. When quite firm these cakes are compressed in bronze molds, having appropriate designs engraved upon them. The molded ink is then wrapped in tinfoil, with a second envelope of gilt paper. The ink which has been prepared in this manner possesses all the properties of the real Chinese article. Its grain is smooth; it flows very well, mixes perfectly with many other colors, and becomes so firmly fixed to the paper that other colors may be spread over it without washing it out.

USEFUL INFORMATION.—It is sometimes useful to know how to dissolve silver without attacking copper, brass or German silver, so as to remove the silver from silvered objects, plated ware, etc. A liquid for the purpose is simply a mixture of nitric acid with six parts of sulphuric, heated in a water bath to 106 deg. Fah., at which temperature it operates best. By this means the old silver attached to plated ware, old daguerreotype plates, etc., may be removed and saved without necessity for wasting acids in dissolving a large amount of useless metal.

Domestic Economy.

How to Cook Turkeys and Chickens.

ROAST TURKEY.—A turkey should be well singed and cleaned of pin feathers; then draw the inwards. Be sure you take everything out that is inside. Dip the turkey into cold water; clean the gizzard, liver, heart and neck; let all soak one hour if you have time. Wash all very clean; wipe the turkey very dry inside and out. Make a dressing of two cupfuls of bread crumbs, one teaspoonful of salt, two large spoonfuls of sweet marjoram, two spoonfuls of butter, one egg and mix them well together. Cut the skin of the turkey in the back part of the neck, that the breast may look plump; fill the breast with the force-meat and sew it up. If you have any more force-meat than is required for the breast, put the remainder into the body and skewer the vent, tie the legs down very tight, skewer the wings down to the sides, and turn the neck on to the hank with a strong skewer. Baste with salt and water once, then frequently with butter; fifteen minutes before dishing, dredge with a little salt and flour, and baste with butter for the last time. This will give a fine frothy appearance and add to the flavor of the turkey.

To make gravy, put the gizzard, neck and liver, into a saucepan with a quart of water, a little pepper, salt and mace; put it on the fire and let it boil to about half a pint. When done, braid up the liver very fine with a knife, and put it back into the water it was boiled in; then add the drippings of the turkey and a little flour, and give it one boil, stirring it all the time. Dish the gizzard with the turkey. Allow twelve minutes to a pound for the time to roast a turkey. A turkey weighing ten pounds requires two hours to roast with a clear fire, not too hot. Turn the spit very often.

Boiled turkey is prepared the same as for roasting, except in the dressing. Put in pork, chopped very fine, instead of butter. In trussing, turn the wings on the back instead of the sides, as for roasting; flour a cloth well, pin up the turkey tight, put it into boiling water where one or two pounds of salt pork have been boiling for some time; let this boil with the turkey; and dish the pork with the turkey on a separate dish, with some parsley. Serve with oysters or celery sauce. A turkey weighing eight pounds requires an hour and a half to boil.

ROAST CHICKENS.—Dress and roast the same as a turkey. A pair of chickens weighing six pounds require an hour and a half to roast. Make the gravy the same as for a turkey, except the mace, which is to be omitted.

BOILED CHICKENS.—Dress and boil the same as a turkey. Some cooks do not stuff boiled chickens or turkeys; but the dressing adds as much to the boiled as to the roast. Pork boiled with chickens is very necessary. A pair of chickens require from one to two hours to boil, depending upon the size and age.—*Ohio Farmer.*

BLOWING MEAT.—Dr. Yeld, medical officer of health for Sunderland, England, has presented a memorial to the health committee of that town against the "blowing and stuffing of meat." The practice of "blowing" is described as follows: "A tube or pipe is thrust under the skin of the meat, and the butcher or dresser then blows the foul air from his own lungs into the cellular tissue of the meat, the effect being that a deceptive appearance of plumpness or fatness is given to the meat, and in many cases it becomes tainted with the smell of rum, tobacco, etc." This is pleasant for consumers of meat, and where ignorance is bliss, it is perhaps folly to be wise; and now that public attention has been called to the "blowing" practice, it might perhaps be as well for butchers to meet the wishes of the fastidious so far as to use a pair of bellows for the purpose of giving a graceful contour to the carcasses of animals they kill. Even for their own sakes they will act prudently by discontinuing the use of their lungs in the process.

CHOCOLATE CARAMELS.—Take one pound of sugar, one-fourth pound of chocolate, one tablespoonful of milk, one also of molasses. Grate the chocolate and mix with sugar, etc. Put the mixture in an iron skillet on the back part of the stove, where the heat will slowly melt it. Cook slowly, stirring it well. To ascertain when done, take a little in a spoon and drop it in a cup of water; if done, it ought to sink in a solid mass, and in a few minutes be firm. When you have decided that it is cooked enough, grease a long cheese-cake tin with butter; pour in the mass and spread evenly. Before too cold, cut in small squares.

BREAKFAST INDIAN CAKE.—Take as much meal as may be required, scald it partially; then take some drippings of lard and warm water—melt the fat with it; then take the meal and mix it with milk to the proper consistency; add a little salt and a beaten egg, or the egg may be omitted; bake on the griddle, and you will have an excellent cake.

WATER CAKE.—Take four cups of sifted flour, two cups of white sugar, half a cup of butter, two eggs, and one cup of water. Turn the water over the butter, stir the sugar into it, add the eggs well beaten. Dissolve a small teaspoonful of saleratus in a little boiling water; stir it in; mix two spoonfuls of cream of tartar with the flour. Nutmeg, lemon or mace for the flavoring.



W. B. DEWEY.....SENIOR EDITOR.

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San Francisco:

Saturday Morning, Jan. 2, 1875.

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[Business Notice.]

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A QUERY.—Would it be practicable to construct an apparatus which would automatically imitate the sounds of a telegraphic instrument? Some who read this may be already aware that messages can be sent very rapidly by means of perforated patterns, punctured to correspond to the dots and dashes used in telegraphy. If some inventor will be ingenious enough to apply this principle, or some other, in such a way as to get up a self-acting sonnder which will repeat any given message that may be arranged for it, imitating the sounds made by a good operator; such a sonnder could be made very useful to students in telegraphy. By its use students could, at their own homes, soon become familiar with these sounds. It would greatly aid in removing one of the chief difficulties in the way of becoming a "sonnder" operator.

A CLEAN-UP at the Chile Gulch hydraulic, Calaveras county, last week, realized \$21,000.

The Idaho Mine.

The Idaho mine, Grass Valley, is owned by a few people and worked on strict business principles as all mines should be. It is not known in the stock market, and is not listed in the Board. For this reason no quotations of its value appear in the newspapers, and very little is heard of it except reports of progress in the Grass Valley newspapers. The mine is owned by a "close corporation," has its offices in Grass Valley, and is not known on California street. The 35-stamp mill, hoisting works and machinery are the best in the district, and the mine is in a generally prosperous condition. The mine is a sample of many others in this State, worked by private companies, which greatly increase the billion product, and of which no record is made of profits. In the published statement of dividends, etc., each year, no mines are mentioned except those on the stock list, and mines like the Idaho are totally ignored. Nevertheless, the Idaho has paid from 1869 to 1874 the sum of \$1,602,750 in dividends, making a profit of 517 per cent. during that time on the capital stock. Since 1869 there have been 65 dividends paid, as follows: In 1869 11 dividends were paid, equal to \$170,500, or 55 per cent. on the capital stock. In 1870 the mine paid seven dividends, equal to \$37,500, or 12 per cent. In 1871 it paid 12 dividends, equal to \$232,500, or 75 per cent. In 1872 it paid 11 dividends, equal to \$162,750, or 52½ per cent. In 1873 it paid 12 dividends, equal to \$682,000, or 220 per cent. In 1874 it paid 12 dividends, equal to \$317,750, or 102½ per cent. This makes a total of \$1,602,750 in dividends, or 517 per cent on the capital stock in six years.

There are few mines which can show a better record than this when the percentage of profit is considered. There are only 3,100 shares in all, and the owners realized a profit this year of \$102.50 per share. The report of the officers of the mine as published in full in the Grass Valley Union is quite interesting, as showing the relative expenses and profits of working the mine. During the year they crushed 28,801½ tons of rock, of which 1,942½ tons came from the 400 level; 1,886½ tons came from the 500 level; 5,581½ tons came from the 600 level; 16,433½ tons came from the 700 level; 1,594½ tons came from the 800 level, and 963 from the shaft. This gave a gross yield of 36,169 ounces of gold, \$631,190.56—217 tons of sulphurets, \$1,600; specimens, \$38.50; gross yield of tailings, \$10,959.25; gold from old copper, \$692.39. Total, \$664,811.20. Giving an average of \$23.40 per ton.

The superintendent states that during the year they have driven 1,149 feet of drift. This amount of drift has opened up more ledge than they have worked out, and he estimates that they have four years work of pay ore in sight. The following is a summary of receipts and expenditures:

EXPENDITURES.	
Mill and mining.....	\$233,662.20
Sulphurets account.....	4,436.50
Tailing do.....	1,288.50
McDougal concentrator.....	293.01
Burleigh drill.....	11,667.20
New pumping works.....	25,001.41
Repairing old shaft for pump.....	9,186.86
New steam pump for 200 level.....	1,685.02
Sinking main shaft.....	23,375.53
General account.....	24,270.99
Total expense of working mine.....	\$334,767.58
Dividends \$102.50 per share.....	317,750.00
	\$652,517.58

RECEIPTS.	
Cash on hand.....	\$ 10,297.10
31,167 ounces bullion.....	631,190.56
Sulphurets, worked and sold.....	19,243.35
Percentage from tailing.....	5,587.13
Pan rent.....	1,288.50
Old copper.....	992.89
Lease of surplus water.....	400.00
Specimens sold.....	38.50
Old rope.....	15.00
Total receipts.....	\$699,023.03
Expenditures.....	652,517.58
Cash on hand.....	\$ 16,505.45

On the mill and mining account the principal items were \$15,605 for surface labor, \$123,912 for underground labor, \$9,312 for foundry work, \$21,522 for lumber, \$4,055 for powder and fuse, \$5,220 for candles and oils, \$3,116 for quicksilver and \$6,000 for Superintendent's salary.

They sold 153 tons of sulphurets, and worked 64 tons, the latter costing \$1,600 to work by chlorination process. From the whole they got \$19,243. The Burleigh drill cost them \$11,567 of which the machinery cost \$7,800, freight and commission \$1,103, and masonry foundation \$2,168. The new pumping works cost \$25,000, of which the foundry work cost \$16,764.

Repairing the old shaft cost \$9,186, of which \$7,217 was spent for labor; sinking the new shaft cost \$23,375, of which \$16,886 was for underground labor and \$2,652 was for surface labor. The State and county tax on the mine for the year was \$15,200.

The receipts from all sources, according to the report of the Secretary, were from December, 1873 to December 1874, \$658,725, which,

with a balance on hand December 1st, 1873, shows assets for the year of \$669,023. The total expenses including dividends for the year, were \$652,517, leaving a balance in the treasury December 1st, 1874 of 16,505. In these expenditures are included 12 dividends amounting in all to \$317,750 for the year.

In reviewing the operations of the mine for the year, it will be seen that the yield of the rock has not been so much nor the dividends so large as last year. Still it has been very good, and the dividends very handsome. The pumping capacity of the mine has been increased, and in carrying that out the old shaft has been straightened and retimbered, and this work is still in progress. The engine is 20 inch diameter and 42 inch stroke. The surface machinery is all set on solid masonry, and all its parts are deemed sufficiently strong and capable of standing any work that may be required of it for many years. The Superintendent says: The underground work has been pushed ahead with due diligence, and having in view the importance of keeping the mine well opened, work has been constantly going on in the drifts and in the main shaft. The shaft is down 75 feet below the 800 level. The ledge is somewhat broken up, thus rendering it necessary to carry away large shafts, as well as to make it more expensive. The quartz seems to be improving, and it is thought it will form a solid ledge before reaching the 900 level. The 800 west level is in 116 feet from the shaft, but little rock has been taken from the backs. This is an average quality of rock. Also the 800 east is of average grade ore, and the drift is in 109 feet from the shaft. The 700 west drift is in to within 35 feet of the Enreka mine, and a few months more will exhaust the backs. The 700 east drift is in 424 feet from the shaft, and the backs are worked through to the 600 level 233 feet from the shaft. The 600 south drift is in 803 feet from the shaft, or 322½ feet from the split. The ledge is exhausted in the drift, and it is low grade ore in the backs. The north branch is in 421 feet from the split, and 901½ feet from the shaft. The ledge has been very small, it is now opening out larger, but it is low grade ore; however from indications it ought to come in better. The rock in those backs is good mill rock, and it is worked through to the 500 level 341 feet from the shaft. The 500 backs is of an average quality; they are not yet worked through to the 400 at any point. The 400 is exhausted.

At the annual election held on the 21st of December, the following Trustees were elected for the year: Edward Coleman, John C. Coleman, M. P. O'Connor, Thomas Findley and John Polglase. The Board organized with the following officers: Edward Coleman, President and Superintendent; Geo. W. Hill, Secretary; Thomas Findley, Treasurer.

Shell Mound, Oakland.

Some two miles to the northwest of Oakland city hall, a few rods from the shore of the bay, on the farm of Mr. Wiard, stands an aboriginal mound. Well-grown willow trees effectually conceal it from view until you arrive quite near it. The accompanying sketch was taken when the tops of many of the trees on the south side were cut away. These have now so luxuriantly grown as to embower the tumulus, and shut out the view on the side of approach. It is called the "Shell Mound," from the fact of its being composed chiefly of marine shells and some gravel. It rises a sharply defined pile from the surface of a uniformly level plain of rich, alluvial soil. Without exact measurement it is estimated to be near thirty-five feet high. It is a circular, conical pyramid, with a truncated or flat summit, which measures 150 feet in diameter, and 300 feet at the base. Bones, skulls, stone mortars and charcoal, have been found in and about it.

That it owes its existence to the barbarous energy of human beings is self-evident. Abbo Domenico, speaking of Indian mounds on the Pacific coast, says they are often made from the adjacent soil, and hence near them is observed wells or pits from which the earth has been taken to erect them. Such an explanation does not apply to the Oakland mound, for there are no pit holes in its vicinity, and if there had been, which by the agency of the elements and time became filled up, that alluvial soil could not furnish the shells of which the mound is mainly composed.

Shell mounds are numerous on the Pacific coast, and they abound in profusion in Denmark. Danish archaeologists call them "kjokkenmoddings," or "kitchenmiddens," and regard them as the accumulated remains of the repasts of by-gone inhabitants. We know not how the people slept, but these crumbs tell us what they ate and where. Such mounds have grown into existence by accident and without object. A like "kitchen midden" keeps subordinate company with the subject of our sketch, only a few rods east of it. This is a beautiful, round topped knoll, some 12 feet high and 400 feet basic diameter. On this most reliable spot of always moist, mellow mould, Mr. W.'s dwelling-house stands surrounded with choice shrubbery.

They are digging away and otherwise preparing to put in place at the Consolidated Virginia hoisting works a new engine for forcing air down to the mine.

Hydraulic Mining in California.

No. 6.

The Chimney.

The advisability of extending the tunnel well into the basin before "tapping" the latter cannot be disputed. If a shaft or incline has been sunk to the depth of the channel or basin, the terminus of the tunnel can be decided upon according to the knowledge gained. Whenever this point is reached, it will be necessary to pierce the bed-rock intervening between the terminus and the gravel deposit in the channel, by a "chimney"—either a vertical shaft or a slope. This chimney must be started in such a direction as to strike the bottom of the shaft or incline. Should water have collected in the latter it must be removed by pumping before a connection is made. Want of care in this matter has caused much lamentable loss of life.

Chimney Without Shaft.

Should, however, no shaft or incline exist, and should this condition of the gravel bed overhead be unknown, the greatest care must be taken in making the attempt to break through.

As before remarked, great bodies of sand lie in the sloping rim-rock, before the solid bottom gravel is reached. This sand is in connection with loose gravel deposits overhead, and becomes quick under the great pressure of water which always exists in deep gravel deposits. (See Fig. G.) Whenever these sand patches are entered without the greatest precaution, immense rushes of water, sand, and loose gravel will occur, filling often the largest tunnels in a few minutes. There are cases on record where the labor of two or three years was lost, the greatest portion of the tunnel being necessarily abandoned, and a new direction, to the right or left, pursued. When, therefore, the attempt is made to run up a chimney from the terminus of the tunnel into the unexplored channel above, the work should be commenced in the right or left of the terminus, and be continued on a convenient slope. The experienced miner will know, whenever the water increases in the seams of the rock, or when the seams turn yellow, or the rock changes to a softer stratum, that the basin or channel may be only a short distance above. When these signs occur, it is advisable to drill a hole far enough to test the thickness of the rock intervening between the chimney and the channel. Should the drill pierce the rock, it is easy to insert a thinner and longer iron rod to feel the deposit above the bed-rock. If hard gravel is struck all will be safe, and the chimney can be continued without any apprehension; but if water and sand are found, and the iron rod enters readily for 5 or 6 feet, it will be better to abandon the chimney at once, and continue the tunnel. The presence of sand and water, or quicksand, indicates that the depth of the channel is not reached, and that the most valuable gravel deposits lie deeper, and at the same time forewarns the miner of a great danger, a rush of quicksand and loose gravel.

The diagram given herewith, representing a section of sloping rim-rock, and the different deposits as they occurred in fact, will explain itself.

The chimney, if hard gravel is reached, should be continued, as before stated, on a slope, as in this way the work can be more safely done than in a vertical shaft. This consideration may be of little importance, so long as the ground is hard and strong, but in softer strata, surcharged with water, a slope offers the only chance to proceed with safety to a certain point. When this point is reached, and a further progress barred, it is best to secure the terminus of the chimney in such a way that the water can drain off, without giving the sand, or loose gravel, a chance to run. After this careful survey must be made to ascertain the exact spot where a shaft from the surface down will strike the terminus of the chimney. This is an easy matter when the tunnel is straight.

Shaft.

A shaft with square section, (say 4 by 4 feet,) to permit timbering, must be commenced and worked down in the usual way, as far as circumstances will permit. If the drainage established through the chimney is sufficient to free the shaft from water, it will be comparatively easy to go through sand and gravel and connect shaft and chimney; but if this drainage cannot be established, or is not adequate, even with additional hoisting of the water by windlasses and buckets, it is best to procure an artesian borer, and to make thus a connection between the bottom of the shaft and the chimney. (The character of the ground excluding the existence of large pebbles or boulders, an artesian borer can be used to advantage.) After this the shaft can be brought down, but must be secured firmly against side pressure by good framing and planking.

First Washing.

The connection once made between shaft and chimney, sluice boxes may be laid through the tunnel, and the first washing of "dirt" may commence. This begins by removing the upper sections of timber out of the shaft, widening its mouth by pick, shovel, and water, and tumbling and running the "dirt" and water into it, always, however, taking care not to choke the shaft or chimney. This process is

continued downward, in the shape of steps, or terraces, as security against cavings or slides. It must depend on the depth of the shaft, as well as on the greater or less safety of the ground, whether a larger or smaller opening of the shaft is to be made, since dangerous cavings may occur in spite of all precautions. In this way an opening must be made to permit the use of water under pressure. It must be left to the manager of the mine to shape the chimney in such a way that an easy and uninterrupted discharge in the sluice boxes is secured.

If the main tunnel is to be continued farther it will be necessary to leave enough space between the starting point of the chimney and the face of the tunnel to admit blasting operations. At the same time precaution ought to

To avoid these dangers working in benches is resorted to, (see page 7), and the washing away of the upper strata thus serves three beneficial objects: first, in producing the pecuniary means in support of other works to be carried on; second, in lessening the depth of the shaft to connect with bed-rock tunnel; and third, in leaving a "bench" which, under all circumstances, will be necessary in a deep gravel mine.

—Condensed from an article by Charles Waldeyer, in the last Annual Report of the U. S. Commissioner of Mining Statistics.

A New Volume.

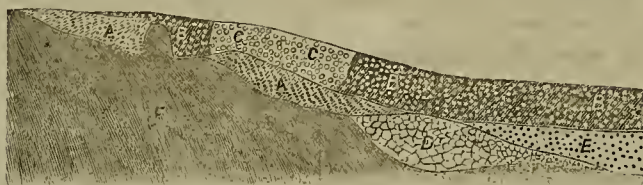
With this number commences Volume XXX of the MINING AND SCIENTIFIC PRESS. The pa-



SHELL MOUND, OAKLAND.

be taken to protect the blasters in the tunnel from any accident arising from the possible blockade of the sluice boxes or tunnel, and the only safe expedient will be to have not only a strong barrier between the blasters and sluice boxes, but also to have an independent way for ingress and egress. This may be secured by

Fig. VI.



A, quicksand; B, red gravel, (firm); C, loose gravel; D, moraine; E, blue gravel; F, bed-rock.

widening the chimney sufficiently to admit a strong water-proof box with a ladder, by which means the miner can reach the surface of the ground, without interference from either the washings or cavings of the gravel from above, or any blockade in the tunnel below.

It will be seen that the existence of a shaft

Fig. VII.



Gravel-bank, with three drifts; A B, bed-rock tunnel.

or incline, before the connection between the terminus of the tunnel and the basin or channel, is of great importance. If an incline exists, great facilities are offered to employ hydrostatic power from the lower part of the incline, as soon as a moderate opening is made to the surface.

Upper Workings.

Many mines are situated so favorably that the upper strata can be worked without any expensive bed-rock tunnel. In such cases it will be advisable, if circumstances permit, to commence the working of the upper strata at once, particularly if the gravel deposit has a thickness of two or three hundred feet. In this case a very useful and necessary work can be accomplished pending the construction of the deeper bed-rock tunnel; and perhaps a part, if not all, of the cost of the latter may be earned.

When the gravel bank rises to a greater height than 125 or 150 feet, the work in a hydraulic mine becomes very dangerous, as the momentum of any mass of matter falling from the high bank will carry it far into the mine, endangering life and property.

The Old Comstock.

The fortunate owners of some of the mines on this famous lode, who familiarly apply the "pet name" which heads these remarks, to the most wonderful lode in the world, have of late become more attached to it than ever. The "Old Comstock," so much belied, so badly misrepresented; the subject of thousands of articles and hundreds of sermons intended to induce people to abandon mining; the Old Comstock, which has held its grip through all, is coming out gruder than ever. Although the figures—which are never supposed to lie except in mining matters, when they are always supposed to misrepresent—show that the profits of the Comstock mines since the lode was discovered have been enormous. Every time the stock market fell we were told that the mines there were worthless; still the owners of the mines went on working and sinking regardless of all rumors or reports. They had faith in the Old Comstock, and their faith has been well repaid. They sunk shafts and winzes, ran levels and drifts, made inclines and tunnels, built hoisting and pumping works, put up mills and buildings, and continued to prospect and open up their mines in the face of all sorts of difficulties. The results have been most magnificent; their labor has been rewarded a thousand-fold.

The mines which have "struck it" have made fortunes for their owners and encouraged other mines to further development. The smallest and most insignificant mine on the lode may strike rich ore any day, and become famous. Some of the mines have worked out their ore bodies and are working on for others. Some, again, have been unprofitable and have been kept running by assessments. But still, when we compare the assessments with the dividends, as a whole, the dividends have a magnificent balance in their favor.

Aside from all questions of individual profit, there is one question which is seldom thought of, but which is of very great importance. If the mine simply paid expenses it would yet be beneficial to the country to have them worked. Thousands of persons are employed about them in one way and another, and immense amounts of money are distributed in the very channels where it is most needed, that is among the laboring classes. Why people should grumble because Mr. Jones, or Sharon or Hayward, or Ralston, or Flood & O'Brien, or a dozen others have accumulated large fortunes from these mines, we do not see. If these gentlemen have invested their money and received large profits, they are perfectly entitled to it. They are envied and abused by scores of people who wouldn't have the pluck to invest where there was not a sure thing, but who would like very much to come in for the profits without risk of loss.

They are not by any means the only ones who are prosperous on account of the profits of the mines. The farmers, millmen, teamsters, railroad men, foundrymen and mechanics of all kinds who are kept busy by the work on the Comstock, may be numbered by the thousands; of the fifteen or twenty foundries in this city which are now so busy, one-quarter would suffice if it were not for mining work. Artisans of all kinds are furnished with employment at good wages on account of these mines. A number of handsome and expensive buildings are going up in this city at present, which are being built with money made from the Comstock. These employ hundreds of men of different trades at fair wages and steady work. In fact the benefits are wide spread and general, causing prosperity in all branches of business and a hopeful feeling of its continuance.

Still, after all it has done and is doing, the Old Comstock promises us even more to come. It promises to increase its production and its dividends; to employ more men and to want more and heavier machinery; to turn the attention of the whole world toward the Pacific coast; to help build up the Queen of the Pacific more than it has ever done; to furnish capitalists with as much money as they want to invest in other directions; to give other countries a vast amount of experience in deep mining; to show other countries milling and mining machinery of dimensions and perfection never dreamed of; to call forth the inventive faculties of genius to aid in overcoming the difficulties attending mining on such a large scale and at such depths; to solve problems of ventilation by practice; to increase the resources of the coast; and to assist in bringing times of general prosperity to Nevada, California and the whole United States.

IT PAYS IN MORE WAYS THAN ONE.—It pays in more ways than one to take a good newspaper. If you read it, it is a benefit which lasts beyond death. If your family read it, they will be better companions for you and the world besides. It is a good representative of your community when sent abroad, and you can afford to support it for the value of its influence in the public weal.

The New Comer—1875.

How awkward the bookkeeper, the correspondent, and others who flourish the pen, feel in making the simple change of figures from '74 to '75! But it must be done; for time is "relentless" in small things as well as in more weighty matters. We accordingly make the imperative change, hoping that the "new broom"—1875—will really sweep a clean course for the PRESS, and that our intercourse with our subscribers and friends will be as pleasant when we remove it from the heading of our paper, as it is at the present time when we first place it there. We again wish our friends a "Happy New Year."

In Trinity county everything is dried up, and farmers and miners are waiting for rain.

Novices and Adobe Soil.

Eastern people before coming to California manifest a good deal of curiosity concerning our adobe soil; and one of the prominent points of their initiation into farm life here is becoming acquainted with this stubborn reality. We have on several occasions had inquiries from such parties for information on this subject. One of these, who confesses himself a novice in this respect, asks some general questions, which in answering we hope to benefit a class of careful, energetic, persistent men, who are well calculated to subdue this stubborn portion of our soil, and make the spots where it abounds places of enduring wealth.

The character of adobe soil varies materially in different localities; it is not safe, therefore, to accept any general system for treating this kind of soil. Particular care is needed in taking the soil when in proper condition to work. To work it when perfectly dry is simply impossible; and if it is plowed when too wet, and sticky, it becomes lumpy, hard, and altogether unmanageable. Our correspondent is probably acquainted with the characteristics of the heavy clay soil that forms much—and some of the best—of the farm land of the Atlantic States. He will find the adobe soil of California of the same character "only more so." Both require the same "catching" habit in working; deriving equal benefit from thorough cultivation, and being alike in their lasting qualities. In the East this kind of soil is brought up to a high state of cultivation by underground draining, subsoiling and fall plowing, leaving it exposed to the action of the frost during winter. This soil possesses in itself remarkable endurance in fertility, and will give a better return than any other for manure applied. It is not expected that the cultivators of adobe soil in California will, as yet, resort to underground draining and subsoiling; and they will not have the aid of severe frosts and repeated thawings; still, if they use the means within their reach they can subdue this soil, and bring it up to a perfect state of cultivation.

Our friend asks, "what grain and what fruit will grow on it?" We answer that when properly treated it will grow any kind of grain or fruit, but unless the condition of the soil is favorable when worked, the labor bestowed upon it will be extremely hard and unremunerative. Probably in the locality from which our correspondent writes—San Luis Obispo—the present condition of the soil would favor plowing. If he could put in a crop of wheat while the ground is in suitable condition, then early in autumn plow in the stubble, this would lighten up the soil beside furnishing a good supply of manure. If the wheat could be put in and get a good start, so as to cover the ground before the drying northerly appears, a good crop might, reasonably be expected; but if after seeding and before the starting of the grain, the heavy rains ensue, followed by dry north winds, then the prospect is discouraging. In regard to fruit, as in other products which we have mentioned, in connection with adobe soil, we, of course, cannot consider the various surroundings; these must be taken into account by the residents of the localities; but speaking of the character of the soil, merely, we say that it is especially adapted to apples and pears; and that under favorable circumstances, the small fruits, even strawberries, would do well on it.

In answer to the inquiry of our correspondent in regard to a work giving directions for planting and working nurseries, we would inform him that this coast is, so far as we can ascertain, destitute of reliable authority on this subject. Works that meet the wants of Eastern nurserymen in every respect, are not adapted to California. Our most successful nurserymen are those who have from the starting point adapted themselves to the peculiar wants of the country and have obtained their knowledge by experience. They have had much to learn, but they have learned it thoroughly, consequently judicious selections have been made in all departments; and the treatment of what they grow is, from the first, such as the soil and climate of the country require. No portion of the United States is better supplied at this important point, or has a better horticultural basis to build upon.

PARADISE VALLEY.—The *Silver State* says: There is not a mountain range in Humboldt county that has been at all prospected in which mineral bearing quartz has not been found. The mountains at the head of Paradise valley were supposed to be an exception to the rule, but recent developments in that locality prove the contrary. Last week Dan Muffley went in the range about four miles easterly from Camp Scott to cut cottonwood poles for John Byrnes. While at work on the hillside he noticed large quartz boulders in every direction, which led him to believe that there was a quartz ledge in the vicinity. With six hands he proceeded a short distance up the hill where he discovered a large ledge cropping out above the ground, and breaking off a piece with his ax was astonished to find that it was ore. Taking as much as he could conveniently carry he repaired to Byrnes', and informed him of what he had found. The result was a location of the ledge, and an assay of an average of the croppings, which was made yesterday by J. A. Algauner, assayer of the Humboldt reduction works. The certificates show that it contains \$55 45 per ton in silver, and Byrnes, who is a member of the Grand Jury is in a hurry to get home and ascertain more about the discovery.

Landscape Gardening.

Landscape gardening is an art which is but little understood in the Pacific States, generally speaking. We shall therefore try to make it not only interesting to the general reader, but profitable to those who may have such work in contemplation. Landscape paintings are always admired by people with any pretensions to refinement, and to paint a good and faithful likeness of a landscape the artist must possess the special gift of imitative ability. But to make a park or garden or lay out the ground of a private residence, no matter what the dimensions are, the landscape gardener must have good creative ability, being able to create something which will harmonize with the place and its surrounding.

Men or women who are fond of natural scenery often become bewildered from the extravagant beauties which the landscape may afford, and not unfrequently will they select one particular point which to their mind surpasses all others. To possess such a piece of landscaping in some special part of their grounds, would be a satisfaction indeed; but, great as would be the delight if this was accomplished, it often follows, through the criticism of others, more eminent in the profession, that sorrow takes the place of delight, and it often occurs in this way:

A sketch is perhaps made of that which we wish to possess, and although not marked by any special gift of imitative genius, yet it may be able to call to mind all the special features of interest that surround, or necessary to be remembered. After all the necessary preparations are completed, work is commenced; trees, shrubs, and plants are bought, rocks, soil and water are, perhaps, introduced, all to represent, as nearly as possible, the original picture. Work goes on and the required end may be attained to the entire satisfaction of the parties concerned; satisfied beyond a doubt, that they have accomplished much which is not only new and expensive, but forms one of the most unique pleasures grounds in the country; but alas for poor human nature, it depended too much on its own ability, not having had any previous knowledge of landscaping, I find that I have made a very great mistake. The introduction of such a piece of work on these grounds was entirely out of place. Finding now that it will be impossible to make such a work harmonize more improvements suggest. Keep your trees in moist sand until the ground is ready to receive them. The sooner a tree is "set out" after it has been taken from the nursery, the better. In ordering trees, instruct the nurseryman to trim ready for planting, and you will save freight as well as the vitality of the tree. These rules are good for all trees; but especially for the almond and peach.

Crude Way to Test Sulphurets.

Since it has been found that sulphurets will pay to save in milling process, and that the county abounds in this material, we give below a hint to prospectors in testing rock, which never fails. Several veins which have heretofore been considered of little value, on account of the large amount of sulphurets contained therein, and the ignorance of the holders of the way to test them, have been found to be immensely rich in gold. A new era is opened in mines here, and it will yet be found that these sulphurets are the ones for durability and wealth. This crude mode will not hold good in all cases, (in all kinds of sulphurets rock,) but will bring out more or less of the precious metal, if there is any in it: Put a piece of rock into the fire, say about the size of your fist, and heat it to a cherry-red, through-out, but do not get it to a white heat, as it will fuse and run; take it out of the fire and give it a gentle shower bath, so as to cool it off slowly, so too sudden a cooling will slack up the rock. When cool, examine the rock, and if it is rich it will generally show the gold. But for a surer test, pulverize it and "horn it out" in the usual way. This, perhaps, is not so sure a way as a test with acids, but acids are not always at hand in the woods with the prospector. After burning, as above, if it does not show gold, it will not be apt to do so with acids, as it scarcely, if ever fails to bring the color; that is, where the sulphuret is composed mostly of iron and sulphur, or arsenic, this test is good and will not fail. But where the sulphuret is copper (and iron) the test is not so good, because the copper fuses and carries everything that comes in contact with it, so if there is any gold with it, it will be covered or fused with copper.—*Tuolumne Independent.*

GROOM DISTRICT.—We understand that J. B. Osborn, who is largely interested in the mines of Groom district, will shortly commence the erection of reduction works at that place. Groom has been considered for years past one of the most promising undeveloped districts in southeastern Nevada. It is situated about 200 miles south of Eureka, in Lincoln county. The ores are mainly of the character treated by the smelting process. The starting of operations in Groom district is one of the fruits of the narrow-gauge railroad to Eureka. The ores of that section could not be made available at a profit so long as it was necessary to freight the bullion a distance of nearly 300 miles to the Central Pacific. The same is in a great measure true of Tybo district. Stages will do for localities which produce pure silver, but a railroad is requisite to carry off the bullion of important base metal camps.—*Eureka Sentinel.*

Levee Law Amendments in Political Code.

As the following amendments, lately made to the new code, are not generally known, we give them as important information to many of the readers of the Press:

INDIVIDUALS LIABLE TO DISTRICTS FOR ALL DAMAGES SUSTAINED BY REASON OF EXISTING OR CUTTING OF LEVEES.

[Amendment to Political Code.]
Sec. 3490.—Any person who shall cut, injure or destroy any levee or other works of reclamation in any district, is responsible for all damages which may be occasioned thereby to such levee works; and an action therefor must be brought in the District Court of the county, or either of the counties in which such levee works are situated, in the names of the trustees of the district. If there be no trustees then the action may be brought in the name of any landowner in the district. The amount recovered in such action must be paid to the treasurer of the county who must place the same to the credit of the district.

OCCUPANTS OF LANDS ON BANKS OF STREAMS LIABLE FOR DAMAGES. [Political Code.]

Sec. 3486.—Any person owning or occupying lands upon the banks of any stream where the lands lying back of such stream are lower than the bank thereof, is responsible for all damages which may be sustained by the owners or occupants of lower lands by reason of any cut or embankment made on the bank of such stream by the owner or occupant of the bank.

COUNTY AND INDIVIDUAL RESPONSIBLE FOR INJURY TO OR DESTRUCTION OF LEVEES BY MOBS OR RIOTS. [See Political Code and Amendment 73 and 74.]

Sec. 4,000.—Every county is a body politic and corporate, and as such has the powers specified in this code, or in special statutes, and such powers are necessarily implied from those expressed.

Sec. 4,452.—Every municipal corporation is responsible for injuries to real or personal property situated within its corporate limits done or caused by mobs or riots.

Sec. 4,453.—Actions for damages under the preceding section must be tried in the county in which the property injured is situated.

Sec. 4,454.—All actions herein provided for must be commenced within one year after the act complained of is committed.

BOARD OF SUPERVISORS AUTHORIZED TO PAY FOR DAMAGE CAUSED BY MOBS OR RIOTS.

Sec. 4,455.—On the certificate of the presiding officer or of the clerk of the court in which the judgment is rendered, the board of supervisors of the county or the legislative authority of the city must by ordinance direct and cause to be issued a warrant for the payment thereof on the general fund, and the same must be paid in its regular order, as other warrants of the municipal corporation are paid; and must, at the proper time, levy and cause to be collected a tax on the taxable property of such municipal corporation for the payment of such warrant within a period of not more than three years.

Sec. 4,456.—The plaintiff in any action authorized by this title must not recover if it appears upon the trial that the damage complained of was occasioned, in any manner aided, sanctioned, or permitted by his carelessness or negligence.

[Title IV, Chapter I, sections 4,452, 4,453, 4,454, 4,455, are made applicable to levees, by amendments to Political Code.]

Sec. 4,457.—The provisions of this title and chapter (Title IV, Chapter I) are applicable to cases where losses and other works of reclamation of any district are injured or destroyed by mob or riot; and the action brought for damages therefor must be prosecuted by the Attorney-General of the State in the name of the people of the State of California; and the amount recovered in such action must be paid to the Treasurer of the county, who must place the same to the credit of the district. All provisions of law inconsistent with the provisions of this section are repealed.

TO INJURE OR DESTROY LEVEES OR OTHER WORKS OF RECLAMATION, A FELONY, UNDER "AN ACT FOR THE PROTECTION OF CERTAIN LANDS FROM OVERFLOW," APPROVED MARCH 25TH, 1868.

Sec. 18.—Any person or persons who shall wilfully or maliciously, cut, injure or destroy, any levee or other work of protection built under the provision of this Act, or that may be in charge of said Board of Supervisors, shall be deemed guilty of felony, and upon conviction thereof be liable to any court of competent jurisdiction shall be fined in any sum not less than fifty dollars nor more than one thousand, or be confined in the State prison not less than one nor more than five years, or may be both fined and imprisoned, at the discretion of the court.

ACCESSORIES HELD AS PRINCIPALS.

Sec. 971 (Penal Code Amendment 73, 74).—The distinction between an accessory before the fact and a principal, in cases of felony, is abrogated, and all persons concerned in the commission of a felony, whether they directly commit the act constituting the offense, or aid and abet in its commission, though not present, shall hereafter be indicted, tried and punished as principals, and no additional facts need be alleged in any indictment against such an accessory than are required in an indictment against the principal.

Sec. 972.—An accessory to the commission of a felony may be indicted, tried and punished, though the principal may be neither indicted nor tried, and though the principal may be acquitted.

CONSPIRACY AND RIOTS, ETC., REFINED.

Sec. 182 (Penal Code).—If two or more persons conspire—

1st. To commit any crime; or

2d. Falsely to move or maintain any suit, action, or proceeding, etc. They are punishable by imprisonment in the county jail not exceeding one year, or by fine not exceeding \$1,000.

Sec. 405.—Any person who participates in any riot, is punishable by imprisonment in the county jail, etc.

Sec. 407.—Whenever two or more persons assemble together to do an unlawful act, and separate without doing or advancing toward it—such assembly is an unlawful assembly.

Sec. 408.—Every person participating is guilty of a misdemeanor.

Sec. 409.—Every person remaining present at the place of any riot, mob, or unlawful assembly, after warning, is guilty of a misdemeanor.

RELIEF DISTRICT.—It affords us pleasure to announce that work is to be resumed immediately on the Central Pacific mine, in Relief district. The Central produced considerable bullion at one time, and was almost on a paying basis when, owing to complications arising out of informalities in the articles of incorporation, work was suspended. M. H. Bailly, one of the principal owners, has let a contract to Stein, Tirrel & Co., to run a tunnel, now in 150 feet, 100 feet further on to the ledge. There is a mill attached to the mine, which of course will be started as soon as ore can be procured to run it. The ledge has been developed to a depth of 150 feet by a shaft, and at one time it produced ore that worked from \$800 to \$1,200 per ton in silver.—*Silver State.*

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CALIFORNIA INVENTION,

Has been very lately well proven by performing a job of dredging at the mouth of San Antonio Creek, at Oakland, Cal.

There is but this one machine that has ever had these improvements employed. It is an old machine, formerly built for another device, and is unfavorably constructed for Ball's improvements; yet this first temporary experimental machine has filled a scow of eighty-five cubic yards in sixteen minutes in unfavorable digging. For durability, digging hard material and fast work, it has a reputation (supported by leading engineers) as having no equal.

Testimonials and references will be given on application to the inventor, who is the sole owner of patents (excepting having made an assignment of the one machine now belonging to the Central Pacific Railroad Company) Having resolved not to sell any rights unless upon a basis of actual work performed by a machine built by myself for the purpose of fairly establishing the worth of the invention, I therefore offer to sell machines or rights on the following plan, which is warranting the capacity of the machine by actual work.

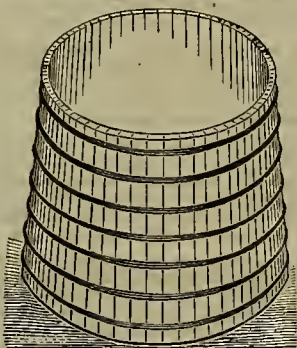
I will enter into an agreement with any responsible party to build and sell a machine, scows and tender, all complete, and right of all my improvements in dredging machines throughout the Pacific Coast for \$20,000, warranting the machine to dredge six cubic yards per minute (to fill a scow at that rate). \$20,000 will but little more than pay the cost of building the machine, scows, etc., all complete; therefore I am proposing to ask nothing for my patents unless my machine dredges more than six cubic yards per minute. But it shall be further agreed that in case (at a fair trial to be made within a stated time) the machine shall fill a scow at the rate of more than six cubic yards per minute, then \$10,000 shall be added to the price above stated for each and every such additional cubic yard thus dredged per minute, and for additional fractions of a cubic yard thus dredged in the same ratio the \$10,000 is to be added to said price above stated.

I will sell any other Territorial or State rights (either United States or Foreign) upon the same plan and at a lower price proportionately than the rights for the Pacific Coast.

I will sell a single machine with scows and all complete, and right to use the same in a limited territory, for \$30,000 on the same plan as above stated, but will add only \$2,000 to each additional yard over the six cubic yards per minute. Each machine is not to employ more than two 10x20 inch engines.

Payments to be made in U. S. gold coin on delivery of machine, as may be indicated by agreement.

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WATER TANKS of any capacity, made entire by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Cost less than elsewhere.

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Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merit.

They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the muller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Sellers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and sellers for themselves, at the office, 229 Fremont Street, San Francisco.

Nevada Metallurgical Works,

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Ores worked by any process.

Ores sampled.

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Analysis of Ores, Minerals, Waters, etc.

Plans furnished for the most suitable process for working Ores.

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We manufacture all sizes of BED and FURNITURE SPRINGS, from No. 7 to the smallest Pillow Spring; also, the Double Spiral Spring, which is the most durable Bed Spring in use. It is adapted to upholstered or skeleton beds. We have the sole right in this State to make the celebrated Oermann Self-Fastening Bed Spring. Any man can make his own spring bed with them. They are particularly adapted to Farmers' and Minors' use. Send for Circulars and Price List to

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147 New Montgomery St., S. F.

Trouble at the Cornell Watch Factory.

The workmen at the Cornell watch factory in this city, who have been engaged for several weeks in putting up the machinery, which is now about ready for starting, became aware, a day or two since, that it was the intention of the proprietors to introduce Chinese labor into that establishment. These workmen, who have devoted several years to acquiring their trade, and who have been brought here from Chicago, on account of their especial skill in the art of watch making, fear that if they instruct the Chinese in the practice of their art, that these people will soon supplant them in the business, by virtue of their known capacity for soon becoming skillful in everything requiring light and delicate manipulation.

Moved by these considerations several meetings have been held to consider the subject and confer with Mr. Cornell, the principal proprietor, the result of which, so far, as it has transpired up to the time of our going to press leaves the matter in rather a ticklish condition for both the workmen and the company.

Out of some 70 hands it appears that only three of the foremen and eight of the men, manifest any disposition to remain. All the others proclaim it as their intention to return East, and seek employment in other factories, if Mr. Cornell continues to insist on his original intention.

This unexpected obstacle in the way of establishing a new and important industry on this coast is greatly to be regretted, and we earnestly hope that some compromise will be devised under which these newly arrived artisans can feel it to their interest to remain with us. We are not advised as to the particular class of labor to which it is proposed to assign the Chinese, but can hardly suppose it is the intention of Mr. Cornell to instruct them in anything beyond some light, simple processes, which perhaps might be advantageously turned over to some of our own girls or boys.

THE JAPANESE PERSIMMON.—This tree is beginning to attract the attention of our fruit-growers. Those who have seen the fruit in Japan pronounce it very fine, unlike anything grown in this country. General Capron, former Commissioner of Agriculture, and since for several years residing in Japan, states: "That the persimmon is the best of all the native fruits of that country, and well worthy of introduction in California." The tree is described as finely shaped, having a rich, dark green foliage, and is an ornament anywhere. It produces fruit in Japan in from six to eight years from the seed. It would not be surprising if it came into bearing earlier with us. The experiments of Messrs. Shinn & Co., nurserymen, at Niles, Alameda county, show conclusively that our soil and climate is well suited to this foreigner. They have several thousand successfully grown, large enough for orchard planting. We gladly notice any effort on the part of our culturists to introduce valuable fruit and other trees. The successful introduction of one choice variety will repay for many failures.

THE Pacific Coast Pulpit, for Dec., contains the sermon of Rev. W. H. Platt—"The Immortality of the Soul." Each volume will contain some of the most notable sermons of the year. Price \$2. Chas. F. Whitton, short-hand reporter is the managing publisher, Montgomery block, S. F.

SAGIT Valley, W. T. is looming up. The latest mineral development in that region is an extensive coal field a few miles up the river, where coal can be obtained to an unlimited extent on the surface without going to the usual expense of underground tunnelling.

New machinery for sinking the shaft of the Phil Sheridan mine deeper has been ordered. The Utah mine on the north and the Sierra Nevada on the south, both being worked deeper, keep the Phil Sheridan pretty well drained of water.

The drift run west from the shaft of the Halse & Norcross on the 2100-foot level did not disclose any solid body of ore, although the vein formation which it penetrated was of the most favorable character.

The new Quicksilver Mining company organized to work the ground of the old Welch company near Clayton, are now putting up furnaces calculated to smelt twelve tons of cinchona rock a day.

Work is progressing favorably at the Gwin mine, Calaveras county. The last sinking of one hundred feet in the main shaft is nearly completed. When done, the depth of 1,000 ft. will have been reached.

Large quantities of coal are being hauled from the Ione mines, to be used in the quartz mills at Sutter Creek and other localities.

BETWEEN 150 and 200 men are employed near the mouth of Sonoma creek in the work of reclaiming overflowed lands.

General News Items.

SHOOTING.—The emotional mania for shooting seems to be on the increase. Some woman is generally at the bottom of such trouble and not unfrequently does the shooting herself. The latest instance of such a case occurred in this city last week. A woman named Annie Smythe, shot Mr. M. G. Cobb, a lawyer of this city as he was passing along Washington street near Montgomery. The wound was at first thought to be fatal, but Mr. Cobb is now in a fair way for recovery. The woman has been arrested. The only cause assigned was a supposition on her part that he was mismanaging a land case in which she was interested, for which there was no reason whatever. It is charitably thought by many that the woman, who is a widow, was insane.

FATAL POLITICAL QUARREL.—Mr. Byerly, editor of the New Orleans Bulletin, having cast some severe reflections upon ex-Governor Warmoth, a challenge had passed, or was about to pass, when the two accidentally meeting in the street, Byerly knocked Warmoth down and jumped upon him. During the fight Warmoth drew a knife and stabbed his antagonist several times in the abdomen, from the effects of which he died the next day. Warmoth has been arrested. Byerly was a Northern man and a political opponent of Warmoth.

HAWAIIAN ANNEXATION.—Washington newspaper correspondents state that the General Government is striving to induce the King of the Hawaiian islands to use his influence for annexation. Undoubtedly annexation would be of great advantage to the Sandwich islands, and incidentally to California. The islands would also be of advantage as a way station to the nation at large.

TWO BOYS CHARGED WITH PARRICIDE.—Two sons of Jacob Nerswinder who lived 15 miles north of Columbus, Ohio, have been arrested charged with having murdered their father and then burned his body. The boys are fourteen and eighteen years old. The family deserted their house, and the remains of Mr. Nerswinder have been found among the ashes in the fire place.

P. M. S. S. INVESTIGATION.—The examination of Mr. Irwin before the Congressional Investigation Committee proceeds slowly. Mr. Irwin don't "pump" as well as it was thought he would. It has transpired, however, that large sums of the company's money went into the hands of the Congressional postmaster, but for what purpose, or where it went subsequently, has not transpired.

THE GERMAN CHURCH CONTROVERSY.—It is reported that Queen Victoria has written to Emperor William urging him to compromise the ecclesiastical conflict in Germany. The report is of doubtful authority, and Germany is generally supposed to be pretty well calculated to mind her own business, and the Catholics don't compromise worth a cent.

DROWNED.—Wm. Farmer was drowned while trying to cross the Eel river at the Fort Seward ford, on the 29th of November. He started to cross the river on horseback, and his horse failed or refused to swim, and Farmer, who could not swim, was washed from his back and drowned.

EMIGRANT SHIP BURNED.—News has been received of the burning of the English emigrant ship "Cospatrick," while on the voyage from London to New Zealand. Four hundred and sixty lives were lost. Further details are anxiously awaited. The vessel and cargo are a total loss.

CUBAN ANNEXATION.—A letter to the *Diario* reports that strong efforts are being made in Washington to obtain the recognition of Cubans as belligerents. The letter couples the names of Aldama and Collector Casey with these efforts, and says that the object is to throw on the market Cuban bonds held in Washington.

DEATHS LAST WEEK.—During the last week 79 persons died in this city, 51 males and 28 females. Of these 68 were white, 1 colored, and ten copper colored persons. There were 3 casualties, 1 homicide and 17 persons died in public institutes.

GERRITT SMITH DEAD.—This well known philanthropist died suddenly in New York on Monday last, of apoplexy. He had just arrived in that city to spend the Christmas holidays with his friends.

The great ship "Three Brothers" went to sea on Monday with 4,000 long tons of wheat in her hold. She was taken out by two tugs. This is the most magnificent specimen of naval architecture that carries sails.

HORSE BEEF.—The horse shambles of Paris supplied the public during the first quarter of the present year with nearly 630,000 pounds of meat, the result of the slaughter of 1,555 horses, mules and asses.

FATAL ACCIDENT.—Patrick Smith, foreman and section man on the California Pacific Railroad at Napa Junction, stumbled across the track on Monday morning with such force that he died almost instantly.

CALIFORNIA RIVERS.—The proposition pending before Congress to expend a small sum of money to improve California rivers ought to receive favorable consideration. But \$57,000 are required for the Sacramento River.

RAILWAY ACCIDENT IN ENGLAND.—Several persons were killed and many wounded by a railroad accident at Woodstock on Thursday last. Some of the latter are fatally wounded.

STRANGE.—The extraordinary character of the present season seems to puzzle the animal as well as the vegetable kingdom. We have already noticed the fact that the trees seem to be puzzled to know what to do, and now we find the birds equally at a loss. The *Mountain Messenger* of December 12th says: A nest of young birds was recently hatched in Judge Davidson's orchard. What does this mean? Won't some prophet investigate this unusual occurrence and tell an anxious people what sort of a winter it foreshadows?

A THOROUGHbred IMPORTING ASSOCIATION.—Articles of incorporation of the California Confederacy were filed yesterday. The purposes for which the corporation is formed are, the importation of thoroughbred horses into this State, and the improvement of the breed. The directors are George M. Pinney, Ezekiel Wilson, J. S. Taylor, A. E. Swain, John Martin, O. F. Willey and William Shear. The capital stock is \$50,000, divided into 500 shares of the value of \$100 each.

CHANGE IN THE WEATHER.—The weather during the past ten days has taken a new turn, and it is extremely cold for San Francisco; overcoats out of doors and fires within are in demand, and frost and thin coverings of ice are discernible in the morning. In Los Angeles the late severe frosts have seriously damaged the promising tobacco crop at Agricultural Park. This is the longest cold term ever known in Los Angeles. Considerable anxiety is also felt in regard to holding off the usual December rains.

Industrial Items.

THE NAVY YARD.—Eighty-two men are employed at the present time in the construction department at the navy yard, as follows: Ten men are engaged in boat building in that department. There are twenty-five blacksmiths, twenty-two ship joiners, three block makers, five spar makers, two pattern makers, seven plumbers, and eight in the saw mill.

AN INDUSTRIAL COLONY.—Westminster Colony is still on the march of improvement. Several houses are nearly completed, and were it not for the scarcity of lumber and carpenters others would at once be erected. The school is flourishing, the plows are busy, the corn crop excellent, and the number of trees to be planted this season will be greatly increased.

STEAMSHIP EXPENSES.—Some idea of the expenses attending the trial trip of a large steamship may be had when it is known that the trial trip of the "City of Peking" to Newport with a large number of guests, cost \$50,000. Delmonico's bill for the entertainment was about \$25,000.

The estimated cost of a ship canal from Stockton to Disappointment slough, eleven miles, is \$1,117,000. Such a work is greatly needed, and would be of immense benefit in opening up the San Joaquin valley.

Twenty tons of coal per day are used at the Starr mills, in Vallejo, which at present rates costs about \$130. One vessel is kept constantly running to supply fuel for this great flouring establishment. Fifteen carloads of wheat are ground every twenty-four hours.

ANOTHER WOOLEN MILL.—Active efforts are being taken to secure the erection of a woolen mill at Merced. The sum of \$32,000 has already been paid up. It is proposed to go into the manufacture of mixed fabrics—woolen and cotton.

IRON WORKS AT SANTA CLARA.—An effort is being made to get up a joint stock company at Santa Clara, with a capital of 100,000, for the purpose of obtaining the location of J. T. Walker & Co's iron works there.

The Anaheim branch of the Southern Pacific Railroad is now within seven miles of Anaheim. The track will be completed by the 1st of January.

The San Jose woolen mill company is making weekly shipments of goods to St. Louis, Chicago and Boston. The shipments of late have consisted of doeskins, cassimeres and blankets.

A NEW INDUSTRY.—One hundred and sixty acres are being planted to peppermint at Milpitas, Santa Clara county, by W. Boete.

Three hundred and fourteen men are employed at the gunpowder works near Santa Cruz.

The Sacramento beet sugarie will this year plant from 1,500 to 2,000 acres in beets.

There are eight vessels contracted to be built on Humboldt bay.

The Pacheco-road pass over the Coast range has been completed, at a cost of about \$18,000.

A company has been organized for constructing a new hall at Monterey.

SALT LAKE boasts of 200 new houses this year.

MAYOR TOREMAN, of Los Angeles, estimates the population of the city at 13,000.

The San Luis Obispo water works have been completed.

A HANDSOME hotel is being erected at Felton, Santa Cruz county.

The wharf at Wilmington is about to be extended 1,000 feet.

SINCE April 1st 29,102 immigrants have arrived overland.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., Dec. 29th, 1874.

FOR WEEK ENDING DEC. 15TH, 1874.*

TIRE UPSETTER.—Quintus C. Tehhs, Windsor, Cal.

WINDMILL.—William C. Nelson, Sacramento, Cal.

ALARM COMBINATION LOCK.—Henry W. Dilg, Portland, Oregon.

OVERALLS.—Chesung Quan Wo, S. F., Cal.

ARTIFICIAL STONE.—Achille Berard, Oakland, Cal.

TRADEMARK.

FOR COCONUT PREPARATIONS.—The California Cocosnut Pulverizing Company, S. F., Cal.

*The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible.

Agricultural Items.

FOUR CROPS OF PEARS IN ONE SEASON.—The *Foothill Tidings* of a recent date is responsible for the following: Four crops of pears from one tree in one season is one of those stories for which California is famous, but which people East seldom believe. Any one who will take the pains to walk out to near the end of Neal street in this town can satisfy himself if such things do happen. Mr. Barker has a winter Nellis pear tree in his orchard that has blossomed four separate and distinct times this year and now has upon it four crops of pears. Only the first and second crops are perfect, the others being small and immature.

ANSWERS TO QUESTIONS.—A subscriber at Anaheim asks the following questions: First, will the Muscat Alexander do well on sandy soil? Second, in what month should deciduous trees be budded? Third, what month is considered the best for planting blue gum seed?

Answers: First, yes, on "sandy soil," but not on pure sand. Second, in August and September. Third, amateurs would do well to wait until February or March before planting blue gum seed.

Of the 14,000 acres of arable land comprising Sherman island, it is estimated that 10,000 acres are already sown to wheat and barley. Several hundred acres of volunteer grain stand six inches high.

There are no new developments regarding the potato rot in Sonoma county. Nearly all not dug before the late rains are ruined. About 50,000 sacks are stored in Petaluma.

SETH BENNETT, farmer, on Dry creek, Sonoma county, gathered from one vine of Mission grapes 100 pounds of grapes, which, if made into wine would have produced eight gallons.

FRESH butter is arriving at Petaluma in considerable quantities, and is selling from 43 to 45 cents per pound, or 6 cents higher than last year.

MESQUITE grass is being sown extensively in Lake and Mendocino counties. It is said to be fine for hay, and rich green feed. Neither frost, wet, nor ordinary dry weather affects it.

When all her land is properly reclaimed, Sutter county will have added fully one half more to the amount of land now under cultivation.

SANTA CLARA county is sending more grain East this year than ever before.

The capacity of the Consolidated Tobacco factory at Gilroy is about to be doubled.

THIRTY SEVEN vessels have loaded wheat at South Vallejo this season.

A NEW ledge with very promising appearances has been found on the southwestern side of the ridge back of Pioche. The ledge is of good size, and contains ore that assays well. The owners are Murphy, Jones & Co.

The covered car track leading from the Consolidated Virginia mine to the mill of the same company is about completed. The rail for the cars is laid about half way through and the woodwork is all done.

The Calaveras Chronicle reports that the Mokelumne Hill Canal and Mining company are negotiating for the purchase of Overton's ditch, at Rich Gulch flat.

THE HOME CURE THAT NEVER FAILS.—"The atmosphere of pine woods is good for consumptive patients," says Dr. Erasmus Wilson. No doubt it is; but *Hale's Honey of Horehound and Tar*, charged with the concentrated essence of the most valuable of all medicinal trees, the Abies Balsamea, or Balsam of Gilead, and tempered with the purifying and healing juice of the horehound plant and with the purest honey, will do more in one day to cure a cough or cold than the air of pine woods could do in a twelve-month.

Pike's Tooth-Ache Drops—Cure in one minute. Woodward's Gardens embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds, and Skating Rink. Admission, 25 cents; children, 10 cents.

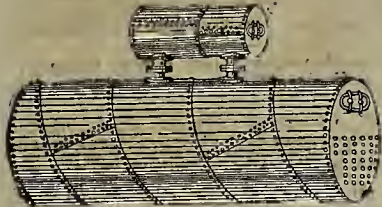
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San Francisco Boiler Works,

123 and 125 Beale Street.....SAN FRANCISCO

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Late Foreman of the Vulcan Iron Works, Proprietor



High and Low Pressure Boilers of all Descriptions.

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SHEET IRON WORK of every description done at the Shortest Notice.

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CAPITAL.....\$1,000,000.

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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Gears and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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24v17-4y

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Amalgamators, and all kinds of Machinery.

N. E. corner of Tehama and Fremont streets, above Howard street, San Francisco. 5-47

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Rolling Mill Company,

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Established for the Manufacture of
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—AND—
Every Variety of Shafting,
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DATA OF CAMERON'S PATENT STEAM PUMPS, REGULAR SIZES.		NUMBERS.	
DIAMETER OF STEAM CYLINDER, in inches.	STROKE OF PISTON, in inches.	0	1
4	6	1	2
6	8	2	3
8	10	3	4
10	12	4	5
12	14	5	6
14	16	6	7
16	18	7	8
18	20	8	9
20	22	9	10
22	24	10	11
24	26	11	12
26	28	12	13
28	30	13	14
30	32	14	15
32	34	15	16
34	36	16	17
36	38	17	18
38	40	18	19
40	42	19	20
42	44	20	21
44	46	21	22
46	48	22	23
48	50	23	24
50	52	24	25
52	54	25	26
54	56	26	27
56	58	27	28
58	60	28	29
60	62	29	30
62	64	30	31
64	66	31	32
66	68	32	33
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70	72	34	35
72	74	35	36
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76	78	37	38
78	80	38	39
80	82	39	40
82	84	40	41
84	86	41	42
86	88	42	43
88	90	43	44
90	92	44	45
92	94	45	46
94	96	46	47
96	98	47	48
98	100	48	49
100	102	49	50
102	104	50	51
104	106	51	52
106	108	52	53
108	110	53	54
110	112	54	55
112	114	55	56
114	116	56	57
116	118	57	58
118	120	58	59
120	122	59	60
122	124	60	61
124	126	61	62
126	128	62	63
128	130	63	64
130	132	64	65
132	134	65	66
134	136	66	67
136	138	67	68
138	140	68	69
140	142	69	70
142	144	70	71
144	146	71	72
146	148	72	73
148	150	73	74
150	152	74	75
152	154	75	76
154	156	76	77
156	158	77	78
158	160	78	79
160	162	79	80
162	164	80	81
164	166	81	82
166	168	82	83
168	170	83	84
170	172	84	85
172	174	85	86
174	176	86	87
176	178	87	88
178	180	88	89
180	182	89	90
182	184	90	91
184	186	91	92
186	188	92	93
188	190	93	94
190	192	94	95
192	194	95	96
194	196	96	97
196	198	97	98
198	200	98	99
200	202	99	100

The above data apply to the Regular sizes only. All these pumps have Brass Valve Seats and Brass Water Pistons. Pumps when lined with brass cost extra. We have many supplementary sizes.

LONG STROKE PUMPS, No. 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100. No. 6, 30 in. Stroke, \$1,000. No. 8, 36 in. Stroke, \$1,500. No. 10, 42 in. Stroke, \$2,000. No. 12, 48 in. Stroke, \$2,500. No. 14, 54 in. Stroke, \$3,000. No. 16, 60 in. Stroke, \$3,500. No. 18, 66 in. Stroke, \$4,000. No. 20, 72 in. Stroke, \$4,500. No. 22, 78 in. Stroke, \$5,000. No. 24, 84 in. Stroke, \$5,500. No. 26, 90 in. Stroke, \$6,000. No. 28, 96 in. Stroke, \$6,500. No. 30, 102 in. Stroke, \$7,000. No. 32, 108 in. Stroke, \$7,500. No. 34, 114 in. Stroke, \$8,000. No. 36, 120 in. Stroke, \$8,500. No. 38, 126 in. Stroke, \$9,000. No. 40, 132 in. Stroke, \$9,500. No. 42, 138 in. Stroke, \$10,000. No. 44, 144 in. Stroke, \$10,500. No. 46, 150 in. Stroke, \$11,000. No. 48, 156 in. Stroke, \$11,500. No. 50, 162 in. Stroke, \$12,000. No. 52, 168 in. Stroke, \$12,500. No. 54, 174 in. Stroke, \$13,000. No. 56, 180 in. Stroke, \$13,500. No. 58, 186 in. Stroke, \$14,000. No. 60, 192 in. Stroke, \$14,500. No. 62, 198 in. Stroke, \$15,000. No. 64, 204 in. Stroke, \$15,500. No. 66, 210 in. Stroke, \$16,000. No. 68, 216 in. Stroke, \$16,500. No. 70, 222 in. Stroke, \$17,000. No. 72, 228 in. Stroke, \$17,500. No. 74, 234 in. Stroke, \$18,000. No. 76, 240 in. Stroke, \$18,500. No. 78, 246 in. Stroke, \$19,000. No. 80, 252 in. Stroke, \$19,500. No. 82, 258 in. Stroke, \$20,000. No. 84, 264 in. Stroke, \$20,500. No. 86, 270 in. Stroke, \$21,000. No. 88, 276 in. Stroke, \$21,500. No. 90, 282 in. Stroke, \$22,000. No. 92, 288 in. Stroke, \$22,500. No. 94, 294 in. Stroke, \$23,000. No. 96, 300 in. Stroke, \$23,500. No. 98, 306 in. Stroke, \$24,000. No. 100, 312 in. Stroke, \$24,500.

These Long Stroke Pumps have large free openings, and are highly esteemed for draining mines.

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Smooth, Jack, Fore, Jointer, Block and Circular Planes.

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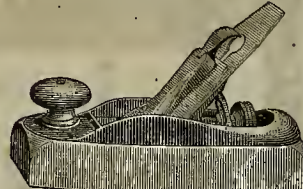
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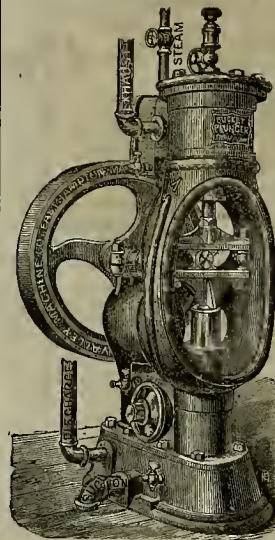
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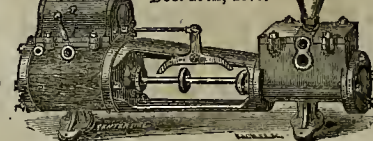
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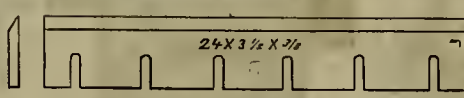
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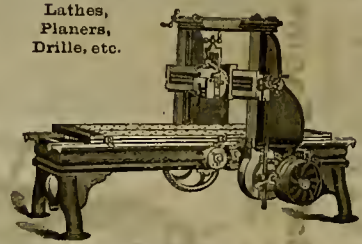
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Lathes,
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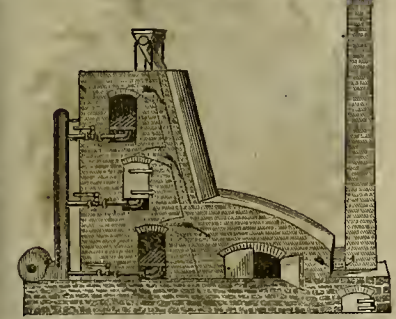


Recently improved and submitted to thorough sci-
entific tests by James Emerson, showing the following
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THE HIGHEST RESULTS EVER KNOWN.
Percentage of part gate, $\frac{1}{4}$ 50.08; $\frac{1}{2}$ 69.64; $\frac{3}{4}$ 78.73
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Mr. Emerson says: "These are the best average
results ever given by any Turbine Wheel
in my experience."

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Sole Agents for the Pacific States and Territories.
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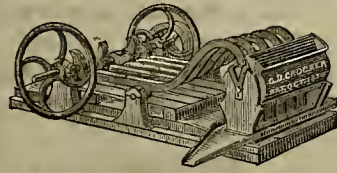
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(Patented July, 1873.)



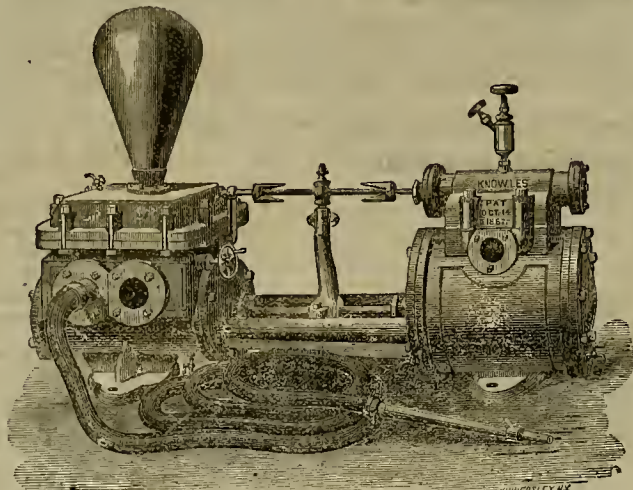
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Parties desirous of building above furnace, or for any
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TRIP HAMMER QUARTZ BATTERY.**



This machine, complete, weighs 1,500 lbs. Has an iron
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which strike 2,000 blows per minute, in a mortar provided
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It has no Cranks or Fly-Wheel, and has no dead points where it will stop, consequently it is always ready to
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when the steam cylinder is filled with cold water of condensation.
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best in use, and prefer it to any other.
Yours, truly,
A. J. STEVENS, General Master Mechanic.

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to Knowles' Patent Steam Pump, as published in the Official List September 23d, 1871.
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And for Every Conceivable Purpose.

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CLAPP & JONES SUPERIOR STEAM FIRE ENGINE,
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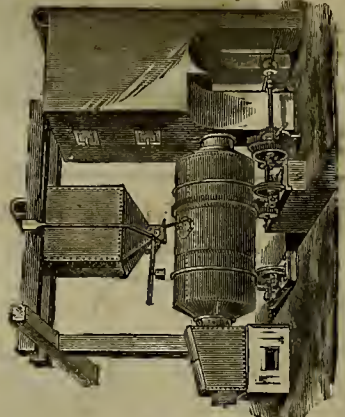
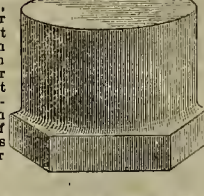
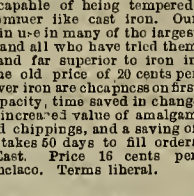
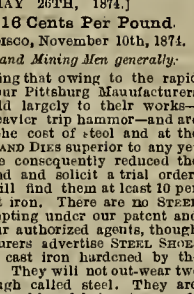
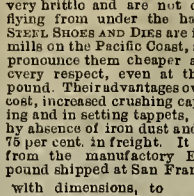
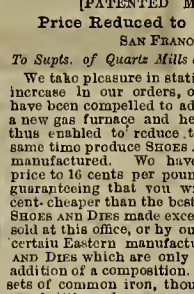
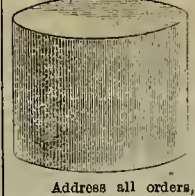
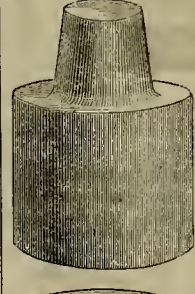
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Price Reduced to 16 Cents Per Pound.
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STEEL SHOES AND DIES are in use in many of the largest
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For Roasting, Desulphurizing, Chloridizing
and Oxidizing Ores, etc. For the reduction of
Gold, Silver, Lead and other ores, saving a larger per-
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any other invention. The Furnace is so constructed
that one man, of ordinary ability, tends five or more
furnaces; controls them with ease; adding heat or air;
stopping or starting at will; charging and discharging
with ease. Also, Patent "Conveying Cooler," for con-
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amalgamation and the boilers at the same time. Saving
the large space in mill (covered with brick or iron),
and the labor of two men per day, exposed to the poi-
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Kiln," for drying ores direct from the mine or breaker,
saving fuel and labor heretofore necessary in drying
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MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874.
For particulars address
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No. 12 West Eighth Street, Cincinnati, Ohio
Circulars, &c., will be furnished, if required.
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FOR QUARTZ MILLS,
Made by our improved pro-
cess. After many years of
patient research and experiment
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STEEL SHOES AND DIES for
QUARTZ
MILLS,
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Strength,
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Will wear three times longer than any iron Shoes
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Of Quartz Mills, Pans, Separators, Concentrators, Jigs,
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and Shafting, and general Mining Machinery in all its
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Nye County, Nevada. Midway between Austin and
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Settlers, and entire outfit of milling appliances;
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140 Degreee Fire Test, for Family Use.

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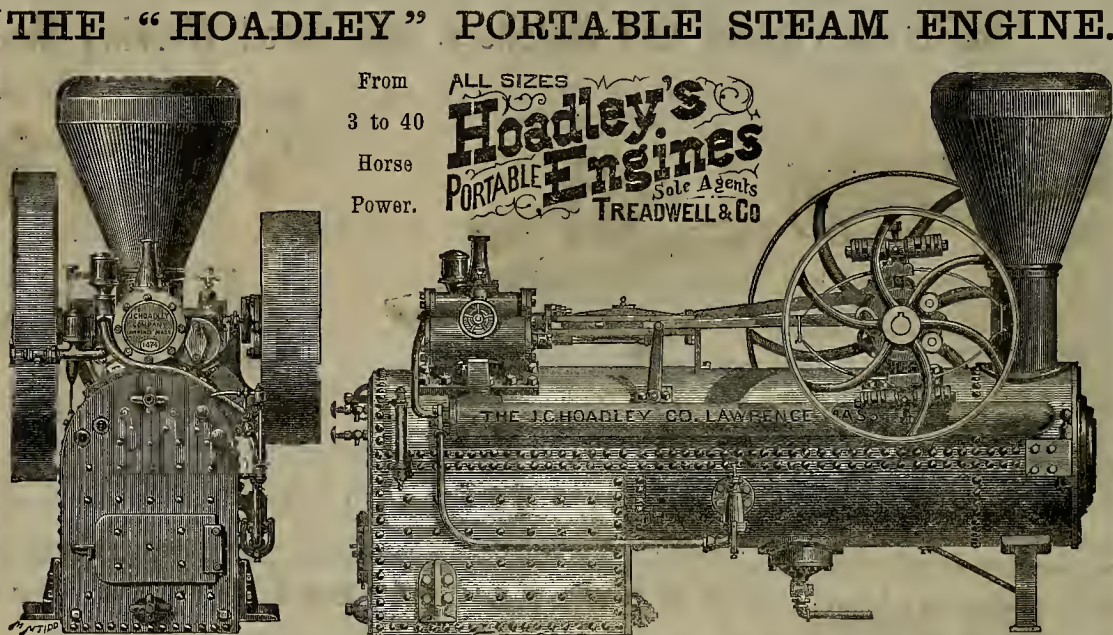
Upright Safety Engines and Boilers.

(MADE BY THE NEW YORK SAFETY STEAM-POWER COMPANY.)

We would call particular attention to the graceful design and simple mechanism of this Engine Boiler; the form is not only pleasing to the eye, but is, also, that which secures the greatest strength and rigidity with a given amount of material. The Boilers, which are of the Upright Tubular style, with internal fire-box, are of the highest quality. The heating surface and area of grate are in excess of the quantities usually allowed for the same power, and it is therefore unnecessary to purchase a greater rated power than is actually required, while in cases of emergency these boilers can be depended on for more than their rated power. The Engine is not fastened to or upon the boiler, and is therefore not subjected by expansion and contraction to the over-heating of the boiler, but is mounted on rollers, and is free to move in any direction. The high speed at which this Engine is necessary for economy of fuel. All parts are easily accessible—a great advantage. Is complete in itself as a Portable Engine and Boiler, or the Engine can be detached from the Boiler and run independently, if required. Its main points are simplicity, safety and smallness. It is a perfect machine, for its simplicity, small size and safe power is required in use.

All Sizes from 2 to 10 Horse-Power.

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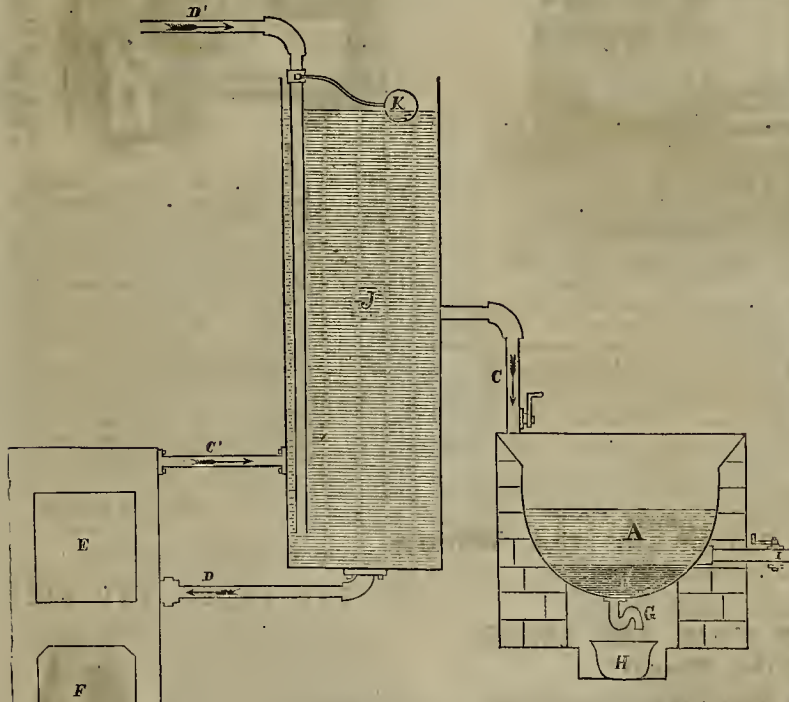


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Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.



PATENTED NOVEMBER 25th, 1873.

RANDOL AND FIEDLER'S QUICKSILVER CONDENSERS, MADE OF WOOD AND GLASS.

Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 10th, 1874.

FIEDLER'S QUICKSILVER CONDENSERS, MADE OF IRON.

Patented February 24th, 1874. See MINING AND SCIENTIFIC PRESS, November 15th, 1873.

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(Covered by Letters Patent of July 2d, 1872, and recent applications.)

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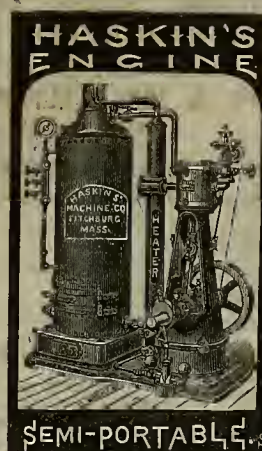
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 9, 1875.

VOLUME XXX
Number 2.

Eastern Investors in Mines.

We received a letter this week from some people in a town in Indiana, of which the following is an extract: "We would like to have a map of the Washoe or Comstock lode; also a book or whatever is published that would enlighten a stranger on the great resources of wealth in that region. Now whatever you know to be of interest to young speculators in said mining districts please mention by mail or through your journal, so we will be able to purchase."

Probably the best thing to enlighten a stranger of the great resources of wealth of that region would be to go there and see it, or else come to the mint and look at a few cords of silver bricks. There is a great deal published which might enlighten them about the mines, but not much to enlighten them about how, and when, and where to invest so as to make money. There is considerable to tell young speculators about the Comstock, but as the advice they want probably relates to a stock that is very low and will surely go up very high after they buy into it, this question is difficult to answer, more particularly as no stock is very low just at present. The map wouldn't be of the slightest use in informing them about what they want.

Evidently our stock excitement has had time to travel across the continent, and is making some of those Eastern folks dream about large profits with little capital and no risk. But to those who are thinking of coming here to make money out of mines by investing in stocks, our advice is to remain at home. If they have made up their minds to mine, the only way to do is to come here and buy one of the many thousand mines awaiting capital for development. There are plenty of them which can be bought cheap. But if the intended immigrants have only a few hundred dollars, and expect to make a fortune out of it, they stand more chances to lose what they have than to get richer, by investing haphazard in stocks.

Mining is a business just like anything else. Anybody may stumble on a bunch of croppings and strike a ledge, but to make money out of it afterward is another thing. Deshlag in stocks is also a business, and requires much more shrewdness to be successful than many suppose. Because a man can run a plane, a lathe, or any other tool, it does not follow that he can jump at once into another man's business, and do as well as he. It needs capital to go into stocks like anything else, but a man's profits are not always proportionate to his capital.

We on this coast who know anything about mining are often provoked to laugh at the crude ideas entertained by our Atlantic brethren on the subject of mines. They hear about a man having struck a ledge which assays \$10,000 a ton. Straightway they calculate that a ton could almost fill a dumpster, and for every dumpster full they would get \$10,000. And as the ledge is three feet wide, and they can get out at least 50 tons a day, there is \$500,000 a day. When they figure up the yield for the first 30 days it gives them about \$15,000,000 on the \$10,000 per ton basis, about which time they begin to get excited on the subject. We all know what absurdity there is in figuring on \$10,000 per ton assays, or even \$1,000 per ton assays, and what they amount to, but those Eastern people hearing of our Sharone and Jones, *et. al.*, think a thousand a ton isn't so much after all.

About mining stocks they have still cruder ideas, imagining that all a man has to do is to put a few hundred dollars into a broker's hands, and in a few days it comes out thousands instead of hundreds. This is all very well in a few cases, but is not by any means the rule. The mining stock men here are quite as sharp in their peculiar business as the Wall street men in theirs, and Eastern speculators would probably do as badly here as our speculators would there. No sensible man would advise people to come here from the East to make their fortunes in stocks. There are plenty of us Californians who haven't made our fortune yet, and we want our turn first.

Hydraulic Mining in California.

No. 7.

Connection Between Tunnel and Surface.

The first opening of a hydraulic mine, as we have seen, is rather a tedious and expensive business; however, after a connection is once made between tunnel and surface, other necessary improvements are easily accomplished. For instance, the chimney represented as running up on a slope may be, if only short, changed into a vertical shaft, or, if long, into terraces, so that the gravel rushing down may be submitted to a crushing process, which a fall of 20 feet or more will create.

Where the bed rock between terminus of tunnel and basin is of considerable depth, a

very strong blow. The benefit of a drop of even a few feet on the line of sluice boxes is well known to the miner, and a repetition of such drops must necessarily cause the repetition of such benefits, which consists in the crushing, stirring up, changing of position of the "pulp," and the consequent liberation and precipitation of the gold.

By the time the tunnel is reached the force of the several falls or drops is broken, and a leap of 30 inches lodges the running mass in the sluice boxes.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

A COURSE OF SCIENTIFIC LECTURES.—The Trustees of the Mechanics' Institute and the University of California have arranged for a course of twelve scientific lectures to be delivered in this city. The first will be delivered Saturday evening by Dr. G. F. Becker, on the

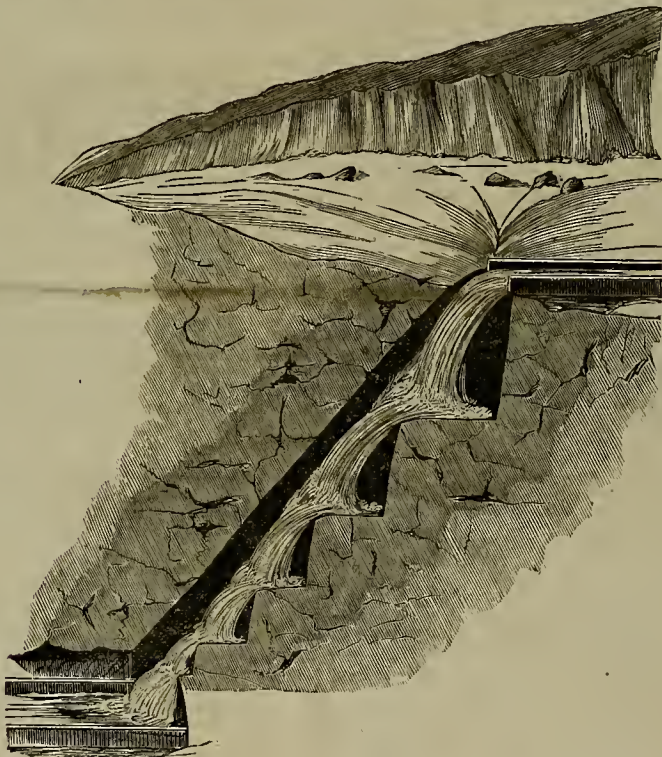


FIG. 8. SLOPE CUT INTO TERRACES.

system of terraces will be more advisable than a vertical shaft, for the reason not only that the sloping chimney is far more easily changed into terraces than into a vertical shaft, but also that the danger of blockading or choking is greatly lessened.

The terraces ought to be constructed in such a way that the first fall is the deepest, each successive one lessening as the tunnel is approached, so that the last fall is not more than a common drop of two or three feet, such as may be found on a line of sluice boxes.

The diagram given represents a slope of 100 feet vertical height, cut into terraces.

	FEET.
The first fall represents.....	30
The second.....	25
The third.....	20
The fourth.....	15
The fifth.....	10
The sixth and last, into the boxes.....	2 1/2
Total.....	100

Whether a vertical shaft or a slope—in other words, a single drop of 100 feet, or a succession of drops of the same aggregate depth, will be preferable, is a matter open to discussion. It seems that a succession of blows, of less force but striking the matter to be crushed from different sides, must be more effective than one

"Metallurgy of Common Metals." One lecture will be delivered on each of the following metals: Gold, silver, quicksilver, and steel. After these four are delivered, Prof. Charles E. Bessey, of the Iowa State Agricultural College, will commence a series of four lectures upon the "Useful Vegetable Products," and will be followed by Prof. Brewer, of Yale College, with a course of four lectures on coal, salt and oil. The lectures, like those heretofore delivered, will be free, but names must be enrolled with the Librarian of the Institute.

THE HOOSAC.—The Eureka Sentinel is informed that negotiations are pending in regard to the incorporation of the Hoosac Mining and Smelting company, to work the mine by that name, now the property of Harry Strout, of Eureka, who is now in San Francisco on business connected with such incorporation. The property has been developed under the supervision of Mr. Strout; the machinery, both at the mine and furnace, is in splendid working order, and should such an incorporation be made the company need not expend any money in perfecting the works, but start immediately on a working basis with a fine show of success from the start.

An eight-inch vein of cinnabar was last week found in the bedrock in the Wolf placer mine on Canon creek, Trinity county.

Academy of Sciences.

The annual meeting of the California Academy of Sciences was held on Monday evening last. No business was transacted except that of reviewing the annual reports of the officers, and the results of the election which took place on the same day.

The report of the Vice-President, enumerating the more important events of the year. The Academy has flourished, and in its new quarters, the museum is fast becoming rich in collections. Five members were lost by death during the year. The first of these was H. G. Bloomer, curator, whose library and botanical collection were purchased by the Academy. Then occurred the death of Col. Leander Ramsom and Dr. Fourgeaud, and news has arrived of the death of two corresponding members, one of them, M. Quatlet, and the other, Ferdinand Stoliczka, a distinguished paleontologist at Calcutta. The Recording Secretary, Mr. Charles G. Yale, had performed his duties with unremitting faithfulness, and in view of the very large amount of copying he has to perform, General Hewston recommended that some assistance be obtained for the mechanical part of his work. Mr. Bloomer's successor, Mr. William G. Blunt, had worked very laboriously since his appointment, in the arrangement of the museum and the library. There are now 20,000 specimens in the mineral department, principally of ores from California, Nevada and Oregon. Many of them are duplicates, and some effort should be made to exchange them for others. There are also 280 species of fishes, and 100 of reptiles, besides birds and 200 different kinds of birds' eggs in the collection. The report concluded with a pleasant reference to the generous deeds of James Lick and the distinguished services of Prof. Davidson.

Mr. R. C. Stearns presented a report on his labors as Corresponding Secretary.

The report of Mr. Charles G. Yale, Recording Secretary, contained the following: During the past year the average attendance at the meetings of the Academy has been 47 members, the highest having been 66 and the lowest 30. Eighty-three resident members have joined during the year, 12 life members and four corresponding members. Two of the resident members have become life members. Seven have resigned. Six have been dropped for non-payment of dues, and the total membership of the Academy now is 411. There are 316 resident, 75 life and 20 honorary members. Not only has there been an increase in the average attendance, but the number of papers read has been greater. During the year past there were 61 papers presented, most of which are published in the proceedings of the Academy. A list of these papers is given in the report.

Mr. Brooks' report on the financial standing of the Academy showed that on the 1st of January last year, there was a balance on hand of \$4,563.72. From monthly dues there was received \$2,961; and from life memberships, \$1,800. The total receipts were \$10,946.47; and the expenditures, \$7,988.04; leaving on hand, \$2,958.43.

Dr. Behr's report on the library stated that by the untiring labors of Mr. Blunt the volumes and papers have been neatly arranged in cases and protected from damp. There are 2,500 bound volumes and the same number of unbound.

Mr. Stearns reported that the proceedings of the Academy for the year will make a volume extending to 424 pages.

The officers elected for the ensuing year are as follows: President, George Davidson; First Vice-President, Henry Edwards; Second Vice-President, Henry Gibbons, Sr.; Recording Secretary, Charles G. Yale; Corresponding Secretary, Henry G. Hanks; Treasurer, Elisha Brooks; Librarian, Wm. J. Fieber; Director of Museum, Albert Kellogg; Trustees, David D. Colton, Geo. E. Gray, R. E. C. Stearns, Thos. P. Madden, Jno. Hewston, Jr., R. C. Harrison, W. Ashburner.

The property of the Tannehill Mining company, at Enreka, has been sold to satisfy an execution. Selden Hentzel was the purchaser, paying \$4,300.

CORRESPONDENCE.

Arizona--The Dreary Desert Trip--The Quahate Mines.

Not many years ago I listened to a glowing description of the then but little known mines in Arizona, by Christopher Carson (nephew of the celebrated "Kit"), who asserted that the then hidden and undeveloped treasures that would be found would far surpass the famed Comstock lode. Mr. Carson (who since that time was killed in a quarrel at White Pine) I thought was entitled to great consideration in his views, as being an expert in the Indian language and travelling among the Apaches almost anywhere unmolested, of course his field of observation was more extended than that of any other person. Remembering his peculiar manner of predicting the future of Arizona, and noticing the quiet drift of emigration tending that way for the last few years, and occasionally reading of some rich strike being made, my attention has been closely drawn to this southern country. So, being placed by an engagement to a large mining company, at this extreme southern town for an extended period, I shall note down from time to time the mining and other progress of this territory, for the columns of the SCIENTIFIC PRESS.

At six o'clock on the morning of the eighth of December, Gov. Safford, Lieut. Loshe and myself left the Horton House, San Diego, en route for this place, the Capital of the Territory. Our conveyance a Concord wagon, canvas top, with two seats inside and the driver's outside; drawn by four very good horses, and the redoubtable "Brown" for our driver.

What Brown?

Why, our Brown, of course. The pleasant, agreeable and noted driver, H. C. Brown--strictly temperate, always ready with a song, and, as he says, a "banking after broncos." We had a surplus of baggage aboard, the amount allowed to each passenger being only forty pounds--charges for all above that, sixty cents per pound--the fare being ninety dollars, all in greenbacks. At two o'clock we arrived at Rock Springs, 37 miles out, in Lower California--Mexico. Salt and alkali plains, with sagebrush and some mesquite. Here we had something to eat, changed horses and travelled on, through some very fair land, with fine running water, to

Hill's Ranch.

Travelled 33 miles more, and by 10 p. m. stopped a few miles from the summit of the coast range, got a good supper, changed horses and drivers--exit Brown--and in 25 minutes on we go again. What a grand mistake I made about the weather. It is piercing cold. Gov. Safford laughs at Lieut. Loshe and myself for not bringing blankets, and said we were a "verdant pair, sure enough," and wondered "why we had brought our overcoats." We managed to buy a single blanket and a pair of woolen socks, and by wrapping our feet and legs in paper and barley sacks, worried through the night. At 7 a. m. arrived at

Coyote Wells;

30 miles more! Oh how cold and sleepy. Sand dunes and rocky ribbed ledges in all directions. Got a poor breakfast, changed horses and drivers, also wagons. One of the most peculiar ideas to me is, right here in the midst of the desert where the heaviest pulling is to do, we are reduced to two horses. On we slowly go again, after an interval of 35 minutes at the worst substitute for a house I ever saw. Gov. and myself walked a few miles while Lieut. Loshe sleeps--desert everywhere, desolation supreme. Eighteen miles more brought us to

Indian Wells

at 3 p. m. Government telegraph station. Sand dunes piled upon each other in every direction seemed almost endless. Change horses, a few more miles and we are in Mexico again. At 6 p. m. we reach New river, 15 miles farther. We partook of an awful bad meal, everybody cross and another cold desert night before us. Seventy miles to Yuma. At a quarter to 11 p. m. we got to Gardiner's. Change horses, got four this time so as to make a good appearance going into town; awful dusty; get some sleep, however; roads smooth. About eight o'clock we struck the Colorado river in Mexico and wind along up its banks and we are soon back in the United States again. Castle Dome loomed up some 50 miles away where I understand some mining is being done. Arrive at Fort Yuma nine o'clock. Fort and barracks with government houses situated on the hills of the west bank of the river. Cross on a very good ferry and roll up to the hotel on a brisk trot. One long wide street dotted with one story adobe houses comprise the town of

Yuma City, Arizona.

Population, about 600. Understand no messages have been received lately from deceased soldiers for blankets. Thermometer in hotel standing at 58° at 10 a. m., calmed our surprise at the cessation of messages from Hades, not

withstanding several Indians were perambulating the town almost in nature's habiliments only. Get a good square meal and Lieut. Loshe draws on quartermaster for some of the good things of life. Procure new driver, new horses, four again to make a good show leaving town, and a small wagon or buckboard with only two seats--they call it a jerk-water. Judge it is rightly named from the many times we were jumped upon our feet and bumped around promiscuously. Gov. Safford receives congratulations of friends. Get copies of Yuma Sentinel and at 10 o'clock trot out of town and take our course along up the Gila river. Arrive at Gila city, a place of one house and a corral. At 2 p. m.; 20 miles out from Yuma city, get another square meal and roll along 24 miles more to

Fillbuster,

A stage station receiving its name from the Crabbe party who went down into Sonora some years ago to revolutionize the government and made this their last camping place before entering the State of Sonora, Mexico. Arrive at 7 p. m. and get a very objectionable meal. Change horses and proceed on to Mohawk, 22 miles; night air very uncomfortable, no sleep from the cold and rough bumping in our jerk-water. Arrive at 12 o'clock at night. Here we change horses and get a new driver, a would-be Congressman--just think of it!

The Hon. Dave Beardsley,

Late candidate for Congress from the Territory of Arizona, guide and director of our little two horse jerk-water en route for Tucson. Our sleepy heads were all awake with curiosity, and our wearied and cramped limbs straightened out, our bodies were erect with the dignity becoming the occasion for a look at the Congressional features, and a shake hands with this wonderful prodigy of the road. We were soon whirling along again after two of the sorriest "plugs" we had hitherto as yet, but the mere idea on our imaginations of the gentleman who was our driver exalted the horses into fiery, prancing steeds, each one a Bucephalus. "Tired nature's sweet restorer" overcame us for awhile, and at 4 o'clock we halted at Teamsters' Camp for breakfast--16 miles more of our wearisome journey over. The bright rays of the morning sun warmed us into life again, and we listened to Mr. Beardsley on the late Congressional canvass. He was an old friend of the Governor's, and the manner in which he described the part he took in the canvass was amusing.

"Governor, I warmed them up, didn't I, do ye see? You bet yer bottom dollar I'll make some of them hunt their holes next time by--do ye see? You can jest bet yer sweet life I'll go for them like a coyote!" Nine a. m. brought us to Stanwix station, the home of

King Wolsey

The great "greaser" hunter and Indian fighter. There are some fine lands in this portion of Arizona. The Gila bottoms are rich, and a great deal of wheat and other cereals are annually produced. Burk's station at 12 a. m., dinner, change horses and move on; the road rocky and rough; cross some high mesas or table lands; some very high hills, and pass the grave of the Oatman family, which is in a very pretty valley. The grave is neatly fenced in and on a clean white board at the head of the grave we read, "Royce Oatman and family, murdered by the Tonto Apaches, April 19, 1851. Erected by Lieut. H. L. Williamson, Troop K, 1st U. S. Cavalry, 1871." The sad details of this affair have been published in all the newspapers of the Union.

Pass the tollhouse in twelve miles more. For three or four miles from here the road runs under a rocky and precipitous bluff along the banks of the Gila, and considerable work is required each year to keep the way passable, so a certain toll is charged on all teams. On to Kenyon station, eight miles; arrive at half-past five; get a very fair meal; change horses and drivers; bid good bye to Mr. Beardsley and roll on to Gila Bend eighteen miles; arrive at 11 p. m. There we find the neatest adobe house we have come to so far, kept by a Mr. Decker. Awful cold; wrap up close and off we go for Maricopa Wells, 45 miles distant, across the worst desert we encounter in Arizona, and which, by the way, I must say is a paradise compared to the California desert. I think Arizona has been somewhat slandered, for over the road we have traveled in the Territory there has been no place but what some vegetation grew, and the interminable and desolate sand dunes of San Diego county, California, are almost forgotten in the relief we experience in traveling over the alkali plains of Arizona.

On the verge of the desert on a high plateau stands the building or buildings of the noted

Maricopa Wells,

Consisting of a series of edifices all connected with each other--hotel, postoffice, telegraph office, stage office, store, grocery, wagon and blacksmith shops, stables, corral, wagon yard and other outbuildings, all of one story adobe and belonging to a Mr. Moore, superintendent and part owner of the stage line, a very hospitable and pleasant gentleman, whose estimable wife with her kind manners and cheering conversation made us feel perfectly at home, especially the Governor, who seems to be a favorite all along the route. After partaking of a hearty breakfast, we get a new team, driver and a large wagon, and in an hour from the time we stopped we are off on the road again with one additional passenger, Mr. George H. Tyng, U. S. Marshal of Arizona. Through this gentleman I received some information about the

Silver Quahate Mines.

They lie 40 miles southeast of Maricopa Wells, in the Quahate mountains. On the Quahate claim they are down but a few feet, and have a three-foot vein of rich ore, which would all yield if worked right over \$300 per ton. Their claim lies within the 300 foot limits of the Sacaton, to which it runs nearly parallel, the ore carrying a great deal of chloride. It is now being worked by arrastras, yielding handsomely. The

Sacaton Mine

Has a shaft 12 by 12 down 64 feet in solid ore. True fissure vein 12 feet wide; 1800 pounds of ore yielded 394 ounces of silver by smelting; ores not base enough for easy smelting, but too base for easy amalgamation. The mine is now worked by arrastras, yielding over \$200 per ton. It is twelve miles to wood and water. Besides these two mines there are several other locations which have been pretty well prospected, the assays running way up in the thousands. We pass through the Pimo villages on the Gila, by the U. S. Indian agency buildings, on to the Sweetwater station 25 miles; arrive at 4 p. m. and get dinner. Here we diverge from the direct route, as the mail has to go by the way of Florence following the Gila, which makes our journey some 40 miles longer. We pass through Sacaton and arrive at

Florence

At 11 p. m., over a very good road, 33 miles. The change into a much better country is very perceptible, the land since leaving Maricopa Wells growing richer with fine grasses. Florence has as fine a fitted up store inside as any place outside of San Francisco, also fine running streams and trees growing in all directions. Change horses and drivers for the last time; get a very good supper; take on another passenger, which makes six on our wagon now, with no chance for sleep, and off we go on the homestretch for Tucson, 80 miles distant over a very fine road with a good four horse team and an excellent driver. Pass the Picacho in the night; eat breakfast at 8 a. m. at Desert station, and travel on a brisk trot by some fine ranches along the Santa Cruz river, and at 12 o'clock noon on Sunday, the 13th, after being one hundred and twenty-six hours on Concord wagons and buckboards, we arrive at Tucson, a wearied, worn out, sleepy set.

JOHN E. M.

Tucson, Dec. 18, 1874.

The Empire Mine.

The Grass Valley Union speaks as follows of the Empire mine:

This is one of the oldest quartz mines in the district, and is, we believe, the very oldest of any now being worked. The mine employs 80 miners at \$3 per day, as wages. The cost of sinking per foot is \$12; cost of drifting, per foot, \$8, and the cost of stamping, per ton, \$5. The cost of extracting ore per ton is \$8, and milling costs \$1.75 per ton. The company own the mill. The number of tons taken out and worked during the year is 11,000, and the average yield has been 16.75 per ton. The percentage of sulphurets has been 3 1/2. The total billion product has been \$187,000. The length of location is 2,800 feet; course of ledge north and south, with the dip toward the west. The length of the pay zone is 1,300 feet, with an average thickness of 15 inches. The mine is worked through a shaft which has a depth of 1,250 feet. There are 12 levels opened. Total length of drifts, 7,900. Cost of hoisting works, \$40,000. Steam power is used, and the mill has 20 stamps, which weigh 900 pounds each. Each stamp drops 72 times in a minute, and the height of the drop is nine inches. Number of pans, four; number of concentrators, ten. The cost of the mill was \$40,000, and its capacity is 40 tons for every 24 hours. The sulphurets are treated by the chlorination process.

The empire is owned by an incorporated company, whose principal place of business is at San Francisco. Mr. David Watt is Superintendent, and Mr. James Benallick is the underground foreman.

PLACERS IN NEVADA.--A gentleman who has been prospecting in Island Mountain district writes as follows to the *Elko Independent*:

I took a pick and shovel and started to work in Brown and Norton's claim at the head of the talrace, where it is about five feet to the pay ground, of which there are three feet next to the bed-rock, and out of ten buckets of this, B. washed \$5, which of course astonished me. I also went some 30 or 40 feet from this toward the side-hill and washed 10 buckets more, taking out the sum of \$2. This satisfied me beyond a doubt that the ground was exceedingly rich and would pay from \$25 to \$50 per day to the man. I spent the balance of the day in panning out, and found that two bits to the pan was a common prospect, sometimes ranging as high as \$1. I did not confine my prospects to one claim; I panned out some six or seven pans in Judd's claim, which verified the result of the other claims, and so on up to the summit of the mountain. I would just as soon have a claim of 20 acres in Hope Gulch as \$20,000 on deposit in Freeman & Co.'s bank. The miners of this place are satisfied with their claims, and don't care to sell. The water ditch is complete to the company's claims, and their hydraulic is set and ready to wash down the large bank of gravel on the bench from the creek. When they get it in full blast they will certainly take out large quantities of gold dust.

The New "C. and C. Shaft."

We yesterday visited, says the *Enterprise*, the spot where the new California and Consolidated Virginia shaft is being sunk, 1040 feet east of the present main shaft of the Consolidated Virginia Mining company. This shaft will be known as the C. and C. shaft. It is situated a short distance northwest of the works of the Virginia City gas company. We were surprised at the progress that has already been made on the shaft and at the life and bustle already visible in its vicinity. The shaft is larger than the shaft at the present Consolidated Virginia hoisting works, and is already down a distance of twenty-six feet. It is being substantially timbered from the top, and quite a strong force of carpenters is now on the ground. A small frame building now covers the shaft, but there is in process of erection over this a new building which will be 40x70 feet in size. In this new building will shortly be set up a donkey engine to be used in hoisting from the shaft. Eventually, when the shaft shall have attained a depth beyond the power of the donkey engine, there will be set up new and powerful hoisting machinery, and a new and commodious building will take the place of the temporary structure now about to be erected. Some of the carpenters are engaged in the erection of the temporary building, some in framing timbers for its interior works and others in cutting and fitting the timbers used in the shaft. Already there is enough lumber and timber of various kinds on the ground to answer as the start for a first-class lumber yard. As yet the shaft is in a gravel formation; no bed rock has been reached. The location is a fine one for such a shaft, as the ground is smooth and comparatively level in all directions about it for a great distance. Just north of the shaft is a small ravine, but this will soon be filled up to the general level with the dirt and rock hoisted from the shaft. When they begin working the great bonanza through this shaft it will be quite a lively place. In anticipation of this there has already been a considerable rise in property in the neighborhood. From \$400 to \$500 is the price now asked for lots which might have been purchased for \$100 a fortnight or two since. Already new frame buildings are to be seen going up in various directions, and the indications are that in another year or two Chinatown will again be absorbed, and that it will again be necessary to call upon the Celestials to pack their traps, pull up stakes and build themselves a new town farther out in the country; probably some where down on Six-mile canyon. In this new departure to the eastward by the California and Consolidated Virginia companies, other companies will follow at no distant day, and in a few years there will be seen numerous shafts and hoisting works extending north and south on a line with the "C. and C."

COVERED UP THE NUGGET.--The San Juan (Nevada *City*) Times says: A couple of men, one of them a sailor and the other a blacksmith, were working in a certain mine situated not far from San Juan, a few days ago, being engaged in pining against a bank of solid gravel. They were working about 30 or 40 feet distant from each other. While thus engaged, each having his eyes directed towards the bank very intently anticipating a cave, discovered at the same moment something peeping out of the bank which looked to them like a chunk of solid gold. Each dropped his pining apparatus and started toward the bank to secure the prize, but before they reached it a cave came and covered up their treasure. The adage of the fox and the grapes will apply to the incident. The fellows are working like Trojans night and day to unearth the chunk of gold.

BEAVER DISTRICT.--A correspondent of the Salt Lake *Tribune* says: Joseph Smith and others have made arrangements to immediately erect a thirty-ton furnace at a large spring, near Minersville, where an abundance of ores can be obtained to keep it going. The cry is sent us a railroad to haul the bullion away, and this ores too, for in the range adjoining Lincoln district has been found large quantities of milling ore, which, as soon as a railroad makes its appearance, will be shipped forthwith, to some good and reliable mill or mint, there to be crushed into trade dollars. The whole mining interests in and near Beaver, and for 50 miles around, are looking up. Every day I hear good news from the miners in Star. Beaver Lake District will also shortly be placed on the list as good, and now is the time to invest.

THE Eagle mill started up last Thursday, says the *Silver State*, and the machinery ran smooth as oil. The capacity of the mill is 18 tons per day. A drift is being run on the ledge from the bottom of the shaft 130 feet from the surface. Two shifts are employed in sinking the shaft and two more in running the drift, which is now in 60 feet from the shaft. The ledge is from three to four feet wide the whole length of the drift.

VILLAGE BELLE.--The Village Belle in Unionville continues to excite the good people of that town. The ledge is located on a steep hillside, and a tunnel has been run on the ledge 50 feet into the hill. A cross drift from the end of the tunnel 24 feet long has not reached the foot wall. This 24 feet is in vein matter, principally decomposed quartz, all of which assays well in gold and silver.--*Silver State*.

MECHANICAL PROGRESS.

Economic Use of Fuel.

The following interesting summary is from an address recently delivered before the Royal School of Mines, at Berlin, by G. F. Becker: The progress in the economical consumption of fuel in the last fifty years has been enormous, and has been effected in great part by metallurgists; and here again we find the scientific men taking the lead. In the economical application of the heat developed by fuel, the Bessemer process is enormously effective, not more than ten pounds of coal being requisite for the production of a hundred weight of steel from pig iron by this method, while in the older process, still in use for fine qualities of steel, two hundred and fifty pounds are needed. Siemens, by making the heat which would escape through the chimney of an ordinary furnace warm the fuel and the air necessary to combustion, obtains an economy of two-thirds the weight of fuel. It was Faber du Faur, an accomplished Bavarian metallurgist, who first made practical use of the gases which formerly escaped in immense quantities from the tops of blast furnaces and the enormous blast engines, the hoisting engines, pumps and hot blast stoves, even the roasting kilns of such establishments now-a-days require no fuel except this long-neglected waste product. Bischof, another German engineer and metallurgical author was the first to produce gas artificially for smelting purposes, and this was certainly one of the greatest advances ever made in our art. By first turning it into gas, fuel can be much more perfectly consumed than in the solid form, and hence can be made to give us, as in the Siemens furnace, in which only gas is used, a much higher temperature than is practically attained by the combustion of coal in the ordinary way, but perhaps the greatest advantage of gas is that substances, in general scarcely regarded as fuel at all, can be employed for the production of gas with the most brilliant results, a matter of the greatest importance, especially in a region destitute of true coal, like California. Lindius, a noted and thoroughly educated Swedish metallurgist, has taught us how to produce gas from wet sawdust, entirely without preparation, of such power that wrought iron may be melted with it, and the great difficulty is to find any material infusible enough to answer as a lining in the furnaces where it is consumed. You will receive some idea of the importance of these improvements from the fact that the economy in fuel effected in England alone in the year 1872, as compared with 1871, by the progress made in the introduction of more perfect apparatus, represented more than four millions of tons of coal.

Glass For Veneering, Paneling, Etc.

Attention has already been made in these columns to the use of glass for lining of tanks, etc., and to take the place of the ordinary enamel on iron—a method for the practical accomplishment of which has been devised and patented. The great object to be gained by this is a surface easily cleaned, and the possibility of perfect cleanliness—as for fermenting vats, etc. It also offers a solution to the lead poisoning difficulty. It may also be used for veneering and decorating purposes, in many cases with very good effect. Designs might be colored and placed under glass and so preserved from fading and wearing. Another good suggestion has been made by a writer in the London Builder that thick glass might be easily and cheaply cemented to the walls of hospitals, etc. It would be non-absorbent, imperishable, easily cleaned, readily repaired if damaged by accident, and, unlike paper and paint, would always be as good as at first. Glass can be cut or bent to conform to any required shape. If desired, the plates may be colored any cheerful tint. The non-absorbent quality is the most important for hospitals and prisons, and, we should think, is worthy the consideration of architects. NEW ENGRAVING PROCESS.—M. de la Grys reports a new process in engraving on copper. It consists, says the Scientific American, in first covering the plate with a thin coating of adherent silver, which is in turn covered with colored varnish. The lines are then drawn with a sharp point, after the fashion of using a diamond for stone engraving, and subsequently sunk into the plate by means of the action of perchloride of iron. IMITATION PATENTS.—The practice of patenting imitations of articles of standard excellence is growing in favor in the United States. A patent lately granted is for producing an imitation of Russian sheet iron. This is done by hammering the sheet between anvils and hammers that have indented surfaces, so as to give the sheet a mottled appearance. Another patent is for an imitation Swiss window shade, in which the lace work is imitated by stencils. IMPROVING RIVER NAVIGATION.—An appropriation was granted by the last Congress, furnishing \$40,000 for improving the navigation of the Ohio, near Pittsburg. It is expected that this appropriation will test the efficiency of the system of the improvement of rivers by the erection of dams.

Cutting Steel Rails Cold.

The cutting of a file in halves with soft iron is an old lecture experiment. The soft iron forms a disc about six inches in diameter, is mounted on a lathe spindle, and run at about 2,000 revolutions per minute. A file held to the edge of the disc is cut in two in about ten or fifteen seconds, the disc being unharmed. The shower of sparks renders this a brilliant experiment, very popular with a general audience. The principle involved is now being applied for a practical purpose. Mr. Charles White, manager, Sir J. Brown & Co.'s Works, Sheffield, England, has found the cost of cutting off the ends of steel rails cold in the ordinary way so enormous that he resolved to try another experiment. For experiment, he had an ordinary rail saw put in the lathe and all the teeth cut off. The revolving disc was then mounted on a spindle and driven at nearly 3,000 revolutions a minute. This disc was 3 feet in diameter, so that its circumferential velocity was about 27,000 feet, or over five miles a minute, or over 800 miles an hour. Steel rails forced against the edge of this disc were easily cut through in three or four minutes each. The rails weighed 65 pounds to the yard. Sparks flew in abundance, and the disc appeared to melt the rail before it; but after cutting five rails the disc itself was not sensibly warmed. The experiment was such a complete success that the firm intend putting up a very powerful saw for the purpose of cutting cold steel rails.—Ironmonger. Saws of this kind and for the purposes similar to those named were in operation at two steel works in Pittsburg, Pa., before the experiments at Sheffield were made public. The application is no doubt a very important and valuable one. BRONZES INCRUSTED.—This is the name given to a new style of bronze or copper work ornamented with gold and silver and manufactured in Paris. The ornamentation is produced by etching and electroplating, and consists in the following operations: After the object which may be of massive copper or bronze, has received the desired form; the drawings are made with water colors, the body of which is white lead. If several pieces are to have the same design, it may be printed on as in porcelain and faience painting. Those portions of the surface not painted are covered with varnish. The article is then placed in dilute nitric acid where the paint is dissolved off and the surface of the metal is etched to a certain depth. When the etching is finished the article is washed with water and immediately placed in a silver or gold bath, and a layer of the precious metal deposited by electricity on the exposed portions. When the latter operation is finished the varnish is perfectly removed and the whole surface ground or polished so that the ornamental portion is just even with the remainder of the surface. The contours are quite sharp. The surface is then bronzed which does not change the color of the gold or silver. A specially fine effect is obtained by producing a black bronze of sulphuretted copper on portions of the surface between the silver ornaments. A copper vessel then has three colors, black and white drawings on a red brown ground of snoboxide of copper. This new process for ornamenting metals has been devised at Christoffe's works since the Paris exposition of 1867. These goods are so expensive as to be only accessible to the few, although much cheaper than those in which the engraving is done by hand, and the gold or silver inserted by mechanical means. The production of an incrustation requires a high degree of manual skill and patience, but no costly machinery. Every brass foundry contains all the necessary tools for the mechanical operations. A NEW SHELL.—Various experiments have been made by a War Committee on explosives, with a view of ascertaining the practical effect of Professor Abel's proposed plan for the bursting of common shells filled with water, by means of a detonator, consisting of dry compressed-gun-cotton enveloping a small cap of fulminate of mercury. Some months ago the practicability of exploding 16-lb common shells in this manner was satisfactorily established, and the result of such an arrangement was the bursting of a shell into 300 fragments, whereas only about thirty pieces were produced by the explosion of an ordinary bursting charge of gunpowder. The effect of such an explosion among troops in the field could not be otherwise than disastrous in the extreme. Lately, however, experiments have been made with 9-inch common shells, which far exceed in effect that of any conducted with the field service common shell. On this occasion the bursting element employed was wet gun-cotton in lieu of water. The result was extraordinary, the shells bursting literally into thousands of pieces. IMPROVEMENT IN MAP MAKING.—Lloyd, the famous map man, who made all the maps for General Grant and the Union army, has invented a way of getting a relief plate from steel so as to print a map 40x50 inches in size on a fast working power press. This will so much cheapen the price of map-making as to enable him to furnish an unmounted map of the above size on bank note paper, plain and unvarnished for 10 cents, or 25 cents colored and varnished.

SCIENTIFIC PROGRESS.

The Vacuum an Absolute Non-Conductor of Electricity.

We condense the following from the Scientific American: "The passage of electricity through rarefied air constitutes a well known experiment in the lecture room of physical science. The oldest style of performing it is to attach, by means of a stop-cock connection, a long glass tube to the air pump, each end of the tube being provided with brass caps. The electricity may be made to flow through its interior as soon as the exhaustion of the air has proceeded to a certain extent; then a most beautiful exhibition is produced in the dark, resembling the aurora borealis; hence such a tube is called an aurora tube, and the aurora borealis has been ascribed to a discharge of electricity from the polar regions to the equator, through the stratum of rarefied air above the clouds. Experiments prove that electricity is retained on the surface of bodies by the presence of the atmosphere, which is an isolating substance; and that when its pressure decreases, the escape of electricity becomes easier; while, in a good vacuum, the resistance to escape becomes zero, and the electricity flows off and cannot be retained at all. This has for a long time been the accepted theory, and is still taught in most text books on physics, and is believed in by most electricians; but that it is an error was proved by Becquerel, Hawksbee, Gray and Snow Harris, as they showed that even the weakest electric discharges could be retained in vacuo. Becquerel even went so far as to show that the charge was retained for 15 days, provided that the vacuum was so perfect as to be equal to a mercurial pressure of the twenty-fifth part of an inch; and he concluded that, in a perfect vacuum, the body would retain the charge for ever; in other words that electricity could not be transmitted through an absolute vacuum. Du Moncel, in his lately published French work on the Ruhmkorff coil, gives an account of his experiments in passing a powerful electric current through a tube in which the air was being more and more rarefied, and states that, when the vacuum was made very nearly perfect by the continued operation of a good air pump, the passage of electricity through the tube continually diminished; so that at last, when the pressure had decreased to less than a half millimeter (one-fiftieth of an inch) the light had almost disappeared, while tests proved that very little electricity passed; when, however, a little air was gradually admitted into the tube, the electric current was re-established, and the light appeared again. Gassiot was the first who attempted to make an absolute vacuum, deprived of all traces of air or gas. He produced a vacuum much more perfect than any one ever did before; while his manner of procedure allowed the experiment to be extended over several days, and even weeks. When the vacuum had been made with the air pump on carbonic acid, an electric discharge, which, in the air, would not pass over a distance of half an inch, traversed 20 inches with the greatest ease. In proportion as the vacuum became more perfect by the absorption of the carbonic acid, the discharge tended to fill the tube with a more and more pale luminous vapor. The vacuum becoming more perfect in the course of several days, the luminosity became confined to the sides, where the platinum wire, which conducted the electricity, entered into the vacuum; and a certain space, half way, became dark, and this darkness extended itself, so that, in a tube of 20 inches length, it occupied nearly 10 inches. When a galvanometer was placed in the circuit, it indicated that there was no longer a constant discharge as before, but occasionally alternate discharges; when also the tube showed light flashes, and the so-called stratification of the light. When at last the absorption went on, and formed a perfect vacuum, perfect darkness was obtained in the tube, and no trace of light showed itself, even with strong electric charges, while neither the galvanometer nor an ordinary vacuum tube, when introduced into the circuit, would manifest a trace of any current. From all this, it is therefore evident that it is practically demonstrated that the absolute vacuum is not only a non-conductor, but that it is absolutely impenetrable by electric discharges. SINGULAR CAUSE OF BOILER EXPLOSION.—The tube of a boiler recently exploded in a foundry at Liege, Belgium, was caused, as shown on examination by the corrosive action of ferrous sulphate and sulphuric acid, derived from the sulphur in the coal fuel. This discovery strangely points to the necessity of carefully and frequently cleaning the forward portion of the boiler tubes, and other parts which do not come in direct contact with the flame. THE MAGIC LANTERN IN DISEASE.—Dr. Balmano, a London surgeon, has successfully applied the magic lantern to the study of diseases of the skin. A transparent photograph of the skin is taken and then placed in a magic lantern. A strong hydro-oxygen light casts the picture enlarged on a white sheet, and in this way the smallest details are brought out with astonishing minuteness.

The Mysteries of the Human Throat.

Dr. Frederick Fieber, of Vienna, like the little boy with his drum, not content with enjoying the melody of Madame Pauline Lucca, has made a close scrutiny of the throat whence the sweet sounds issue, and publishes the result of his investigations. The mechanical apparatus which is the instrument of the mental faculty, appears, in Madame Lucca's case, to be beautifully perfect, the result to some extent, perhaps of congenital fitness, but also doubtless, partly of the scientific training to which the artist has been subjected in early youth. Examined under the laryngoscope, the larynx appears small and well shaped, its several parts being marvelously developed and perfect. The true strings are pure snow white and possess none of the bluish tinge common among women. Although shorter than usual among vocalists they are stronger in proportion and amply provided with muscle. When at rest they are partially screened by the false strings; but Dr. Fieber, who watched Madame Lucca's throat through his instrument whilst she was singing, noticed that as soon as a tone was struck, they displayed themselves in their full breadth and strength. The aid given by a suitable form of mouth to the production of vocal music is a novel and interesting point brought out by Dr. Fieber. On being admitted to a view of the artist's mouth he was at once struck with the spaciousness and symmetry of its hollow, the otherwise perfect symmetry being impaired only by the absence of a tonsil, which had been removed, as well as with the vigor with which every tone produced raised the "sail" of the palate. Dr. Fieber is of opinion that the natural conformation of her mouth accounts in a large measure for the wonderful power Madame Lucca possesses of raising and dropping her voice alternately. The sound waves are naturally strengthened in so favorably shaped a space, while the muscles of the palate appeared to have acquired exceptional strength and pliability by long practice. METALLIC SULPHIDES.—The reactions of sulphuretted hydrogen upon metallic salts are very different and often much opposed, according to the nature of the bases of the acids, and finally of the concentration of the solutions. Sulphuretted hydrogen precipitates weak solutions of lead, of copper, of mercury and silver; and this precipitation so often utilized in analysis is always accompanied by a disengagement of heat. A number of experiments show that a solution of sulphuretted hydrogen changes the chloride of silver and the bromide of silver into the sulphides. It has also been proved that the contrary reactions can be realized. In other terms the sulphuretted hydrogen decomposes the chlorides of lead, of copper, and of mercury in weak solutions, whilst hydrochloric acid ought to decompose in an inverse sense the corresponding sulphides. It is the decomposing action of the water upon the neutral salt which is the origin of the observed absorption of heat. Sulphuretted hydrogen ought not, in principle, to decompose any salt of manganese. However, sulphuretted hydrogen attacks, in truth the acetate of manganese, with a sensible precipitation of sulphide of manganese and also with the absorption of heat. ACTION OF MAGNETS ON SPECTRA.—An important fact has been noticed by M. Choquet of the French Academy of Sciences, which may seriously interfere with many of the conclusions heretofore drawn from the appearance of the spectra of the heavenly bodies. M. Choquet states that the effect of magnetic influence on the spectra of the flames of sulphur and selenium is to cause them to pale and finally to become quite extinguished. On the other hand the same influence multiplies the rays and renders more brilliant the spectra of chlorine and bromine. The effect, says the Investigator, is so rapid as to seem magical. The result of these discoveries is to render the deductions from the spectra of the heavenly bodies only to be accepted with great caution, as they virtually introduce a new element to be considered in drawing conclusions from the aspect of the same. AN EXPERIMENT WITH SILVER.—Böttger offers the following experiment to show the formation of binoxide of silver and metallic silver by electrolysis. A concentrated solution of nitrate of silver is placed in a wide glass cylinder, and two platinum wires, forming the poles of a galvanic battery, are placed in the solution in a vertical position, about three inches apart. Beneath the anode is placed a small watch glass, and the current from two Bunsen cells started. In a few minutes brilliant needles of binoxide of silver appear on the anode, and becoming too heavy to remain unsupported, fall on the watch glass beneath. On the cathode an equivalent quantity of pure metallic silver collects in snow-white dendritic ramifications. FATTY MATTERS IN CAST IRON.—An experiment made long ago by Froust revealed the fact that fatty matters can be extracted from cast iron when the latter is dissolved in certain acids. M. Cloez has recently separated these materials in a pure state, and their analysis reveals the interesting fact that they consist of carburets of hydrogen of the series C²nH²n, and present all the terms thereof at least from C⁸H¹⁶—propylene—to C¹⁶H³². This is a veritable organic synthesis, realized by the aid of substances purely mineral, and is susceptible consequently of important applications. In the Science Record for 1873 will be found an account of the extraction of similar matters from meteoric iron.

Mining Stocks.

Mining stocks continue "booming." The whole town seems in a state of excitement and nothing is heard but ore, drifts, levels, bonanza and other mining terms. Everybody talks stocks, and reads stocks, and there seems to be no other topic of interest at present. Cash sales are the rule, and the margin buyers have taken a back seat or are content with fewer shares and smaller profits. Our stock table in this column show the prices of all the stocks, some of which are almost fabulous, compared to their value a year since. The great bonanza on the Comstock is the talk of the country or city, and is said to be still spreading to the eastward. Prospecting has been stimulated around the Comstock to a great degree, and claims are being located on the mineral belt in all directions. The *Enterprise* says: In all directions along the Comstock and in the silver belt the utmost activity prevails. Not only is work being most vigorously prosecuted on the old claims, but much work is beginning to be done on new locations. It has now come to be the pretty generally received opinion—the suggestion was made by us a short time since—and that a certain belt of country is silver-bearing that it makes but little difference whether or not quartz is found on the surface so long as the location is favorable and the rock shows certain characteristics. This metalliferous belt is pretty strongly marked on the surface—the hills and the ground being of a yellowish or reddish tinge, very different from the dead hue seen in hills where the underlying rock is pure granite or other barren country rock. Below Gold Hill all the prospecting companies are very active, and all have new ideas of the strength and capacity of our silver range. When day after day they are driving ahead in the Consolidated Virginia without passing through their ore body the most experienced miners, experts, scientists, and all who know anything whatever of ores and mines are astounded. At once their ideas of the value of a location anywhere within the mineral belt go up at least one hundred per cent., and they do not feel like calling any mine "wildcat." Three months hence the mining excitement will not be confined so exclusively to the north end of the lead as it is at present. There will be developments made that will cause it to spread to the southward.

THE Moore & Morgan, on the Comstock, is a newly located mine, situated at the head of Comstock ravine, near the Enropa mine, and some five thousand ft south of the Consolidated Virginia. The croppings at the surface look very favorable, and as if it would not require any great depth to find pay ore at that point. The locators are energetic men, with plenty of capital.

Sales at the S. F. Stock Exchange.

Last Week.		This Week.	
WEDNESDAY, DECEMBER 30.		THURSDAY, JANUARY 7.	
MORNING SESSION.		MORNING SESSION.	
750 Alpha.....	375 1/2 39	920 Ophir.....	311 1/2 31
90 " b 30.....	100 " 100	" " b 10.....	32 " 32
505 Belcher.....	54 52 52 1/2	3555 Mexican.....	6 7 7 1/2
625 B.....	46 46 46	1000 Nevada.....	15 15 15
65 " b 5.....	81 81 81 1/2	1445 Beet & Bel.....	67 67 67 1/2
100 " b 30.....	64 " 64	" " b 10.....	10 10 10 1/2
515 Dollar.....	8 8 8 1/2	230 Savage.....	182 1/2 182 1/2
1700 Ophir.....	10 10 10	10000 Silver.....	15 15 15
340 CG Hill.....	76 74 74 1/2	260 H N.....	65 1/2 65 1/2
660 Confidence.....	44 44 44 1/2	45 Crown P.....	45 45 45 1/2
65 Con Vir.....	10 10 10	445 Jacket.....	14 14 14 1/2
20 " b 30.....	56 56 58 1/2	100 " b 10.....	10 10 10
760 California.....	160 160 160	1205 Imperial.....	1 1/2 1 1/2
10 " b 30.....	49 " 49	645 Empire.....	14 14 14 1/2
30 D.....	22 22 22 1/2	1000 CG Hill.....	14 14 14 1/2
860 Empire M.....	13 1/2 14 1/2	240 Kentuck.....	22 1/2 22 1/2
20 30 G & C.....	52 52 52 1/2	105 Belcher.....	55 55 55 1/2
100 " b 30.....	100 100 100	1000 Am Flak.....	15 15 15 1/2
150 Kentuck.....	22 1/2 22 1/2	3160 " b 10.....	1 1/2 1 1/2
50 " b 30.....	100 " 100	2235 Belmont.....	14 1/2 14 1/2
1920 Imperial.....	18 18 18 1/2	300 Caledonia.....	30 30 30 1/2
10 " b 30.....	22 22 22 1/2	210 Eureka Con.....	14 1/2 14 1/2
2125 Mexican.....	41 1/2 41 1/2	65 Excheq.....	40 40 40 1/2
100 " b 30.....	40 40 40 1/2	3210 Koonst.....	75 75 75 1/2
920 Ophir.....	15 15 15 1/2	223 Justice.....	12 1/2 12 1/2
100 " b 30.....	19 19 19 1/2	1000 " b 10.....	15 15 15 1/2
300 " b 5.....	150 150 150 1/2	1820 Lady Wash.....	5 5 5 1/2
369 Savage.....	184 1/2 184 1/2	2300 Lady Bryan.....	1 1/2 1 1/2
100 " b 30.....	24 " 24	2235 Con Vir.....	8 8 8 1/2

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MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. E. Journals.]

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No.	Amt.	Levied.	Deling't.	Sale.	Secretary.	Place of Business.
American Flag M & M Co	Ely District	8	50	Nov 10	Dec 14	Jan 11	G R Spinney	329 California
American Flat M Co	Washoe	4	1 00	Dec 7	Jan 9	Jan 27	C A Sankey	331 Montgomery
Andes S M Co	Washoe	3	26	Feb 7	Jan 11	Feb 1	M Landers	501 Montgomery
Arizona & Utah M Co	Washoe	11	75	Dec 1	Feb 1	Jan 27	J Mander	419 California
Arroyo S M Co	Unionville	1	1 00	Nov 20	Jan 8	Jan 29	Wm Willis	419 California
Baltimore Cons M Co	Washoe	7	1 00	Dec 5	Jan 8	Jan 29	D T Bazley	401 California
Bellvue M Co	Placer Co Cal	10	50	Dec 10	Jan 14	Feb 23	F B Verdenal	409 California
Bowery Cons M Co	Ely District	12	1 00	Nov 14	Dec 18	Feb 8	G E Hildreth	419 California
California S M Co	Nevada	12	1 00	Nov 14	Dec 18	Jan 7	C A Sankey	331 Montgomery
Charlot Mill & M Co	San Diego Co	1	50	Dec 24	Jan 23	Feb 13	F Swift	419 California
Cherry Creek M & M Co	Nevada	1	15	Nov 10	Dec 14	Jan 7	F B Verdenal	409 California
Chollar-Potosi M Co	Washoe	11	50	Nov 10	Dec 14	Jan 7	W E Dean	419 California
Crocker M Co	Washoe	11	1 00	Oct 27	Dec 4	Dec 23	G R Spinney	419 California
Empire Mill & M Co	Washoe	17	50	Dec 28	Jan 29	Feb 13	W E Dean	419 California
Empire M Co	Idaho	8	1 00	Nov 10	Dec 10	Jan 4	Willi m Willis	419 California
Globe Cons M Co	Washoe	9	75	Dec 1	Feb 1	Feb 1	J Maguire	419 California
Globe M Co	Washoe	9	75	Dec 1	Feb 1	Feb 2	J Maguire	419 California
Golden Charlot M Co	Idaho	12	1 50	Jan 4	Feb 8	Feb 23	L Kaplan	Merchants' E
Ida Elmore M Co	Idaho	15	1 00	Nov 16	Dec 21	Jan 12	Willis Willis	419 California
Imperial S M Co	Washoe	20	40	Nov 16	Dec 21	Jan 12	D A Delaney	419 California
Idaho S & M Co	Washoe	25	25	Dec 30	Jan 30	Feb 18	D Wilder	M Roban's E
Justice M Co	Washoe	12	3 00	Nov 13	Dec 15	Jan 15	J S Kennedy	Merchants' E
Kentuck M Co	Washoe	12	1 00	Dec 3	Jan 5	Jan 25	F Swift	419 California
Knickershooker M Co	Washoe	1	50	Dec 10	Dec 10	Feb 8	H Bonney	Stevensons Bl
Lafayette M Co	Nevada	4	50	Nov 11	Dec 16	Jan 11	F Swift	419 California
Lady Washington M Co	Washoe	2	30	Dec 17	Jan 21	Feb 8	H C Kibbe	419 California
Mahogany & S M Co	Idaho	15	2 00	Jan 5	Feb 11	Mar 4	O R Huggins	402 Montgomery
Minot S M Co	Washoe	8	1 00	Dec 14	Dec 22	Jan 29	D A Delaney	401 California
Minor-Belmont M Co	Nevada	5	50	Nov 10	Dec 14	Jan 4	W W Hopkins	414 California
New York Cons M Co	Washoe	11	50	Dec 5	Jan 6	Jan 25	H C Kibbe	419 California
Original Gold Hill G & S M Co	Washoe	2	50	Dec 12	Jan 14	Feb 1	W M Helman	Fireman's Fund E
Original Hudson Treasury	Washoe	1	1 00	Nov 10	Dec 14	Jan 21	D A Delaney	401 California
Payroll M Co	Washoe	30	3 00	Dec 1	Jan 5	Feb 26	G D Edwards	411 California
Paga Tunnel Co	Utah	1	5	Dec 12	Jan 20	Feb 20	J Ha dy	419 California
Pioche S M Co	Ely District	8	1 00	Nov 11	Jan 21	Feb 15	C E Elliott	419 California
Placer & S M Co	Ely District	8	30	Dec 13	Jan 21	Feb 15	T L Bonney	419 California
Posorman G & S M Co	Idaho	1	50	Nov 13	Dec 18	Jan 11	William Willis	419 California
Raymond & Ely M Co	Ely District	2	3 00	Nov 3	Dec 10	Jan 7	J C Colburn	418 California
Rock Island G & S M Co	Washoe	5	50	Nov 16	Dec 21	Jan 12	T W Clark	418 California
Rocket Mill Co	Idaho	5	50	Nov 16	Dec 21	Jan 12	Wm Willis	418 California
Savage M Co	Washoe	16	5 00	Dec 5	Jan 1	Jan 27	E B Holmes	419 California
Sierra Nevada S M Co	Washoe	30	3 00	Dec 1	Jan 5	Jan 26	G D Edwards	414 California
Silver Cord M Co	Idaho	7	1 00	Jan 2	Feb 1	Feb 26	Frank Swift	419 California
St. Louis S M Co	Idaho	11	50	Nov 10	Dec 14	Jan 27	G H Hildreth	401 California
Thrift G & S M Co	Calaveras Co Cal	5	50	Nov 24	Dec 26	Jan 16	H R West	240 Montgomery
Trier M Co	Washoe	7	50	Nov 19	Jan 21	Feb 12	C D Squire	Stevensons Bl
Utah S M Co	Washoe	7	1 00	Nov 25	Dec 30	Jan 20	W E Dean	419 California
Watson M Co	Idaho	8	1 00	Nov 10	Dec 14	Jan 4	Wm Willis	401 California
Washington & Creole M Co	Ely District	13	50	Dec 8	Jan 11	Feb 4	F D Cleary	Merchants' E
Watson M Co	Robinson Dist Nevada	1	1 00	Nov 16	Dec 21	Jan 13	W H Watson	302 Montgomery
Woodville G & S M Co	Washoe	8	1 00	Nov 10	Dec 14	Jan 5	W M Helman	401 California
Yule & Perkins S M Co	Washoe	19	1 00	Nov 10	Dec 14	Jan 5	G W Bonney	401 California
Yule Gravel M Co	Placer Co Cal	5	10	Nov 9	Dec 14	Jan 5	W H Watson	302 Montgomery

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Baltic Cons M & Co	Washoe	1	15	Nov	18	Dec	23	Jan	20	B Burris	507 Montgomery st
Calaveras Hydraulic M Co	Cal	5	5	Dec	7	Jan	9	Jan	25	A Sbear	321 Better st
Combination G & S M Co	Panamint	5	10	Dec	28	Feb	1	Feb	23	D Wilder	Merchants' Ex
Con Refrorm L & S M Co	Lower Cal	2	50	Dec	24	Jan	3	Feb	23	A D Carpenter	635 Clay st
Con Quick	Cal	5	20	Dec	23	Jan	3	Feb	23	J L Leonard	113 Leland st
Enterpise Cons M Co	Cal	1	12	Dec	26	Feb	3	Mar	3	F J Hermann	418 Kearny st
Florence M Co	Humboldt Co	10	10	Dec	5	Jan	6	Feb	3	E J Delamar	230 Montgomery st
Gold M G M Co	Holcomb Valley 'al	3	50	Nov	19	Dec	29	Jan	23	E F Johnson	418 California st
Gold Run M Co	Nevada Co	9	20	Dec	7	Jan	11	Feb	3	J P Cavalier	513 California st
Gravel M & M Co	Cal	6	10	Dec	13	Jan	8	Feb	3	C Palm-r	41 Market st
Hayes G & S M Co	Robinson Dist	1	20	Jan	4	Feb	12	Mar	8	R S Whelan	320 California st
Illinois Central M Co	Idaho	1	30	Dec	24	Jan	30	Feb	23	G R H Brown	402 Montgomery st
Kennedy M & M Co	Amador Co	4	1	Dec	12	Jan	10	Feb	10	C S California	210 California st
Keystone No 1 & 2 M Co	Arizona	4	1	Dec	12	Jan	12	Feb	10	A Wissel	330 Pine st
Los Angeles & Water Works	Cal	1	1	Dec	12	Jan	10	Feb	10	W R Townsend	808 Montgomery st
Martin & Walling M & M Co	Cal	1	50	Dec	7	Jan	8	Jan	23	J W Trapp	408 California st
New York M Co	Washoe	11	50	Dec	5	Jan	6	Jan	23	H C Kibbe	419 California st
North Bloomfield Gravel M Co	Cal	35	10	Dec	1	Jan	4	Jan	23	L Derr	326 California st
New York M Co	Plumas Co	1	75	Dec	3	Jan	4	Jan	23	A Martin	520 Washington st
Oreida M Co	Amador Co	10	10	Dec	11	Jan	16	Feb	3	L Kaplan	Merchants' Ex
Rattlesnake Quicksilver M Co	Cal	2	12	Dec	24	Jan	28	Feb	19	A Baird	316 California st
San Francisco & Central	Cal	1	1	Dec	12	Jan	10	Feb	10	K Lapp	376 Montgomery st
Star King M Co	Elko Co Nevada	9	25	Dec	4	Jan	8	Jan	26	L Kaplan	Merchants' Ex
Succor M & M Co	Washoe	10	10	Nov	27	Jan	4	Jan	25	W H Watson	332 Montgomery st
Union Gravel M Co	Cal	1	1	Dec	10	Jan	10	Feb	23	Del Monte	376 Montgomery st
Yarborough S M Co	Kern Co	6	30	Dec	23	Jan	30	Feb	23	E Berry	415 Montgomery st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	meeting.	Date.
Black Diamond Coal M Co	Cal	J H Dobington	305 Sansome et	Annual	Jan 1
Beech & Packer S M Co		Called by Trustees	507 Montgomery st	Special	Jan 1
Buckeyes & S M Co		Called by Trustees	331 Montgomery st	Special	Jan 2
Bullion M Co	Washoe	J S Kennedy	Merchants' Ex	Annual	Jan 1
California M Co	Washoe	Called by Trustees	401 California st	Special	Jan 2
California M Co	Washoe	D T Besley	401 California st	Annual	Jan 2
Consolidated Virginia	Washoe	Called by Trustees	401 California st	Special	Jan 2
Consolidated Virginia M Co	Washoe	D T Besley	401 California st	Annual	Jan 1
Deer S M Co	Cal	H Hill	411 1/2 California st	Annual	Jan 1
Emerald Hill M Co	Nevada	F Medge	Merchants' Ex	Annual	Jan 1
"430" M Co	Washoe	E F Stone	419 California st	Annual	Jan 1
Gold & Curry M Co	Cal	G C Palmer	41 Market st	Annual	Jan 1
Gold & Curry S M Co	Washoe	Called by Trustees	438 California st	Special	Jan 2
Innosidee M Co		W E Dean	419 California st	Annual	Jan 1
Iowa M Co		D Carpenter	805 Clay st	Annual	Jan 1
Knickertbocker M Co	Washoe	H Boyle	Steven-son's Block	Annual	Jan 1
Koseuth M Co		E F Stone	419 California st	Annual	Jan 1
Memnon M Co		W E Dean	419 California st	Annual	Jan 1
North Utah M Co	Washoe	C S Curtis	419 California st	Annual	Jan 1
Oreans M Co		W E Dean	419 California st	Annual	Jan 1
Sierra Nevada S M Co	Nevada	R Wegener	414 Montgomery st	Annual	Jan 2
Sierra Nevada S M & M Co	Nevada	J M Robinson	Merchants' Ex	Special	Jan 1
Succor M & M Co	Washoe	Called by Trustees	302 Montgomery st	Annual	Jan 3
Utice Cons M Co		W E Dean	419 California st	Annual	Jan 1
Union Cons M Co	Washoe	Called by Trustees	Merchants' Ex	Annual	Jan 2
Union Cons M Co	Elko Co Nevada	D A Jennings	401 California st	Annual	Jan 1

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable
Black Bear Quartz M Co.	Cal	W. L. Oliver,	316 California st.	30	July
Bolton M Co	Washee	H. K. Ribbe,	419 California st.	3	Nov
Chariot M & M Co	Cal	Frank Swift	419 California st.	400	Jan
Consolidated Virginia M Co	Washee	D T Beesley	3	Jan	3
Woods Point M Co	Washee	G E Elliott	414 California st.	1	Dec
Diane M Co		N. C. Passet.	220 Clay st.	2	Jan.
Consolidated M Co	Nev	W W Traylor	419 California st.	50	Jan
Keystone Quartz M Co	Cal	L Vesaris		50	Feb
Phenix G Co		Oberles E Elliott	419 California st.	50	June
Phenix M Co	Nevada	D F Verdental	409 California st.	50	Jan

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office, San Francisco.

NORTH-WESTERN QUICKSILVER M. CO., JAN. 4.—Location: Sonoma county. Capital stock, \$1,000,000. Directors—John Garber, David McClure, W. H. Sears, Israel K. K. and Wm. A. Stuart.

COEAN-VIEW QUICKSILVER M. CO., JAN. 6.—Location: San Simeon Mining District, San Luis Obispo County. Capital stock, \$6,000,000. Directors—H. K. Moore, J. H. Dall, E. B. Burdick, J. F. Greenman and Daniel

The following named companies have filed certificates of incorporation in the office of the Secretary of State at Sacramento:

ELK GROVE COAL CO.—Capital stock, \$1,000,000, in shares of \$10 each.

ELK GROVE BUILDING CO.—Capital stock, \$3,000, in shares of \$5 each.

INCREASE OF CAPITAL STOCK.—The Virginia Consolidated M. Co. has filed a certificate of increase of capital stock with the County Clerk. The capital stock has been increased from \$3,000,000, divided into 30,000 shares of \$100 each, to \$5,000,000, divided into 50,000 shares of the par value of \$100 each. The certificate states that \$5,000 of the capital stock has been paid up on the total amount of debts of the corporation is \$1,000, secured by the mining ground and property of the company; that the owners of more than two-thirds of all the shares of the company voted in favor of increasing the stock.

THE BLACK HILLS.—A letter from General Custer at Fort Abraham Lincoln, Dakota, sharply assails the statement made by the Indian Commissioner, in his annual report, or stating that there was no indications of mineral, etc., in the Black Hills, Custer asserts that the dispatches of the correspondents and explorers on the subject, are accurate; and also his own official dispatches, General Sheridan's annual report, Professor Winchell's report and various others. He imputes to the Commissioner either ignorance or failing less excusable, for his statement on the subject.

In the Chollar-Potosi mine no encouraging developments being found in the prospecting at the fifth level, work at that point is discontinued. The 1100-ft level is being pushed forward in good style and vigorous and thorough prospecting will be done at that point.

THE new hoisting worke of the Woodville mine, on the Comstock, have started up and operate splendidly. The new shaft will now be put down with energy and dispatch, the new hoisting worke being just what was needed.

MINING SUMMARY.

THE following is mostly condensed from journals published in the Interior, in proximity to the mine mentioned.

California

CALAVERAS COUNTY.

RICH STRIKE.—Calaveras Citizen, Jan. 2: During last week rich strikes were made in claims near Altaville by Cogswell & Neezer, and also by William Hale. Mr. H. has been engaged for the past four years prospecting in the claim where his efforts have at last been crowned with success.

STRUCK IT.—Calaveras *Chronicle*, Jan. 2: We hear that gravel has been struck in the claim belonging to Judge Shear, located near Central hill. The workmen are in close proximity to the blue lead.

WEST POINT DISTRICT.—A rich strike was made in the 90 ft south level of the Mina Rica last Monday night. The ore shows free gold plentifully, and measured, then, four feet in width. The Jos-phine, also, shows four feet of milling ore, a small portion of which is high grade. Henry & Son, who bought the old Thome mill, have nearly completed repairs. They intend to overhaul the mill in the spring and add first-class improvements. They have sufficient ore in sight, in their mine on Valentine hill, to keep the mill at work all winter. Recently, while work was being done on the Bartolo to comply with the U. S. mining laws a new and healthy body of ore was discovered near the surface.

SHEEP RANCH.—The Wallace & Ferguson mine is situated right in the centre of the town, and is worked through a tunnel some 1500 ft in length. At equal distances along the line of the tunnel three shafts have been sunk, two of which are at present used as hoisting shafts; the bottom of the lowest being the motive power. The depth of the lower shaft is 93 ft; of the upper, 115 ft. The vein varies in width from one to two feet, the ore paying from \$50 to \$300 per ton, and runs through the entire thickness of the lead. The company owns a 5-stamp mill, in conjunction with Mr. W. I. Armstrong, which is kept running night and day on rock from the mine. The Wallace & Ferguson is the only mine working in the district at present, if I except the Lodi, which Messrs. Hull and Fisher have just started to re-open. The Lodi formerly paid fair dividends, and the gentlemen are very sanguine of good results in the future.

CONTRA COSTA COUNTY.

THE QUICKSILVER MINE.—Countra Costa Gazette, Jan. 2: Since mention of the progress of operations by the new company on the old Welch quicksilver claim, some four or five miles south-east of Clayton, in our issue of last week, we have had a chance interview with Mr. Ryan, the superintendent of the new company, who informs us that the company is composed of persons who have had sufficient mining experience to enable them to form a fair judgment of their chances of success in the undertaking, and to enable them to endure the disappointment should it prove a failure; which, from present favorable indications they do not expect. They have expended about \$10,000 up to the present time, and expect to have their furnaces completed and ready for smelting by the latter part of February. They are running two tunnels for the cinnabar deposit, the upper one of which is now in 100 ft., and has a little more than 200 feet to go, on the calculation made, before striking the ore mass for which it is running. The lower tunnel they calculate will touch the ore depo it 300 ft below the surface, and will run 500 ft to reach it. They have already gathered ready for the furnace, several hundred tons of rock, a portion of which is of low grade but contains quicksilver in sufficient quantity to pay for smelting, while much of the rock is very rich, and he calculates that it will altogether yield very handsomely, though gathered from or near the surface. Mr. Ryan seems a very candid man of good judgment, and he appears very well satisfied that the company have a good prospect.

NEW HOISTING WORKS ENGINE HOUSE.—In

place of the engine house at the new shaft of the Black Diamond Coal company, that was destroyed by an incendiary fire some eight or ten weeks ago, a fine brick building has been erected and is now completed. The damaged engine and hoisting drums have been repaired or replaced with new work, and it is expected that the machinery will soon be put in operation and employed in raising coal through the new shaft. The company have also put up a new brick building for use as an office at the mines.

INYO COUNTY.

PANAMINT IRON.—Panamint News, Dec. 29. The shaft upon the Wyoming mine is down nearly 35 feet (below the graded level, which would add 20 feet more), and shows high grade ore nearly the whole size of the shaft. We also have it from good authority that all the mine on that side of the canyon are either improving or bolding their own at every foot sunk.

New Coso.—Wm. T., better known as Bill Grant came in from New Coso a couple of days since, and informs us that several new and, apparently, valuable locations have been made there in the last few days. Among others, one is due by J. B. Hughes, Martin Mee and the fore-said W. T. Grant, which displays a great amount of carbonate, running by actual assay as follows: silver, 59 ounces per ton; lead 50

per cent. Armstrong and Carroll, of this place, have also made a promising location. Billy Goodwin, in the interest of Belshaw & Co., of Cerro Gordo, was in camp, taking a view of things.

LABOA IN PANAMINT.—The question "is the labor demand in Panamint fully supplied?" may be safely answered in the affirmative; but the time is near at hand, we conscientiously believe, when at least five times as many persons as we now have can find profitable employment. It should be borne in mind that but a few months ago Panamint could be approached only upon the backs of animals and then with the greatest difficulty. The wonder is that not so little but that so much has been done, and that so many hundreds now find profitable employment where then a bare half dozen lonely prospectors sat over their camp-fires and held grim counsel as to when, where and how their next supply of the sheer necessities of life were to be obtained and paid for—millions under their feet but not a cent in their pockets! Where, we ask, is there another silver mining district on the coast which in such a very brief period since it was a "howling, almost inaccessible wilderness," can, or ever did, make such an actual, substantial display of wealth, population and permanency as this, or make a greater return in silver bullion for the work done when we consider all the circumstances—the shortness of time and lack of nearly every requisite for successful mining or even a comfortable existence? We consider Panamint without a parallel in actual progress and solid merit—and but a line of its great history is yet written.

KERN COUNTY.

The railroad at this time would have been completed and in running order to a point 21 miles in advance of the Bakersfield depot but for want of iron. This is now going forward. Eight truck loads went forward Tuesday, and we learn that several lots have passed since, so that but little time will elapse before the rails will be laid the distance referred to. No permanent stopping place, however, will be made there—only such temporary arrangements as may be necessary for the accommodation of the Inyo trade. The permanent depot will be three miles further on. Intervening some deep cuts are to be made. This will be mainly for the accommodation of Havilah, Kernville, the South Fork and the contiguous mining region. About 20 miles more will bring the road to the summit of Tehachapi, after which, if it is deemed advisable to tap the great mining region beyond more effectually, there are only the difficulties of a nearly level plain to contend with. The great bar to its development has hitherto been the necessity of freighting by way of Los Angeles, and it is a terrible incubus now. This will be removed in a few weeks and the mines made of comparatively easy access, and within a year they will be just as accessible, as soon as the road surmounts the summit, as any part of the State. The good time coming is eagerly looked for by the people of Kern and Inyo counties.

LAKE COUNTY.

SILVER DISCOVERIES.—*Bee*, Jan. 2: Last week William Williams discovered a ledge of silver-bearing rock in the vicinity of the Highland springs. On last Tuesday a ledge, supposed to be of the same character, was discovered in Scott's valley. The parties have sent samples of the rock to San Francisco, for assay.

GOLD QUARTZ DISCOVERY.—James Tyler, of Tyler's ranch, about midway between Lakeport and Cloverdale, has discovered a well defined ledge of gold-bearing quartz, on the ridge that divides the waters of Russian river and Clear lake.

MARIPOSA COUNTY.

CATHAY VALLEY.—*Cor. Mariposa Gazette*, Jan. 2: Cathay's valley is destined to be one of the richest mining districts in the State. There are within the bounds of the valley, 12 quartz veins that we know prospect in free gold all the way from six dollars to 80 dollars per ton on different veins. Our outlook is very flattering. Mr. Williams, of the Francis mine, is talking of building a new quartz mill below the Francis mine, of a capacity that will crush all the custom quartz that may be taken to his mill. When Mr. Williams talks he means business. There is a fair prospect of a quartz mill being built in the upper end of the valley the coming spring or summer, as the present necessity requires it. A full supply of quartz will be furnished to any company that will first put up a mill in the upper end of the valley and make fair returns of what the quartz contains. The whole valley is a perfect network of quartz veins, and many of them have hidden pay shutouts on them that will fully pay the prospectors for hunting them.

NAPA COUNTY.

NEW DISCOVERY.—*St. Helena Star*, Dec. 31: We are informed that Dr. Michel, Mr. J. J. Dickenson, and Mr. Swarts, of Pope valley, have located another lode of fine chrome iron eight miles from Calistoga, on the route of the road from that place to the Phoenix mine. We have a specimen of it now in our office which will go over fifty per cent. chrome. The same company are working a ledge of chrome iron, about eight miles from here, in Mowe's canyon.

The silver mine discovered by Chapman & Co. is prospecting well, and ore is being taken out which assays from \$20 to \$80 a ton. In the immediate vicinity of the town two more claims are being worked for silver ore, and the indications are exceedingly favorable.

TUNNELING.—The *Olistoga Free Press* notes:

The owner of the Emma mine, Jacob Cook, is running a tunnel into the hill, and has struck some very rich ore. This mine is situated about two miles, northeast of Calistoga, and the ore thus far brought to the surface evidences a large amount of wealth, which only needs time and labor to secure abundant riches for the owner.

NEVADA COUNTY.

OMAHA MINE.—*Grass Valley Union*, Jan. 3: On the first day of this month and the first day of the year, the Omaha struck into extra good ore. The rock was rich enough to justify the employment of a reliable guard over the dump pile. A man could very easily put thirty or forty dollars from that dump pile into his vest pocket. We intended last evening to go down and glean but we heard that McFate and a shot-gun were on guard, and then we concluded that to walk two or three miles on a dark night is no healthy exercise.

EMPIRE MINE BRICKS.—The Empire mine sent a couple of gold bricks below on New Year's day, a gift to the stockholders, and the bricks aggregated in value the amount of about \$21,000. The Empire, underground, is daily improving in appearance. It is one of the oldest mines in the district and has bottom as well as a good degree of speed.

YESTERDAY was pay day for the Idaho mine. The miners found the money ready for them at Findley's bank. The Idaho pays off every month quite a little army of men—good men at that.

The Darmonth mill started up yesterday morning and was stamping gold out of cement at last accounts. The mine is yielding plenty of the cement to keep the mill constantly going.

THE MINING SITUATION.—The Grass Valley mines have done well during the past month, and some of them make a good showing for the year. There are, however, too many idle mines in the district—mines that only await drills and picks and gads and powder, and other appliances, including pluck and muscle to cause them to show the "bonanza." During the month just passed a great improvement over the month before has been shown here, and that was because more work was done, in a prospecting way last month than in November. There is no doubt but that when work is done in this district pay is sure to follow. That has proved true more than a thousand times.

SANTA CLARA COUNTY.

ALMADEN.—*San Jose Mercury* December 31: The New Almaden Quicksilver Mining Company has been making some extensive improvements at Hacienda. A new smelting furnace of new manufacture and entirely different from anything else of the kind now in use in the United States, has been put up and arrangements are now being made for the erection of still another of the same kind. The old furnaces will not be discarded but will be kept in use and worked to their fullest capacity. New and large condensers are also being constructed, and such other works as are needed for the development of the mine. The company gives employment to a young army of men.

SISKIYOU COUNTY.

SCOTT RIVER DITCH.—*Yreka Union*, Dec. 30: We learn that Joh Garretson has surveyed and located a mile and a half or two miles of the new Scott river ditch, and that a Chinese company have offered to dig that part of the ditch for \$7 a rod. He has written below to the officers of the company, and will not let the contract till he shall receive an answer.

THE HOOPER LEDGE.—Cornish & Co. continue to drive their lower tunnel on the Hooper ledge. They think they are now within from 20 to 40 ft of the pay chute. In the meantime, while they have been running this tunnel which has now occupied several months, they have been taking rich rock from their shaft. The tunnel they are now running will strike the ledge about 300 ft from the surface. The rock heretofore taken from this claim has been very rich, and the owners are sanguine that there is still much more equally rich to be taken out. We trust their most sanguine anticipations may be realized.

W. A. Little, of Oak Bar, was in town a few days the fore part of this week. From him we learn that there will probably be more claims opened on the Klamath next season at Oak Bar, and between that point and the mouth of Scott river, than ever before. On that portion of the river there has been a good deal of prospecting done the present season with very encouraging results.

TRINITY COUNTY.

ANOTHER CINNABAR DISCOVERY.—*Trinity Journal*, Jan. 2: An 8 inch vein of cinnabar has been found in the bed-rock in the Wolff Placer mine, on Cañon creek. The ledge is well defined, and the work already done gives indications that it is extensive. A location has been made, and ore is now being taken out. Some specimens of the ore and castings brought to Weaverville by J. R. Driver, and left at Hartman's, are very rich, and show a large percentage of quicksilver by practical tests.

TUOLUMNE COUNTY.

THE RIVERSIDE.—*Sonoma Democrat*, Jan. 2: This mine is making handsome returns, and from what we learn will prove very profitable. It has been opened to an extent that develops a large quantity of paying ore, and the exploration is increasing the amount in sight daily. On Monday the result of 8 days' crushing was brought to town in the shape of a bar of solid gold weighing 112 ounces. The ore averages to yield two ounces of gold to the ton. When the 10 additional stamps are in motion, which will be in a few days, the amount taken out will be doubled.

Nevada.

WASHOE DISTRICT.

CROWN POINT. *Gold Hill News*, Dec. 30: Daily yield, about 600 tons, from the old ore sections, from the 600 to the 1500-ft levels, inclusive. The stopes and breasts are looking about as usual. Some very good ore is now coming from the north portion of the 1500-ft level, and the ore at that depth seeming to hold out best to the northward. Both cross-cuts at this level are still in porphyry, and are being driven ahead to find another bonanza in that direction, if possible.

JUSTICE.—The main west drift from the Waller Defeat is still driving ahead in excellent ledge matter; it is, however, being pushed forward to form a connection with the fourth station of the main Justice shaft, without present regard to the development of the ore vein. When this connection is completed, every facility will be afforded for opening out the ore developments of this important level by cross-cutting, etc.

KOSAUTH.—Shaft now down 355 ft. Sinking deeper is suspended for a few days in order to open out the station for the 350-ft level. Prospecting at the 200-ft level goes ahead as usual with good indications.

GOULU & CUARX.—Good progress is being made in the double incline winze, designed to connect the 1500 with the 1700-ft level. It will reach the 1700-ft level within the ensuing few days. The several drifts and cross-cuts throughout the mine are being pushed forward with great energy.

JULIA.—Main shaft down 1120 ft, with no water to interfere. The ground is soft and clayey, with occasional streaks of quartz, indicating a ledge near by. The main south drift at the 1000-ft level is driven ahead at the rate of three feet per day.

SIERRA NEVADA.—The water in the new shaft being well reduced, sinking deeper is now going ahead at a lively rate, in good working ground. Good ore developments are being made in the old Sacramento chimney. The best portion of this mine is evidently at the north end, near the Phil Sheridan line.

CALIFORNIA.—Cross-cuts Nos. 2 and 3, running east on the 1500-foot level, are making rapid progress toward the ore body. Cross-cut No. 2, near the southern boundary, has already penetrated the ore body to a distance of 100 feet. The quality of the ore disclosed in this drift is, for its entire length, of very high grade. The "C & C" joint shaft is sunk to a depth of 35 feet, and the hoisting works building erected over the same is nearly completed. Its dimensions are 60x60 feet. The ground is very favorable for sinking. The hoisting machinery is now being erected, and will be running by the second of January.

CONSOLIDATED VIRGINIA.—Daily yield, 400 tons. On the 1550 foot level the north drift has entered into the ground of the California mine, and is in excellent ore, as are likewise the east cross-cut near the north line, and the winze sinking below this level. On the 1500-foot level, cross-cuts Nos 1 and 2 are still progressing eastward in one of the very highest grade. The upper ore breasts on the 1300 and 1400-foot levels are looking splendidly. The new mill will commence reducing ore from the big bonanza within two days from the date of this report.

IMPERIAL EMPIRE.—The face of the drift at the 2000-foot level is getting into the west wall of the ledge, and is being pushed ahead slowly, with all due caution, and kept securely timbered in case of any sudden and extra rush of water or other emergency. The winze from the level above, continues in good ore.

DATON.—Daily yield, 60 tons. The ore sections toward the Kosauth show continued improvement in quality, and promise to yield well for some time to come.

BECKER.—Daily yield, 450 tons, from the old ore levels down to the 1400-foot. The three winzes below that level are showing well and the prospect is that the 1500-foot will open out good. The drift east from the main incline at this level is in 56 feet. The south winze on the 1300-foot level is in very good ore, and is down 23 feet from the surface, and is raised upon from the 850-foot level 127 feet. This mine is looking better generally than it was at last report, and is good for more dividends yet.

CHOLLAR-PORESL.—Daily yield 55 tons from the old workings, the car sample assays of which average \$32 per ton.

FLORIDA.—The main drift west, at the 300-foot level is in 55 feet to-day, with the face in very favorable looking material, with stringers of quartz giving low assays.

OPHIR.—Daily yield, 250 tons. The average bullion yield of the ore is constantly on the increase, owing to the better quality as well as quantity extracted. The ore breasts of the 1465-ft level especially are looking and yielding splendidly. The northeast winze at this level continues down through ore of the richest quality, and the cross-cut 33 feet below this level is also in rich ore. Both cross-cuts in the 1465-ft level are being driven ahead in very favorable material, and cross-cutting east is commenced at the 1700-ft level. So far as developed the great bonanza is found to extend north into the Ophir ground about 300 ft, with every indication of further continuance.

PHIL SHERIDAN.—The main west drift is today in 179 ft. The entire face of the drift is now in hard rock, principally quartz, which gives good assays occasionally. Mining men and experts who have seen it pronounce it good, and a rich development may be looked for at any moment.

OCCIDENTAL.—The three cross-cuts now being made from the upraise between the upper and lower levels are all in a fair quality of milling ore. These drifts have penetrated the ore body for distances of from 12 to 55 ft. The last mentioned distance is the width of the ore body in the upper cross-drifts, 100 ft below the upper tunnel. The two lowest cross-cuts, at intervals of 100 ft respectively below the first cross-cut, have not yet passed through the ore.

GLOBE CONSOLIDATED.—Main west drift driven ahead as usual. Good bunches of quartz continue to be met with occasionally, giving good promise of eventually leading to something better.

UTAH.—On the 400-ft level the drifts running in the ore vein are progressing rapidly. Cross-cuts will be started by day after to-morrow in the ore vein on this level.

YELLOW JACKET.—The north drift at the 1740-ft level is in 165 feet, and is now running in heavy ground, requiring retimbering. The east cross-cut from the drift is in 168 ft, 100 ft of which is in the ledge matter. The face of all the drifts are in porphyry and quartz.

SILVER HILL.—The drifts both north and south at the third level are running in excellent looking vein matter. The north drift of the second level is also showing well in quartz.

AMERICAN FLAT.—The drifts at the 450 and 750-ft levels still show improvement in their face. Both this and the Baltimore mine are encumbered considerably by water, and the heavy new hoisting and pumping works being erected to work both jointly are much needed.

OVERMAN.—The 1100-ft station for a drift to the ledge is opened, and drifting commenced. Sinking at the bottom of the main shaft is about being resumed.

LADY BAYAN.—Cross-cutting for the ledge progresses well, and it will be reached some time next week.

CALENDONIA.—Excellent progress is being made with the drifts at the 1000-ft level, both north and east, also with the drifting at the 1076-ft level. The south drift at the 980-ft level shows fine looking quartz in its face.

DAUNDRELLS.—Face of the east drift still in fine looking quartz with occasional spots which give good assays. It is evident that the company should sink deeper, present prospects giving ample encouragement for so doing.

ROCK ISLAND.—Winze down 59 feet, and still in fine looking vein matter with spots of good ore. Sinking the main shaft deeper is resumed. **NEW YORK CONSOLIDATED.**—Excellent progress is being made in sinking the shaft, and very flattering indications are being passed through, occasional streaks of low-grade ore being met with.

SAVOIE.—Sinking the main incline deeper progresses very favorably and drifting at the 2200-ft level is going ahead, with no important change to report.

HALE & NOCAOSS.—Daily yield, 85 tons, principally from the eighth station level. North drift and west cross-cut at the 2100-ft level making their usual progress, with no new development. The various cross-cuts at the 2000-ft level have not yet reached the west wall of the vein.

SUCOONA.—Main drift at the 550-ft level driving ahead, with face in quartz and porphyry. Indications show close proximity to the ledge.

PERCUT.—The rock in the face of the main tunnel has become much softer, being porphyry with considerable clay, allowing of faster progress.

ORIGINAL GOLD HILL.—The face of both drifts at the 340-ft level are now in low grade ore and looking well.

SENATOR.—Favorable bunches of quartz continue to be met with in drifting along the vein at the 400-ft level.

SUTRO.—Tunnel driving ahead at a lively rate and now in 807 feet from the old Utah shaft. Face in low-grade ore.

NEW YORK.—The good indications in the 250 and 700-ft levels still continue, and the drifts go ahead as usual.

MEXICAN.—Drift from the 1465-ft level of the Ophir going ahead as usual. No change.

The Empress, one of the oldest locations on American Flat, which has been lying for years undeveloped, now is in the hands of parties who are able and willing to find out what its real merits call for. Work is once more resumed upon it, and the old shaft is being cleaned out and re-timbered, preparatory to sinking deeper. The *News* says that the ground about the top of the shaft is being graded off for efficient hoisting works, the machinery for which is engaged and will soon arrive.

THE GOULD & CURRY.—The report of the treasurer of this mine for the last fiscal year shows that four assessments had been made, aggregating \$310,713.29. Other items had swelled the receipts to \$328,224.54. For the sale of assaying materials \$66 was received; for hoisting ores and rock, \$5,751.50. The cash indebtedness on the 30th was \$61,838.15; cost of insurance, labor and materials, \$235,598.08; general expenses, salaries, etc., \$19,502.15; minor expenditures, legal fees, etc., \$45,796.

IN THE CROWN POINT mine two new levels, one and two hundred ft below the present lowest working level will be opened before long, giving plenty of room for the ore vein, which is somewhat contracted at the 1500-ft level, to widen out into a comfortable continuation of the great bonanza, which has yielded so many millions thus far.

Jute.

This is undoubtedly one of the products destined to figure in the programme of diversified farming in California. Although some attention has been given to this matter during the last two years, it may still be ranked among agricultural experiments. We have endeavored to "draw out" those who are experimenting in the culture of jute, and have them communicate the results through the PRESS. But very little practical knowledge, it is evident, has yet been secured, and those who possess that little are quite uncommunicative on the subject. Judging from the extent and character of the inquiries received by us concerning jute, and the difficulty in obtaining the desired information, we are convinced that the growth of interest in the matter is increasing much faster than that of the plant itself.

In Southern agriculture the subject occupies precisely the same position as with us. The farmers there are making the same efforts to curtail the proportions of the cotton product, that we are using to reduce those of the wheat crop. Among the means by which they hope to effect this curtailment, the cultivation of jute figures conspicuously; more so than with us. The Jute company of New Orleans has been in active operation for some time, and is using every means to induce planters to substitute, in a measure, this crop for that of cotton; and to place the material before the manufacturers of the country. The President of this company a short time since sent to the Department of Agriculture at Washington, specimens of jute and its fabrics raised and manufactured in Louisiana. They consisted of jute filament, rolled, after cleaning by machinery; jute rope, crude as it comes from the machine; and jute rope made of rotted jute. The President stated that the jute was acknowledged to be 50 per cent. superior to the Indian article. A planter, writing from North Carolina, says that the ground was prepared as for cotton, and the seed dropped twelve inches apart; and, as the spring was a very wet one, the seed lay dormant for three weeks. The plant grew to a height of thirteen feet, with branches from five to seven feet long. The land was ploughed twice, and hoed once. It was cut in October and thrown into water, where it remained to rot three weeks; the bark was then easily stripped from bottom to top. A specimen of the fibre was exhibited at the State fair, and pronounced very fine by persons who were familiar with its culture. Bottom lands of North Carolina could be made, it is affirmed, to produce, by manuring, as much as 3000 pounds per acre. A planter in Georgia, also, who has succeeded well in an experiment in raising jute, says that if five cents per pound can be netted, more can be made by raising jute than cotton. He planted about May 1; the seed germinated freely, and the plants grew finely on rather poor land, attaining a height of over ten feet by September 19.

The attention of England is already directed to the impetus given to jute culture in this country. Although they declare that there are no indications that this fibre will be raised in the United States to an extent that will jeopardize the prosperity of the jute industry of Bengal—the main source of jute supply for England—the consideration of the subject has induced the Government in India to appoint a commission to inquire into the culture, etc., of the jute plant. They were evidently incited to this by the superiority of the American product, and with the characteristic willingness of Englishmen to acknowledge manifest superiority, and the unwillingness to play second to anybody in anything, they instituted a thorough investigation of the subject.

The report submitted by this commission is complete in every respect; containing much information that will be extremely interesting to those who are simply curious in the matter, and deserving the careful consideration of those who view the subject from the commercial and manufacturing stand points; while those who wish to embark in its culture will be able to obtain from it many points of practical utility. We therefore give the following synopsis of the report, as published in a recent number of the *British Trade Journal*:

"As to the origin of the word *jute*, concerning which there has been so much dispute; it is suggested that the modern word is simply the Anglicised form of the Orissa *jhot*, and the ancient Sanskrit *jhat*. As to the precise plant which yields the fiber, the commission has shown that the jute of commerce is yielded indifferently by two distinct species of *Tilacea*, the *Corchorus olitorius* and *Corchorus capsularis*. The plants are extremely alike in appearance, leaf, color, and growth, and differ only in their seed-pods, those of the *C. capsularis* being short, globular, and wrinkled, while those of *C. olitorius* are the thickness of a quill, and about two inches long. Both plants are annual, and grow from five to ten feet high, with a stalk about the thickness of a man's finger, seldom branching except near the top. The leaves, which are of a light green color and serrated, are four or five inches long, and taper to a point. Several other species of the same plant are said to yield *jute*, but are not cultivated for the fiber, the species already named alone yielding the real jute. This fact was established by the commission, by a series of experiments in the Royal Botanical Gardens with seeds obtained from all the districts in which the fiber is grown. The results showed that the *jute* of commerce is the produce of

one or the other of the two plants named, and of them only.

In lower Bengal, the two species appear to be grown indifferently; but in the central and some of the eastern districts, the *C. capsularis* largely predominates, while in the neighborhood of Calcutta it is the *C. olitorius* that is chiefly cultivated. The well known Lakhimpore jute of Hooghly and the 24-Pergunnahs, known also as *desi jute*, is the produce of this latter species. The plant has been cultivated from time immemorial in the lower provinces, but its export is a modern industry, although the fiber has been cultivated largely for home use, and for the manufacture of gunny from a very remote period. One or other of the two plants has been found in no less than forty-seven out of the fifty-eight districts of the Presidency. The attention of the Commission was specially directed by the Government to the importance of ascertaining what description of soil was most favorable to the growth of the fiber. The evidence collected upon the point is conflicting. A light sandy soil is not suited to it, and it seems most to flourish in a hot, damp atmosphere, with a heavy rainfall and rich alluvial soil. The seasons of sowing and growing appear to be generally the same as those for the early rice crop of Bengal. The oftener and more thoroughly the land is plowed, and the more manure, the better. The seed is sown broadcast from the middle or end of March to the beginning of June, and the plant cut from the middle of August to the middle of October, and in some of the districts earlier. The Commission direct prominent attention to the extreme carelessness of the cultivators in the selection of the seed. In most instances a corner of the field, or a few stunted wayside plants are left to produce it, not the slightest attempt being made to select it; and if in these circumstances a real deterioration of the plant had taken place, a fact which the commission doubt, little wonder could have been expressed. Neither selection nor change of seed seems to be resorted to, and if the attention of the Government is ever directed to improving the cultivation of this plant, its first step must be a reform in this fundamental point of good husbandry. The acreage under jute in the great producing season of 1872 was 921,000. The area is said to have been no more than 517,000 acres in 1873. The northern and eastern districts may also be said to engross the cultivation, showing a total area of 800,000 acres under the plant in 1872, against 125,000 only in the rest of the Presidency. The suggestions of the improvement of the staple are confined to the selection of the seed, to the observance of a more careful rotation in growing the crop, and to the improvement of the processes for cutting and steeping the fiber. The influence of the cultivation on the condition of the people appears to have been good. The testimony is uniform that it has enriched the cultivators, while the deleterious effects of the manufacture upon their health seems to be very problematic. As to an alleged deterioration of the staple, the commission attribute this belief to the fact that the high prices which have prevailed of late years have stimulated the production of large quantities of inferior or badly-prepared jute. It is not that there is less good jute produced than formerly, but that a larger proportion of inferior fiber grown on any and every soil has come into the market under the stimulus of prices; and that when the quantity grown is large the care devoted to its preparation is comparatively small. The commission record their judgment that there is nothing to show that there has been any deterioration, in the character of the jute, or any general falling off in the quality of the fiber. The local manufactures of the fiber into cordage and twine, and into gunny cloth, and gunny bags, are described in their report at length; and the commission have shown that it is used for paper-making in several districts.

THE OMAHA MINE.—In a review of the mining situation at Grass Valley, the *Union* speaks as follows of the Omaha mine: It is situated south of Grass Valley on Wolf creek, and about three miles distant from the town. It is owned by an incorporated company, which has its principal place of business at Sacramento. Sixteen miners are at present employed and \$3 per day per miner are paid. The cost of sinking so far per foot has been \$25. The cost of drifting per foot has been \$10, and the cost of stopping per ton has been \$6. The cost of extracting ore per ton has been about \$10 and the cost of milling the ore per ton has been \$3 50. The milling is done at a custom mill. The number of tons which have been worked is 100, and gave an average yield of \$21 per ton. The percentage of sulphurets is about 1.5. The total bullion product has been \$2,500. The length of the location is 1400 feet and the course of the ledge is north and south, with a dip to the west at an angle of 32 degrees. The length of the pay zone as far as explored is 170 feet, and the vein has an average thickness of 15 inches. The country rock is serpentine. The work is done through a shaft which is 260 feet deep. The ledge in the bottom of the shaft is fully three feet thick and shows free gold in great quantities besides good sulphurets and general good quality of rock. The walls of the ledge are well defined and smooth. Two levels have been opened and these are, together, of the length of 255 feet. The hoisting works are run by water power and cost \$1,500. M. Dodsworth is the Superintendent.

DYING UP.—In Trinity county everything is said to be drying up, and both miners and farmers are anxiously looking for rain.

Panamint District.

The *Inyo Independent* says: During a recent visit to Panamint we took occasion to make as thorough an examination of a number of its ledges as could be done in three days climbing, and by hammering croppings at short intervals from the beginning of one location, though step by step, to the next and the next. The result of this persistent hammering and breaking rock was to prove conclusively that there is scarcely a point in all that vast range of exposed quartz where "metal" in fair quantities, varying from a "color" to \$2,000 to the ton, cannot be found. It appears as though there was no portion of the croppings in the limestone formation that was not more or less impregnated with mineral. Nor is there an opening anywhere that does not show a pay streak of a few inches in width of very high grade ore.

As our examinations extended over several miles of croppings, with almost uniform results wherever broken into, no matter how unpromising in outward appearance, we conclude that there is enough near surface ore close to Surprise canyon to maintain quite a city for a half a dozen years or more to come. There need be no fear on this point. But it is prophesied by White Piners and others, that since the best and greater portion of the mines lie in limestone the bottom will soon be reached—that no pay ore will be found at any considerable depth. Such may be the case, but there is no reason obvious to a common understanding why it should. On the contrary, it would seem to be an almost absolute certainty that the pay ore runs down to immense depths. There can be no question that these are true fissure veins; they may be divided into two distinct veins; the mother vein, on the north side of the canyon, known as the Jacob and Stewart's Wonder, cuts straight across deep gulches and lofty hills for at least a mile and a half, with scarcely a break in its whole length. The only perceptible difference in the prospect, whether made at the lowest point of depression or the highest elevation. The same is true of the other grand vein, which, from its most noted location may be called the Wyoming series. This lies on the opposite side of the canyon, with which and the Wonder ledge it runs nearly parallel, but at a greater altitude. This ledge is cut down at least a thousand feet deep in one place, and about half as deep in several others. It cuts far into the slate on the east, the only portion that appears to be barren, and extends over two miles southwesterly, across deep gulches, through the lime, into still another formation.

Branching from it are numerous ledges, all large and showing high grade ores, these in turn cutting across hill and gulch a mile down to the main canyon itself. Counting these numerous spurs, the connections of which are easily traced, this mother vein exposes several miles of the very richest croppings. At the lowest depth yet attained, which is on the Wyoming, and is about fifty feet, we saw rock taken which assayed \$915 to the ton, and there was apparently plenty of it. The next lowest, about twenty feet, on the Esperanza, a large spur or cross ledge, there was about a foot of \$325 rock. These are fair average assays of the pay streak proper in hundreds of openings throughout the district. The same openings show from ten to twenty times as much ore which will probably average \$50 to the ton—a class of ore which, with proper facilities, can be worked with fair profit. Outside of these two veins are numerous other locations, none of which we saw, but one or two of which, if no more, are said to be as promising as the best of the series. One of these is the Sunrise, lying in the slate, and possibly the eastern extension of the Wyoming. The Sunrise is the only prominent mine yielding free milling ores—all chlorides. But lack of space forbids any notice in detail of even the most prominent locations of the district.

Owing to the nature of the ground, the town site of Panamint is somewhat circumscribed, but much less so than is commonly reported. There is room there for a city of at least 10,000 without uncomfortable crowding. Its present population, all classes, will approximate 1,500. The business of the place, outside of mining, consists nearly of restaurants, stores and saloons. There is a present sufficiency of them. There are inducements for the establishment of some other branches, particularly a good hotel, one of which, however, will soon be ready for business.

As soon as the concentrating mills are put in operation, which will require at least three months yet, there will be a demand for many more miners, mechanics and common laborers, but at present there is quite enough.

The Surprise Valley Mill and Water company have done an immense amount of work, cutting roads and other permanent improvements, and are now but just beginning to do some systematic mining. They will soon have their principal mines opened at half a dozen levels each, and find bottom and prove them almost the finest mines ever seen. Ton after tons of Hercules powder is being used in these openings, blasting being necessary at every step. The reports from these blasts reverberate and fairly ring in the echo, sounding as full and loud as a heavily charged 24-pounder. The company have already expended nearly \$1,000,000, and expect to expend about half as much more before they get fairly to mining and reducing ores. Numerous other companies are preparing for operations on a large scale, and altogether the future of Panamint is exceedingly promising.

It will afford a great basis for stock operations; in this it will hardly stand second to the Comstock itself. Some thirty incorporations are preparing for legitimate mining, but no doubt with the ulterior view of running "adits" in the San Francisco Stock Board as soon as their mines can be made to give them a reliable base.

The Eureka Mine.

From an article in the *Grass Valley Union* we take the following concerning the Eureka mine, situated about two miles east of Grass Valley, which employed during the year, the average of 80 miners. The wages of these have been \$3 per day to the man. The cost of sinking, per foot, in exploring has been about \$65, while the cost of drifting has been about \$25 per foot. The cost of "stopping" has been about \$10.50 per ton of ore. Milling the ore costs \$2.61 per ton; the company owning its own mill. The number of tons extracted and worked during the year is 8,130, the average yield of which has been \$25 per ton. The percentage of sulphurets in the rock amounts to 1.5. The total bullion product has been, for the year, about \$205,780. The Eureka's location is 1,680 feet, for which the company has a patent. The course of the ledge is nearly east and west, and the dip is towards the south. The length of the pay zone is about 1,000 feet, with a ledge of four feet in thickness. The country rock is slate and serpentine. The mine is worked through a shaft, which has a total depth of 1,250 feet. There are eight levels opened, and the total length of drifts is 9,000 feet. The cost of the hoisting works is \$48,000. At the mill a sixty horse power engine is in use, and the number of stamps is 30, each of which weighs 850 pounds. These are dropped, each, 65 times per minute, and the drop is ten inches. There are two pans and two sulphuret concentrators in the mill. The cost of the mill was \$30,000, and is capable of crushing 65 tons of ore in 24 hours. The sulphurets are treated by the chlorination process. All the stamps of the mill have not been employed during the year. The lower portions of the mine do not show good pay rock, but explorations which are now going on may result in something good. The Eureka went into operation October 1st, 1865, and up to and including the 30th of September, 1874, had taken out bullion to the value of \$4,273,148.49. During that time it paid dividends to the amount of \$2,054,000. On the 1st of October, 1874, the company had on hand in cash and value of supplies the sum of \$101,646.73, which will enable them to explore the ledge to a much lower depth than has yet been reached. Mr. Wm. Watt is the Superintendent of the mine, with Mr. James Gluy as Foreman.

Lively Times on the Comstock.

Notwithstanding, says the *Virginia City Chronicle*, that the present is the dull season, there is an unprecedented demand for houses. Small tenement dwellings are scarcely to be had at any price, and rents are rapidly advancing. Lodging house keepers have applications daily for rooms that they cannot fill, and the ingress of emigrants from the East still increases. The reputation of the Comstock still continues, and Eastern papers are filled with sneering remarks concerning the recent rich discoveries, which are compared to the bogus diamond wedding, which lately took place in Brazil. People east of the Mississippi have but very little idea of mining, and many are of the opinion that silver comes out in solid chunks and that silver hars are cut out bodily in the interior of the earth. However, Nevada does not depend on the East for the sinews of trade. Silver and gold is currency itself, and it is not necessary to hunt for a market, as is the case with any other product. As a natural result a mining community is the most independent in the world, and as long as the residents of Virginia City have beneath their feet millions of dollars in silver ore, they can afford to keep their own counsel and pay no attention to the incredulity of the novices of Eastern States.

The new shaft on the dividing line between the California and Consolidated Virginia mines is already down a depth of twenty feet. The ground on the surface is being graded off for some distance about the mouth of the shaft, and preparations are being made to put up hoisting works which will contain a seventy horse-power engine.

The owners of mining locations are busily engaged all over the State in doing work to keep their claims good, while others are keeping themselves in reserve to make re-locations of eligible properties as soon as the first of January arrives. There will undoubtedly be many conflicts over mines which different parties are preparing to jump.

From present indications the new mill of the Consolidated Virginia will be started up within the next fortnight. Steam was turned on yesterday. An inspection shows that the machinery is the finest in the State. When its sixty stamps start upon ore from the new bonanza, the results will be satisfactory to all concerned. There is talk of building a new mill by the California company in the same neighborhood.

PAPER BARRELS.—The paper barrel business seems likely to amount to something. A manufactory is being erected in Rochester which will turn out six hundred barrels a day. They are much lighter and more durable than wooden barrels, and take very well with the public.

GOOD HEALTH.

Wet and Dry Bathing.

If any one in these days will exercise in the open air, so that each day he will perspire moderately, and if he will wear thin undergarments, or none at all, and sleep in a cold room, the functions of the skin will suffer little or no impediment, if water is withheld for months. Indeed, bathing is not the only way in which its healthful action can be maintained by those living under the conditions at present existing. Dry friction over the whole surface of the body, once a day, or once in two days, is often of more service than the application of water.

The reply of the centenarian to the inquiry to what habit of life he attributed his good health and extreme longevity, that he believed it due to 'rubbing himself all over with a cob every night,' is significant of an important truth. If invalids and persons of low vitality would use dry friction and Dr. Franklin's 'air bath,' every day for a considerable period, we are confident they would often be greatly benefited. Cleanliness is next to godliness, no doubt, and a proper and judicious use of water is to be commended; but human beings are not amphibious. Nature indicates that the functions of the skin should be kept in order mainly by muscular exercise, by exciting natural perspiration by labor; and, delicious as is the bath and healthful, under proper regulation, it is no substitute for that exercise of the body, without which all the functions become abnormal.

POISONED CONFECTIONERY.—A gloom was recently thrown over the town of Placefield, Conn., by the death of a twelve-year-old daughter of Mr. Edward Markland. The immediate cause of her demise was the eating of candy in which there was arsenic. Some three weeks ago the girl in company with two girls named respectively Miss Bunnell and Miss Hemmingsway, attended an evening party, at which, by way of entertainment, was offered confectionery purchased in the town of Forrestville, a portion of which was originally manufactured in the city of New Haven. They partook heartily of the same and soon after were taken violently sick. The sufferers were attended by Dr. Woodward of this place, who, on examining the symptoms, pronounced the poison to be arsenic, and that it was contained in the candy. Under his treatment the two last named girls were partially restored to health, though they are not yet considered out of danger. But with Miss Markland the case was different. Medicine seemed to have no healing effect upon her. Previous to death she literally suffered many deaths. Her tongue became frightfully swollen, and some time before she breathed her last inflammation seized upon her eyes and rendered her totally blind. During it all the little creature was perfectly conscious, and patiently endured the most excruciating pains till death brought relief.

A SINGULAR CASE.—The Chicago physicians are puzzled by Michael Finnegan, a patient in one of their hospitals. During more than two months he has lain rigidly in bed, seldom moving a muscle, and yet shows no other signs of illness than this strange impassiveness. He is fed with liquids poured down his throat; his limbs are moved with difficulty by the attendants, as though the muscles had become fixed, and he never speaks, although his eyes move, and at times he seems to be sensible. The physicians believe it to be a genuine case of catalepsy, or of hysteria and simulated catalepsy. There have been instances of cure of both these disorders by fright, and an experiment was made on Finnegan. The physicians talked in his presence of cutting his jugular vein, so as to kill him and end his suffering, and after a great show of preparation scratched his neck with the point of a knife, but he exhibited no fright.

CURE FOR CORNS.—The safest, the most accessible, and the most efficient cure of a corn on the toe is to double a piece of thick, soft buckskin, cut a hole in it large enough to receive the corn, and bind it around the toe. If in addition to this the foot is soaked in warm water for five or more minutes every night and morning, and a few drops of sweet oil or other oily substance, are patiently rubbed in on the end after the soaking the corn will almost infallibly become loose enough in a few days to be easily picked out with a file. This saves the necessity of paring the corn which operation has sometimes been followed with painful and dangerous symptoms. If the corn becomes inconvenient again, repeat the process at once.—*Hall's Journal of Health.*

HEALTHFULNESS OF APPLES.—The frequent use of apples, either before or after meals, has a most healthful effect upon digestion. Better eat less meat and more fruit. An eminent French physician thinks that the decrease of dyspepsia and bilious affections in Paris is owing to the increased consumption of apples, which fruit he maintains is an admirable prophylactic and tonic, as well as a very nourishing and easily digested article of food. The Parisians are said to devour one hundred millions of apples every winter—that is, they did before the war. Whether this estimate is true or not, the French are extravagantly fond of apples and other fruit.

CARE OF THE EAR.—The *Scientific American* thinks that the ear is quite as liable to injury from drafts of air as from cold water. The modern style of cutting the hair in men, and of arranging the hair of women is much to be deprecated, because it was intended by nature that the hair should fall over the ear, and thus form a protection to it. But as we cannot throw down so great a goddess as fashion, we must use care and artificial means for the preservation of this delicate organ. If sitting in a draft is unavoidable, the handkerchief should be applied to the ear exposed, or a pledge of cotton inserted within it. The ordinary manner of washing the face does no harm to the ear, because the canal leading to the drum of the ear is partly occluded by wax, and water does not penetrate far; but all swabbing of the ear, whether with dry cloth or lint moistened with hot or cold water, or other fluid, is by no means to be advised, as it removes the wax, the necessary safeguard to the internal ear.

EFFECT OF IMAGINATION.—A young man walked into an Indianapolis drug store the other day, and called for fifty cents' worth of strychnine. The clerk, suspecting his object, gave him a harmless dose of sugar of milk. The youth swallowed it at once and sat down to die. To the surprise of the clerk, he soon showed every indication of poisoning, and he thinks that had he not told him of the harmless nature of the potion, he would have died from mere imagination.

IGNORANT PRACTITIONERS.—It is said that Montreal, Canada, has in the last 11 months lost one and one-half per cent. more of its population than the city of New York, by death, and of this rate upward of 12 per cent. has been from small-pox. Singular to say many of the doctors oppose vaccination, which accounts for this mortality. The *Montreal Star* appeals to the clergy for aid against the doctors who are so far behind the age in their practice.

USEFUL INFORMATION.

MYSTERY OF THE LAKES.—Lake Erie is only 60 or 70 feet deep; but Lake Ontario, which is 592 feet deep, is 240 feet below the tide level of the ocean, or as low as most parts of the Gulf of St. Lawrence, and the bottoms of Lake Huron, Michigan and Superior, although the surface is not much higher, are all from their vast depths, on a level with the bottom of Ontario. Now, as the discharge through the river Detroit, after allowing for the probable portion carried off by evaporation, does not appear by any means equal to the quantity of water which the three upper lakes receive, it has been conjectured that a subterranean river may run from Lake Superior, by the Huron, to Lake Ontario. This conjecture is not improbable, and accounts for the singular fact that salmon and herring are caught in all the lakes communicating with the St. Lawrence, but no others. As the falls of Niagara must have always existed, it would puzzle the naturalist to say how these fish got into the upper lakes without some subterranean river; moreover, any periodical obstruction of the river would furnish a not improbable solution of the mysterious flux and reflux of the lakes.

BLASTING ACCIDENTS.—A HINT WORTH REMEMBERING.—Most people are familiar with the fact that friction of the feet on a dry carpet or other non-conducting floor is capable of so charging the person with electricity that a spark may be drawn from almost any part of the body. Thus it is a common trick to light the gas with the finger after shuffling along the floor. An exchange calls attention to the circumstance that the facts just stated may prove to be a frequent but little understood cause of accidents in blasting, and which applies to powder as well as nitro-glycerine. The blaster, not aware that he is often a walking charge of electricity, proceeds to his work, inserting cartridge after cartridge of nitro-glycerine, until he comes to the last, which is armed with the electric fuse. The moment his hand touches one of the naked wires, a current of electricity may pass from his body through the priming, and produce an explosion. Hence, before the blaster handles the wires he should invariably grasp some metal in moist contact with the earth, or place both hands in contact with the moist walls of the tunnel or shaft in which he is working.

TO KEEP ICE FROM WINDOWS.—This advice is hardly appropriate for our California climate under ordinary circumstances; but if the cold continues to increase as it has for the last two weeks, it may be found useful even here: Take an ordinary paint brush or sponge and rub over the glass once or twice a day, a little alcohol. This will keep the glass as free from ice as in middle of summer, and give as fine a polish as can be got in any other way.

A PROCESS OF PULPING LEATHER IN ENGINES, similar to those used for beating rags in a paper mill, is now in use in Massachusetts. By rolling into sheets under considerable pressure, a product of great tenacity, homogeneity, and closeness of texture is obtained which is, moreover, perfectly waterproof.

SINGULAR FACT.—When the beautiful feathers on the breast of a humming bird are examined under the microscope, no colors are to be seen. The brilliant tints come from the display of light upon the bird under different angles.

COMBUSTION OF COAL.—Combustion is a chemical process, consisting usually in a combination of the elements of our atmosphere (the oxygen) with the fuel. The main substance of fuel, especially when it is coal, is carbon, and the chemical equivalent of this, 12, combines with two chemical equivalents, 2x16, or 32 parts by weight of oxygen, which is equal to two and two-thirds parts of oxygen for every part of carbon. A pound of coal requires thus two and two-thirds pounds of oxygen for its perfect combustion; as no one pound of this gas under ordinary atmospheric pressure occupies a space of some 12 or 13 cubic feet, or two and two-thirds pounds of oxygen a space of 34 cubic feet, which in the air is diluted with four times this amount of nitrogen, it requires five times this quantity, or not less than some 170 cubic feet of fresh common air to furnish the oxygen required; it is therefore necessary to pass 170 cubic feet of air through the furnace gates in order to secure the perfect combustion of every pound of coal. If less air is passed, the combustion is retarded, while an excess of air cools the furnace.

SPONTANEOUS FIRE IN HAY.—A somewhat remarkable case of spontaneous combustion occurred last fall at Aztalan, Wisconsin. Mr. James Payne, a well known farmer of that town, some time since cut and put into his barn about ten tons of clover hay, which was quite in a green condition. A few days afterward smoke was seen issuing from Mr. Payne's barn, and it was soon discovered that the clover was on fire, and only by the most strenuous exertions of himself and neighbors were the flames finally extinguished. The fact of spontaneous combustion from the fermentative heat of uncured clover, is admitted by all as being the cause of the fire.

DETECTION OF ADULTERATED WINE.—M. De Cherville gives the following useful hints for deciding whether red wines are artificially colored or not: "Pour into a glass a small quantity of the liquid you wish to test, and dissolve a bit of potash in it. If no sediment forms, and if the wine assumes a greenish hue, it has not been artificially colored; if a violet sediment forms the wine has been colored with elder or mulberries; if the sediment is red, it has been colored with beet root or Pomsambuco wood; if violet red, with logwood; if yellow, with phytolac berries; if violet blue, with pivet berries; and if pale violet, with sunflower."

PROFESSIONAL STATISTICS.—In England there is one lawyer for every 1,240 of the population; France, one for every 1,970; in Belgium, one for every 2,700; and in Prussia, one for every 12,000 only. Another curious fact is that in England the number of persons belonging to each of the different professions is nearly the same. Thus there are 34,970 lawyers, 35,488 clergymen, and 45,955 physicians. In Prussia, on the other hand, there are 4,809 physicians to only 1,362 lawyers.

CHINESE FISH-HATCHING.—A curious mode of fish-hatching is said to be followed in China. Having collected the necessary spawn from the water's edge, the fishermen place a certain quantity in an empty hen's egg, which is sealed up with wax and put under the sitting hen. After some days they break the egg, and empty the fry into water well warmed by the sun, and here nurse them until they are sufficiently strong to be turned into a lake or river.

A RECENT patent for a map consists in having those portions intended to represent the rivers, lakes and oceans filled with actual water. This is done by attaching the map to a back of wood of sufficient thickness. The rivers, etc., are dug out, filled with water and glazed. Such maps may be hung upon the wall in the usual manner.

FIRST USE OF POSTAL CARDS.—Prof. Emanuel Herman, of Vienna, first introduced postal cards. They were used in England, Germany, and Switzerland in 1870, in Belgium and Denmark in 1871, and in Norway, Russia and the United States in 1872-3. In some foreign countries a card is attached on which an answer may be returned.

A CHAIN of compressed cakes of gun cotton tied around the trunk of a large tree and exploded will, it is stated, cut it down instantly by the violence of its action. The cut through the trunk is as sharp as that made by the keenest ax.

THE Brooklyn tower of the East river Brooklyn bridge was completed on the 16th of December. Its total height is 268 feet—48 feet higher than Bunker Hill monument. It presents a very imposing appearance; we hope it will not prove a tower of folly.

USE FOR SNAKES.—A farmer in Washington county, Ky., has found a practical use for a snake. For two years he has had one shut up in his corn crib, and all that time not a single mouse has been seen there.

EUROPEAN LANGUAGES.—A recent calculation, relative to the European languages shows that English is spoken by 99,000,000 of persons, German by 45,000,000, Spanish 55,000,000 and French by 45,000,000.

ELKSkins dried and cut in slips make very strong half lacings.

DOMESTIC ECONOMY.

Importance of the Inorganic Constituents of Food.

The bodies of animals in a state of health, though chiefly composed of organic substances, contain, nevertheless, always certain inorganic salts, either in combination or solution. The soft parts of the bodies are here intended, and not the bones, which are, of course, largely composed of inorganic matter. Mr. J. Forster has recently described some interesting experiments on the effect of gradually reducing the quantity of these salts in the system, by feeding animals with food of an entirely nutritious description, but completely deprived of such salts. The food employed consisted of albumen, starch and fat, with entirely pure water. Animals thus treated suffer gradual derangements of the functions of various important organs, which derangements go on until the power of assimilation of the food taken is so far reduced as to prevent the proper repair of the ordinary waste of the system. The natural consequence of this would be to produce decline or death. But death usually ensues before it could be brought about by a cause so slowly acting, since the deficiency of salts, by arresting some of the processes necessary to life, precipitates the destruction of the organism before it could perish by exhaustion. Exhaustion is the effect produced upon the muscles by withholding salts, but in the nerves there appear, first, increased excitability, and then paralysis of the nerve centers. The quantity of salts necessary in the food is less than has heretofore been supposed, but further experiments are necessary to determine its exact amount.

COCKS' COMBS AS FOON.—The combs of Spanish and Leghorn fowls are sold in some parts of Europe as choice delicacies for the palates of those who sigh for fresh appetizers. Under the name of "Cretes de Coq," a supply of these morsels has been recently imported from Paris. The combs are of large size, both single and rose, and are put up in white vinegar, in long tubular glass bottles, holding about a pint, sealed with black wax. When we say that these small bottles cost at wholesale in Paris more than a dollar in gold each, the reflection is forced that many a large combed rooster may in future be sacrificed to Mammon, as many were offered up to Esculapius. There are enough large combs in the yards of some of our breeders to make a fortune if they could be utilized. We hope, however, the combs on the Mediterranean coast will be reduced in size, as many large ones amount to positive deformity.—*Poultry World.*

MISS SEDOWICK has asserted that the more intelligent a woman becomes, other things being equal, the more judiciously she will manage her domestic concerns. And we add that the more knowledge a woman possesses of the great principles of morals, philosophy and human happiness, the more importance she will attach to her station, and to the name of a good housekeeper. It is only those who have been superficially educated, or instructed only in showy accomplishments, who despise the ordinary duties of life as beneath their notice. Such persons have not sufficient clearness of reason to see that domestic economy includes everything which is calculated to make people love home and be happy there.—*Germanian Telegraph.*

BEEF TEA.—Take one pound of juicy, lean beef—say a piece from the shoulder or the round—and mince it. Put it, with its juice, into an earthen vessel containing a pint of tepid water, and let the whole stand for one hour. Then slowly heat it to the boiling point, and let it boil for three minutes. Strain the liquid through a colander, and stir in a little salt. If preferred, a little pepper or allspice may be added.

Mutton tea may be prepared in the same way. It makes an agreeable change when the patient has become tired of beef tea.

BEEF CLUBS.—Beef clubs are in order in some parts of the west. A dozen or 20 farmers combine and each one agrees to furnish a fat steer at a time allotted him. This is divided among the members of the club. Accurate accounts are kept, and at the end of the year a settlement made. The quality of the beef is regulated by the proportion of tallow to the meat, a fine being levied if it falls below a certain per cent.

SPONGE GINGERBREAD.—One cup of sour milk, one cup of molasses, one half cup of butter, two eggs, one and one-half teaspoonsful of salaratus, one tablespoonful of ginger, flour to make it thick as pound cake. Put the butter, molasses and ginger together and make them quite warm, then add the milk, flour and salaratus and bake as soon as possible.

DRIPPING CAKE.—Mix well together two pounds of flour, a pint of warm milk, and a tablespoonful of yeast; let it rise about half an hour; then add half a pound of broken angar, a quarter of a pound of currants, and a pound of good fresh beef dripping; boil the whole well for nearly a quarter of an hour, and bake in a moderately hot oven.

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San Francisco:

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The Mining Laws.

Within the past week no doubt many thousand mining claims have been re-located, by reason of forfeiture of claims by the owners not complying with the provisions of the mining laws of the United States. The fact that claims have been located by parties not original owners, has no doubt created considerable dissatisfaction in many places. There seems to be, moreover, a difficulty among the miners concerning the correct interpretation of the law, and it is to be expected that considerable litigation will arise from disputes as to ownership of mines. A correspondent, one of many, writes to us from Monterey, Alpine county, and says: "On Jan. 24, 1875, the writer re-located a claim in this town, which claim at the time had not received the amount of work upon it required by the law which took effect upon the advent of the new year. Does the re-location hold good?"

It is to be supposed that by this time the miners know the amount of expenditure required on their claims annually. On claims located after May 10, 1872, \$100 of work must be done or improvements made each year; and on claims located prior to May 10, 1872, \$10 worth of work for each 100 feet on the vein, until a patent is issued. The time required for first annual expenditure on claims located prior to the passage of the Act, was extended twice, the last time to January 1, 1875. Those claims not patented were subject to the provisions of the law requiring expenditure and if the work was not done is most decidedly open to relocation. If the claim referred to by our correspondent had not had the work done upon it, or the improvements made which were required, his re-location most certainly holds good.

However, even if located after the passage of the Act of May 10th, 1872, and the annual expenditure had not been made within the year, it was open to relocation in both cases; provided, however, that the original locators had not commenced work upon it on the 1st of January. If they only did five minutes work on it on that day, however, their chances are good for holding, as the law says the claims can be held provided the original locators, their heirs or assigns have resumed work on the date above mentioned. It is not to be said that they must do all the work continuously from that day, but

simply that they must have "resumed work." Sticking to the letter of the law they may do \$50 worth of work on the first day of the year, and \$50 on the last and still hold their ground. This view is maintained to be right by many competent judges.

Our correspondent also says that another claim was jumped in which is a large quantity of valuable machinery, hoisting works, etc. He wants to know if the location holds whether the machinery becomes forfeit also. To this we may answer assuredly not. The Government owned the land and gave it to be worked on certain conditions; when the conditions are not fulfilled, the Government simply reserved the right to take it back and give it to some one else who will fulfill the conditions. It never owned the machinery and has nothing to do with it, that being property entirely out of the Government reach. There is no mention in the law of forfeiture of machinery. If the claim is not worked it may be re-located; but you can't originally locate machinery, so you can't re-locate it.

A decision made last month by the Department in a hypothetical case may be of interest, or decide some important question among the miners. It is as follows:

"A claim located prior to March 10, 1872, upon which the amount required by the Act of that date shall since have been expended will not be subject to re-location January 1, 1875, provided that the claimants have complied, in all respects, with the local laws."

That is as much as to say that provided the first annual expenditure has been made at any time since May 10th, 1872, the claim could not be relocated on the 1st of January even though the work was not done in 1874. Such claims are safe until January 1876.

Another correspondent says he has located 1500 feet on a ledge, then moved 10 feet away from the end of his claim, sunk a shaft and claimed 1500 feet more. He wants to know whether he can hold both. He cannot hold both claims in any such way, as the law expressly states that a miner can only locate 1500 feet on one vein. But he can get some one else to locate the other claim in the usual way, and then buy him out and so get possession legally of the whole 3,000 feet. But what a man wants with 3000 feet of a ledge is a puzzle. It is hard work enough generally to take care of 1,000 feet.

The Bullion Product.

The total bullion product of the Pacific States and Territories for the year 1873 was \$72,258,693. This year it was \$74,401,055 showing an increase of \$2,142,362 over 1873. Jno. J. Valentine, General Superintendent of Wells, Fargo & Co.'s Express, who computes the most reliable statistics on this point writes as follows:

We hand you herewith a copy of our annual statement of precious metals produced in the States and Territories west of the Missouri river, including British Columbia, during 1874, which shows an aggregate yield of \$74,401,055, being an excess of \$2,142,362 over 1873. California, Nevada, Utah, Colorado and British Columbia increased; Oregon, Washington, Idaho, Montana, Arizona and Mexico (west coast) decreased. The increase in Nevada and Colorado is merely nominal, but in California and Utah it is \$3,100,000, three-fourths of which is to the credit of California.

STATES AND TERRITORIES.	Gold Dust and Bullion by Express.	Gold Dust and Bullion by other Conveyances.	Silver Bullion by Express.	Copper and Base Bullion by Freight.	TOTAL.
California.....	\$16,016,668	\$1,401,566	\$2,077,857	\$1,718,550	\$20,200,641
Nevada.....	345,594	34,536	30,254,602	4,111,638	36,442,233
Oregon.....	653,594	65,359	150	4,111,638	1,000,000
Washington.....	1,411,393	141,139	100	1,000,000	1,552,532
Utah.....	2,519,600	251,960	1,000,000	1,000,000	4,771,560
Montana.....	81,921	8,192	8,192	8,192	98,115
Idaho.....	83,221	8,322	8,322	8,322	91,543
Arizona.....	23,333	2,333	2,333	2,333	28,000
Colorado.....	1,600,700	160,070	1,440,700	1,440,700	4,581,470
Mexico.....	84,655	8,465	8,465	8,465	93,125
British Columbia.....	1,487,473	148,747	1,487,473	1,487,473	4,413,166
Grand Total.....	\$32,114,833	\$2,213,943	\$30,651,411	\$12,580,868	\$77,401,055

In our statement for 1873 we referred to the yield—\$72,258,693—as "undoubtedly the largest, for one year, in the history of the coast." The accuracy of the statement has been questioned, and the yield of 1853 referred to as being greater. Dr. Lundrman, Director of the U. S. Mint, whose information is probably as reliable as may be had, names \$65,000,000 as the amount produced in 1853, and that amount was not exceeded until 1873, which is now exceeded by 1874, and the recent developments on the Comstock lode justify the belief that the total product for 1875 will approximate \$80,000,000. Yours truly, Jno. J. Valentine, General Superintendent.

Brooks' Improved Process of Distillation.

We take pleasure in laying before our readers an improvement in distillation, which, the inventor, Mr. Robert C. Brooks, of this city, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency. Before describing the process we will state that Mr. Brooks is a practical distiller, of about thirty years' experience, the last ten years of that time having been expended in completing the improvements which he has just secured by patent. By the new process and improved apparatus the inventor claims to produce alcoholic spirits directly from the still, and by a single distillation, which are absolutely free from fusil oil. We have seen the reports of several of our best chemists, who have analyzed the products of Mr. Brooks' process and which verified his claims to purity and the absence of fusil oil. It is held by many persons that whiskey without fusil oil would be of no value, in fact that it would not be whiskey, but alcohol. This error of opinion arises from the fact that fusil oil, or amylic acid, as it is chemically known, is erroneously supposed by many persons, and even in some of our standard books, to be defined as the oil of grain, oil of potato, etc. Mr. Brooks has discovered, and his experiments have proven, that the essential oil of grain is an entirely separate product, which vaporizes below, or at about the boiling point of water, 212° Fahr., while fusil oil requires a temperature of 280° to be converted into a vapor. This would therefore spoil such an argument. All the volatile products which are obtained from wort, volatilize below the boiling point of water, except fusil oil, and between the boiling point of these two products there is a difference or space of temperature of about 70 degrees. Mr. Brooks takes advantage of this difference or space of temperature to prevent the volatilization of the fusil oil and leave it in the spent wort, and to do this he has invented an improved distilling apparatus which he has also secured by letters patent. This apparatus is so constructed that it is impossible to obtain a temperature in the upper chamber of the still exceeding the boiling point of water or 212° Fahr. Consequently we can only convert to vapor those products of the wort which volatilize at a point below that temperature, thus leaving the fusil oil and a large portion of the water in the wort. The ether which is first volatilized, is condensed and withdrawn entirely from the still before the alcoholic product begins to vaporize so that the subsequent operation proceeds without hindrance.

Mr. Brooks calls his still an automatic pulsating still, because when it is at work its operation is automatically intermittent, thus producing a pulsation as the products of different specific gravities pass up into the condenser.

We cannot spare the space in which to describe the complete construction and operation of this improved apparatus, and to attempt to give the reader a full understanding of the claims of the inventor, without such description would be folly. We will, however, attempt to show the importance of the invention and explain the theory upon which it is based.

Wort, which is the fermented solution from which spirits are obtained contains four volatile products which vaporize as follows, (Fahr): ether, 173°; alcohol, 188°; water, 212° and fusil oil, 269°. It will be seen that the water product stands between the alcohol and fusil oil, giving a clear space of 81° Fahr. of temperature between the desirable and undesirable products.

In Mr. Brooks' apparatus he employs a condensing and separating vessel between the upper chamber of the still and the main condenser through which a constant stream of cold water is made to pass, and this vessel receiving the vapors of ether which first pass from the still condenses them without allowing them to pass into the worm of the still. The condensed ether is then withdrawn entirely from the still before the next product (alcohol) enters the vessel. The condensation of the ether raises the temperature of the vessel so that the alcoholic vapors will pass over into the worm and to the main condenser before it is condensed.

Meers, Van Winkle & Brooks the proprietors of this patent have a large still in practical operation at School House station, near this city, with which they have proven beyond a doubt that the result of their process is all that is claimed for it.

As is usually remarked in such cases "the greatest wonder is that distillers have been so long seeking for some method or process for freeing spirits from fusil oil without discovering this simple common-sense plan. Frequently the very thing we seek for lies just at our doors while we explore the country in a vain search for it. The rationale of the process comprises nothing that is not familiar to the chemist. It only required that this and that be put together and a practical means of carrying out the plan devised to produce the long looked for result. We shall speak again of this invention as it is developed.

The Jersey mines are attracting a good share of attention. The mines are situated 50 miles in a direction west of north from Battle Mountain, Nev. But little work has been done, except on the Trimble mine.

The Centennial Exhibition Building, Philadelphia, 1876.

We will suppose that all the readers of the RURAL PRESS have already heard of the manner in which it is proposed to celebrate the hundredth anniversary of the existence of the United States as an independent nation, and of the magnificent building in which all the nations of the earth are invited to exhibit their products. Of this building we give a splendid illustration, as also of the Art Gallery, which it is expected will contain some of the most distinguished works of painting and sculpture to be found in Europe or America. The whole structure will be supported on piers of massive masonry, while the superstructure will consist of wrought iron columns with roof trusses of the same material. The columns will be of rolled channel bars with plates riveted to the flanges, while the roof trusses are straight rafters with struts and tie bars. The building in shape, a parallelogram, extends east and west 1,688 feet, and north and south 464 feet. Should necessity arise, these dimensions will be increased.

The Principal Buildings

Are the Main Building, the Art Gallery, the Machinery Hall, the Agricultural and the Horticultural Halls. In the aggregate they cover a floor space of about 46 acres.

The larger portion of the structure is one story in height, and shows the main cornice upon the outside at 45 feet above the ground, the interior height being 70 feet. At the centre of the longer sides are projections 416 feet in length, and in the centre of the shorter sides or ends of the building are projections 216 feet in length. In these projections, in the centre of the four sides, are located the main entrances, which are provided with arcades upon the ground floor, and central facades extending to the height of 90 feet.

Upon the corners of the building there are four towers 75 feet in height, and between the towers and the central projections or entrances, there is a lower roof introduced showing a cornice 24 feet above the ground.

In order to obtain a central feature for the building as a whole, the roof over the central part, for 184 feet square, has been raised above the surrounding portion, and four towers, 48 feet square, rising to 120 feet in height, have been introduced at the corners of the elevated roof.

The areas covered are as follows:

Ground Floor.....	872,320 sq. feet	20.02 acres.
Upper Floors in projections, 37,344 "		.85 "
" " in towers	26,344 "	.60 "
Total.....	936,008 "	21.47 "

Ground Plan.

The general arrangement of the ground plan shows a central avenue or nave 120 feet in width, and extending 1,832 feet in length. This is the longest avenue of that width ever introduced into an Exhibition Building. On either side of this nave there is an avenue 100 feet by 1,832 feet in length. Between the nave and side avenues are aisles 48 feet wide, and on the outer sides of the building smaller aisles 24 feet in width.

In order to break the great length of the roof lines, three cross avenues or transepts have been introduced of the same widths and in the same relative positions to each other as the nave and avenues running lengthwise, viz: a central transept 120 feet in width by 416 feet in length, with one on either side of 100 feet by 416 feet, and aisles between of 48 feet.

The intersections of these avenues and transepts in the central portion of the building result in dividing the ground floor into nine open spaces free from supporting columns, and covering in the aggregate an area of 416 feet square. Four of these spaces are 100 feet square, four 100 feet by 120 feet, and the central space or pavilion 120 feet square. The intersections of the 43 foot aisles produce four interior courts 48 feet square, one at each corner of the central space.

The main promenades through the nave and central transept are each 30 feet in width, and those through the center of the side avenues and transepts 15 feet each. All other walks are 10 feet wide, and lead at either end to exit doors.

The Art Gallery.

Is located on a line parallel with and northward of the Main Exhibition Building.

It is on the most commanding portion of great Lansdowne Plateau and looks southward over the city.

It is elevated on a terrace six feet above the general level of the plateau—the plateau itself being an eminence 116 feet above the surface of the Schuylkill River.

The entire structure is in the modern renaissance. The materials are Granite, Glass and Iron. No Wood is used in the construction, and the building is thoroughly fireproof. The structure is 365 feet in length, 210 feet in width, and 59 feet in height over a spacious basement 12 feet in height, surrounded by a dome.

The dome rises from the center of the structure to the height of 150 feet from the ground. It is of Glass and Iron and of a unique design; it terminates in a colossal bell—from which the figure of Columbia rises with protecting hands.

A figure of colossal size stands at each corner

of the base of the dome. These figures typify the four quarters of the globe.

The main entrance opens on a hall 82 feet long, 60 feet wide, and 53 feet high, decorated in the modern renaissance style; on the farther side of this hall, three doorways, each 16 feet wide and 25 feet high, open into the center hall; this hall is 83 feet square, the ceiling

14 feet wide, which opens on its north line into a series of private rooms, thirteen in number, designed for studios and smaller exhibition rooms.

All the galleries and central hall are lighted from above; the pavilions and studios are lighted from the sides. The pavilions and central hall are designed especially for exhibitions of sculpture. There will be

Dept. VII. Apparatus and methods for the increase and diffusion of knowledge.

Dept. VIII. Engineering, public works, architecture.

Dept. IX. Plastic and graphic arts.

Dept. X. Objects illustrating efforts for the improvement of the physical, intellectual and moral condition of man.

In this connection we may mention that the *San Francisco Journal of Commerce* has applied for a space 50x50, wherein to represent raw materials and staples produced on the Pacific Coast.

How the Work Progresses.

Philadelphia papers represent the work as progressing favorably. The contractor is trying to



of the dome rising over it 80 feet in height. From its east and west sides extend the galleries, each 98 feet long, 48 feet wide, and 35 feet in height. These galleries admit of temporary divisions for the more advantageous display of paint-

Ten Departments

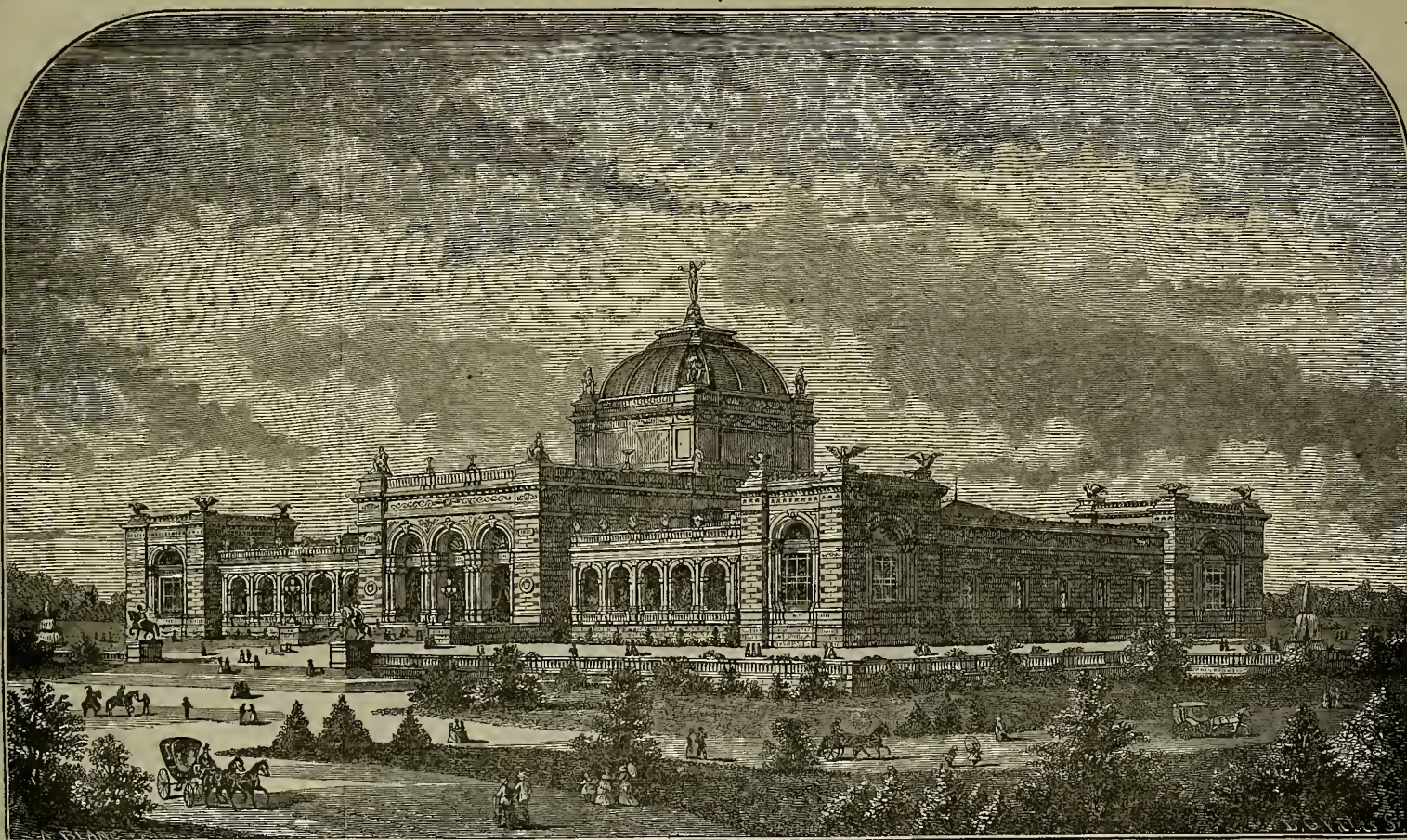
Of classification, divided into one hundred and nine groups, subdivided into one thousand and ninety-nine classes. The departments of classification will be as follows:

The Pacific Coast Commissioners

With their alternates are as follows:

California—J Dunbar Creigh, San Francisco; alternate, Benj. P Kooser, Santa Cruz. Oregon—J W Burke, Baker City; alternate, A J Dittfur,

place the Memorial Hall under temporary cover, to allow work inside during the winter. The interior walls have reached a height of about fifty feet, or above the span of the arches which form the entrance to the magnificent vestibule. On



THE CENTENNIAL ART GALLERY.

ings. The center hall and galleries form "one grand hall 287 feet long and 85 feet wide, capable of holding eight thousand persons, nearly vice the dimensions of the largest hall in the country. From the two galleries, doorways open into two smaller galleries, 28 feet wide and 89 feet long. These open north and south into private apartments which connect with the pavilion rooms, forming two side galleries 210 feet long. Along the whole length of the north side of the main galleries and central hall extends a corridor

Dept. I. Materials in their unwrought condition—mineral, vegetable and animal.

Dept. II. Materials and manufactures the result of extractive or combining processes.

Dept. III. Textile and felted fabrics—apparel, costumes and ornaments for the person.

Dept. IV. Furniture and manufactures of general use in construction and in dwellings.

Dept. V. Tools, implements, machines and processes.

Dept. VI. Motors and transportation,

Portland, Nevada—W W McCoy, Eureka; alternate, Jas W Haines, Genoa. Utah—John H Wickiier, Salt Lake City; alternate, Oscar G Sawyer, Salt Lake City. Idaho—Thos Donaldson, Boise City; alternate, Christopher W Moore, Boise City. Montana—W H Claggett, Deer Lodge City; alternate, Patrick A Largey, Virginia City. Washington Territory—Elwood Evans, Olympia; alternate, Alexander S Abernethy, Cowlitz county. Arizona—Hon. Richard C McCormick, D. C.; alternate, John Walson, Tucson.

the exterior walls all the rough granite up to the water-table is in place, and on the southwest corner the masons have laid a considerable quantity of the fine Richmond granite which is to form the superstructure. Enough is now laid at the Memorial Hall to indicate its beauty and demonstrate the imposing character of the edifice. The granite at the southwest corner is about six feet above the water-table. It is backed with brick, laid in cement, the entire wall being five feet thick and is to be continued to the full height.

South Mountain.

This camp which, until recently, has been wholly unknown to everybody with the exception of a few, is now commencing to attract the attention of prospectors, both in Idaho and Nevada, and is destined to become a large and prosperous mining camp at no far distant day.

The South Mountain

Consolidated Mining company, an organization which numbers among its members several wealthy and influential citizens, not only of Owyhee, but also of San Francisco, has employed a large number of men all the fall in the work of extracting the precious metal from the bowels of mother earth, and consequently has a large amount of ore on hand which will yield \$300 to \$500 per ton. They have recently constructed a large furnace for the purpose of smelting the ores of that camp, and have appointed Sam Wessels, a skillful metallurgist, and one of the original locators of the camp, to superintend the works.

The Furnace is now Working to a Charm, And surpasses the most sanguine expectations of those who always had the utmost confidence in its ultimate success. We understand that it is the intention of the company to erect another furnace next spring. We, in common with hundreds of others who take an interest in the future welfare of Owyhee county, sincerely hope that success will crown their efforts, and that they will succeed in every enterprise which they may undertake; for it depends on the success of the persons who have money invested in South Mountain for the success of every person in Owyhee county. Comparatively speaking, the people of South Mountain have, until quite recently, been isolated, they being almost entirely cut off from any connection with the outside world; but now that Platte River, the energetic superintendent of the Atlantic, Pacific, Nevada and Northern Telegraph Line, has extended his line of telegraph from

Silver City to South Mountain,

The people of that isolated burg can no longer be wholly ignorant of what is transpiring around them. Next spring, when the company commences mining operations in good earnest and the permanency and value of the mine become established, good wagon-roads will undoubtedly be constructed from various points, or no doubt some enterprising man will run a regular line of stages from Silver City to South Mountain. South Mountain City, formerly Bullion City, is located in close proximity to Silver City, both camps not being over 30 miles distant from each other. This circumstance cannot fail to be of great benefit, financially, to the people of both camps, inasmuch as they can go from one camp to another in a day's ride. When we take all our natural advantages into consideration we are led to the conclusion that there is, as we have already stated, a bright future in store for the people of Owyhee county. We think that when the sun of another summer shall make its appearance that Silver City and South Mountain combined will

Employ at Least 2,000 Men,

And we furthermore think that the day is not far distant when Owyhee county will prove itself to be one of the richest and most extensive gold and silver producing districts on the Pacific Coast.—*Cor. Bedrock Democrat.*

New York Hill Mine.

This mine is owned by an incorporated company, whose principal place of business is at San Francisco. The most of the stock of the company is owned by the estate of the late A. Delano. The mine is situated about two miles and a half south of Grass Valley. It employs 45 miners, and is paying, at the present time, \$2.50 per day to each miner. It is said that at an early day, and as soon as the mine has something better of surroundings, full wages will be paid. The cost of drifting is \$15 per foot, and stopping costs \$15 per ton, making the extraction of ore cost \$15 per ton. Milling the ore costs \$4.50 per ton, and the work has been so far done at the Larimer mill. The number of tons worked during the year has been about 500, and the average yield has been not less than \$50 per ton, making a total haulion yield of \$25,000. The location is about 3,000 feet in length, and the ledge runs northeast and southwest, dipping to the northeast. The length of pay zone, so far as explored is 1,400 feet, with an average thickness of 2½ feet. The country rock, as far as explored, consists of greenstone and slate. The ledge is worked through a tunnel which has now a total length of 750 feet. There are two drifts opened from the tunnel. There are 400 feet of backs above the tunnel workings. On the ledge there is a shaft, not used at present, but which is available at any time for working, of the depth of 700 feet. The total length of drifts in the mine is 500 feet. Mr. Joseph Snyder is the Superintendent of the mine.—*Grass Valley Union.*

GOLD IN SONORA.—There is a report in Tucson, Arizona, regarding a rich gold mine in Sonora, on the San Miguel river, near Ures. Some lumps, worth \$60, which were obtained by washing with a wooden bowl, have been exhibited here. The claims cover a mountain two miles square, more or less, and gold is found on the entire surface. High up on the mountain a great deal of mining was done a century ago and continued down to the point where the vein turned to sulphurets of silver, which they could not work.

Geological Puzzle.

Prof. R. Weiser, of Georgetown, Colorado, contributes the following to the *Journal of Science and Arts*: Geologists have been not a little perplexed with the frozen rocks found in some of our silver mines in Clear Creek county, Colorado. I will first give a statement of the facts in the case, and then a theory for their explanation. There is a silver mine high up on McClellan mountain called the Stevens mine. The altitude of this mine is 12,500 feet. At the depth of from 60 to 200 feet, the crevice matter, consisting of silices, calcite and ore, together with the surrounding wall-rocks, is found to be in a solid, frozen mass. McClellan mountain is one of the highest eastern spurs of the Snowy range; it has the form of a horseshoe, with a bold escarpment of feldspathic rock, near 2,000 feet high, which in some places is nearly perpendicular. The Stevens mine is situated in the southwestern head of the great horseshoe; it opens from the north-western. A tunnel is driven into the mountain on the lode, where the rock is almost perpendicular. Nothing unusual occurred until a distance of some 80 or 90 feet was made; and then the frozen territory was reached, and it has continued for over 200 feet. There are no indications of a thaw, summer or winter; the whole frozen territory is surrounded by hard, massive rock, and the lode itself is as hard and solid as the rock. The miners being unable to excavate the frozen material by pick or drill, to get out the ore, (for it is a rich lode, running argentiferous galena from 5 to 1,200 ounces to the ton), found the only way was to kindle a large wood fire at night against the back end of the tunnel, and thus thaw the frozen material, and in the morning take out the disintegrated ore. This has been the mode of mining for more than two years. The tunnel is over 200 feet deep, and there is no diminution of the frost; it seems to be rather increasing. There is, so far as we can see, no opening or channel through which the frost could possibly have reached such a depth from the surface. There are other mines in the same vicinity in a like frozen state.

From what we know of the depth to which frost usually penetrates into the earth, it does not appear probable that it could have reached the depth of 200 feet through the solid rock in the Stevens mine, nor even through the crevice matter of the lode, which as we have stated, is as hard as the rock itself. The idea, then, of the frost reaching such a depth from the outside, being utterly untenable, I can do no other way than to fall back upon the Glacial era of the Quaternary. Evidences of the Glacial period are found all over the Rocky mountains. Just above the Stevens mine there are the remains of a moraine nearly a mile long, and half a mile wide. The debris of this moraine consists of small square and angular stones, clearly showing that they have not come from any great distance. And just over the range, on the Pacific slope, there are the remains of the largest moraine I have ever seen, consisting of feldspathic boulders of immense size. I conclude, therefore, that it was during that period of intense cold that the frost penetrated so far down into these rocks, and that it has been there ever since, and bids fair to remain for a long time to come.

Opening Outside Mines.

Our brother editors here in Virginia are splitting hairs about something which we suspect they would not disagree about for a moment if they would sit down and exchange ideas instead of firing at long range at each other, as they are now doing. One wants men of small means to explore Eastern Nevada and open up new enterprises. The other reports "Oh, yes, give up four dollars a day and go to Eastern Nevada and starve." Now both are right and both are wrong. It would be foolish to leave a means of making a comfortable livelihood to go on any uncertainty. But if several men, each with a surplus of several thousand dollars, choose to make up a purse with a part of their hoarded means to open some as yet unexplored field, there can be no objection; on the other hand, there is every reason to encourage such a course, for it is by such means that new mines are developed and new districts opened. There are two reasons why so many mining enterprises are failures. They are generally, first, lack of judgment, and secondly, lack of means. One-half the work done on mines in this State is dead work, because men followed their hopes after their leads were lost. In this we are not talking of the chronic prospector, whose feet have climbed every hill in the State, and who, were he to come upon a Potosi to day, would trade it to-morrow for a mustang and a sack of flour to follow again his dream. Such mortals need a hook of their own to describe them as they are. But, with careful business men, the easiest thing in the world is to be mistaken about a mine or the best way to explore it. Hence, this work should be approached with the greatest care, and never started until capital sufficient to a little more than do the expected work is secured. For men of small capital there is no way to go to work except by means of joint-stock companies or incorporations. The proof of this is, that notwithstanding thousands have tried, the really successful mining enterprises in the State outside of Storey county can be counted on one's fingers, and that after 12 years of toil. But if a company of men will each put in his quota, then secure a property which a man of experience is sure will justify the work, and go

to work practically and honestly, the probability is that they will more certainly secure a fortune than by wandering about these streets and betting on a guess.—*Virginia Enterprise.*

COAL BORER.—The Nanaimo Free Press says: The Vancouver Coal company are importing from England a Diamond Rock Boring machine which is calculated to work wonders in piercing the hard rock of the country hereabout. A machine similar to the one the company have obtained has been in operation at Middleboro'-on-Tees, and it bored a hole 690 feet in sandstone in the short space of three months, including the time occupied in fixing the engine and apparatus. By the Diamond Drill samples of the strata passed through are brought up in the form of cylindrical cores. Such a method must be invaluable, securing, as it does, solid specimens of the rocks and minerals, which cannot only be judged by appearance in their natural condition, but may be analyzed without risk of error by mixture with contiguous rocks, as in the old system of boring. The speed of boring with the new patent drill is considered to be from six to twelve times quicker than by the ordinary way.

NEW SHAFT.—A new shaft through which to work that portion of the great honauza lying in the Consolidated Virginia and California mines was started a few days since. The shaft will be of the largest size, and will be pushed downward as rapidly as possible. Its location is 1,040 feet northward from the main shaft of the Consolidated Virginia mine, and it will be known as "C and C" shaft. As soon as it shall have been completed, hoisting apparatus of the most improved pattern will be placed upon the surface and everything prepared to bring the great ore body below to daylight. And what with this and other improvements both in contemplation and in actual progress at our mines and the building of business and dwelling houses on every hand about us, a most prosperous season for builders and mechanics generally seems about dawning, or, rather, to have already dawned.

THE Cerro Gordo furnace men, says the Inyo Independent, since the establishment of the smelting industry have been diligently prosecuting experiments with a view to ascertaining exactly how to construct a furnace that will wear the longest and produce the best results. The annual increase of hullion testifies to their success; but of late some improvements have been introduced which seem likely to supersede all the old styles. Belshaw has in very successful operation what is known as a "water jacket," which is simply a double iron boiler, the inner one lined with fire clay, and between them is the water. Beaudry proposes substituting a species of soapstone, found some five miles south of the town, for the molded fire-clay brick hitherto in use. The stone has been used in "patching," and found to stand the intense heat for a long time.

FROM ALTURAS.—Hon. S. B. Dilly and lady have arrived from Rocky Bar; the latter will remain with her friends through the winter, while Mr. D. will return after a short visit. The news which Mr. Dilly brings from Alturas shows a healthy state of affairs in that camp. He says they have a fair quantity of supplies, and the freight now on the road will get in, and they will have an abundance. There don't appear to be any idle men in the camp, as has usually been the case during the winter. Dr. Newton, Superintendent of the Pittsburg company Col. Ward of the Valley company, Mr. Cavanaugh, of the Buffalo company, Mr. Thomas, of the Wide West company and Jake Reaser & Co., who own the Vishnu and have also leased the mines of Wahl & Bros., are each working about ten men, and the Pittsburg, Valley and Wide West mills are running nearly all the time night and day with good results.—*Idaho Statesman.*

From an Inventor.

The following letter, which was recently received from an old client of Dewey & Co., now residing in one of the Eastern States, speaks for itself:

GENTLEMEN: It was through your house that I secured my first patent, and although I have since done business here in the Atlantic States with the ablest patent solicitors—gentlemen who have done me justice—yet I have often regretted that you were too far off to advise with me in my cases. It has taken a longer time with every patent I have taken out since I left California and came East, than in the cases you prepared for me in San Francisco, which is certainly very creditable to you.

By the way, one of my patents has passed the ordeal which is the essential test of a patent's value. I mean that of a trial in the courts, and it stood the hatching of one of the best lawyers in the country. The specifications and claims were completely made out and there was a perfect comprehension of its principle during the trial. Since giving it this test we thought that we would make it even stronger, if possible, and submitted it to one of the best patent solicitors for advice. After a careful examination of the case he advised us to let it alone as it stood, saying that whoever made up those papers understood their business. I then informed him that they were drawn up by Dewey & Co., of San Francisco, and he replied that he knew you very well by reputation. Very truly yours,

L. L. SAWYER.

Meriden, Conn., May 16, 1874.

TRUCKEE, CAL., July 10, 1874.

MESSES, DEWEY & CO.—Gentlemen: My patent is just received, and is entirely satisfactory. Permit me to tender you my sincerest thanks for the care and attention, the promptness and interest you have displayed in managing my affairs. Gratefully yours,

C. F. McGLASHAN,

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American & Foreign Patent Agents,

OFFICE, 224 SANSOME STREET, S. F.

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Our long experience in obtaining patents for Inventors on this Coast has familiarized us with the character of most of the inventions already patented; hence we are frequently able to save our patrons the cost of a fruitless application by pointing them to the same thing already covered by a patent. We are always free to advise applicants of any knowledge we have of previous applications which will interfere with their obtaining a patent.

We invite the acquaintance of all parties connected with inventions and patent right business, believing that the mutual conference of legitimate business and professional men is mutual gain. Parties in doubt in regard to their rights as assignees of patents, or purchasers of patented articles, can often receive advice of importance to them from a short call at our office.

Remittances of money, made by individual inventors to the Government, sometimes miscarry, and it has repeatedly happened that applicants have not only lost their money but their inventions also, from this cause and consequent delay. We hold ourselves responsible for all fees entrusted to our agency. The principal portion of the patent business of this coast has been done, and is still being done, through our agency. We are familiar with, and have full records, of all former cases, and can more directly judge of the value and patentability of inventions discovered here than any other agents.

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Alabama.....	996,092	Oregon.....	30,223
Arkansas.....	454,541	Pennsylvania.....	3,521,791
California.....	560,247	Rhode Island.....	217,353
Connecticut.....	537,434	South Carolina.....	705,606
Delaware.....	125,015	Tennessee.....	1,258,520
Florida.....	187,748	Texas.....	818,579
Georgia.....	1,184,109	Vermont.....	330,551
Illinois.....	2,539,891	Virginia.....	1,225,165
Indiana.....	1,689,637	West Virginia.....	442,014
Iowa.....	1,191,729	Wisconsin.....	1,054,670
Kentucky.....	1,321,011	Total.....	38,113,253
Louisiana.....	726,915	Territories.....	38,113,253
Maine.....	625,915	Arizona.....	9,558
Massachusetts.....	1,437,351	Colorado.....	39,864
Michigan.....	1,184,059	Dakota.....	14,181
Maryland.....	780,894	District Columbia.....	131,700
Minnesota.....	439,708	Idaho.....	34,999
Mississippi.....	827,922	Montana.....	20,595
Missouri.....	1,721,229	New Mexico.....	91,874
Nebraska.....	122,993	Otah.....	186,786
Nevada.....	42,491	Washington.....	23,955
New Hampshire.....	318,300	Wyoming.....	9,118
New Jersey.....	906,096	Total.....	442,730
New York.....	4,382,959	Grand Total.....	38,555,983
North Carolina.....	1,071,361		
Ohio.....	2,665,260		

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Great Britain.....	31,187,108	Bavaria.....	4,824,421
France.....	36,588,559	Portugal.....	3,995,558
Belgium.....	4,839,094	Saxony.....	2,423,586
Prussia.....	24,043,902	Hanover.....	385,957
Austria & Hungary.....	35,943,692	Wurtemberg.....	1,778,479
Russia.....	77,268,898	Brazil.....	11,780,000
Spain.....	15,031,257	Chili.....	2,000,000
Italy.....	25,906,937	Peru.....	2,500,000
Sweden.....	4,195,681	N. Grenada.....	2,794,000
Norway.....	1,701,478	India.....	191,000,000
Poland.....	5,317,362	Australia.....	1,500,000
Denmark.....	1,726,724	N. Zealand.....	326,618

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Attorney at Law and Counselor in Patent Cases
Office, 207 Sansome Street, S. F.
Refers to Dewey & Co., Patent Agents; Judge S.
Heydenfeldt or H. H. Haigh. 6v28-3m

Banking.

The Merchants' Exchange Bank
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Capital, One Million Dollars.

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BANKING HOUSE,
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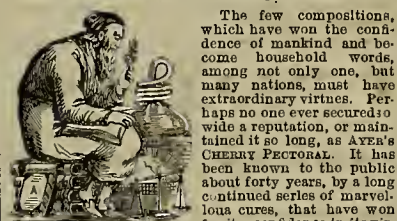
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Allow interest at the rate of Four per cent. upon daily balances of Gold and Currency.
Receive consignments of Gold, Silver and Lead Bullion, and make Cash advances thereon.
Invite Correspondence from Bankers, Mining Companies, Merchants and Smelting Works.

French Savings and Loan Society,
411 Bush street, above Kearny..... SAN FRANCISCO
4v27-1f G. MAHE, Director.

Ayer's Cherry Pectoral,
For Diseases of the Throat and Lungs, such as Coughs, Colds, Whooping Cough, Bronchitis, Asthma and Consumption.

The few compositions, which have won the confidence of mankind and become household words, among not only one, but many nations, must have extraordinary virtues. Perhaps no one ever secured so wide a reputation, or maintained it so long, as AYER'S CHERRY PECTORAL. It has been known to the public about forty years, by a long continued series of marvelous cures, that have won for it a confidence in its virtues, never equalled by any other medicine. It still makes the most effectual cures of Coughs, Colds, Consumption, that can be made by medical skill. Indeed the CHERRY PECTORAL has really robbed these dangerous diseases of their terrors, to a great extent, and given a feeling of immunity from their fatal effects, that is well founded, if the remedy be taken in season. Every family should have it in their closet for the remedy and prompt relief of its members. Sickness, suffering and even life is saved by this timely protection. The prudent should not neglect it, and the wise will not. Keep it by you for the protection it affords by its timely use in sudden attacks.



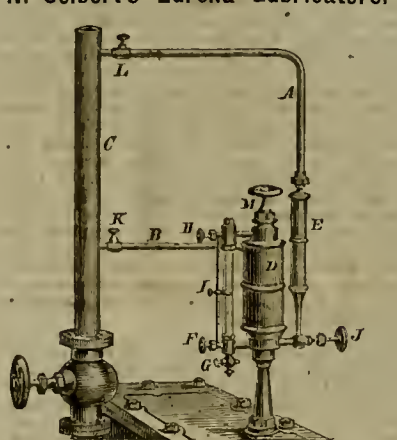
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DR. J. C. AYER & CO., Lowell, Mass.,
PRACTICAL AND ANALYTICAL CHEMISTS.
Sold by all Druggists and Dealers in Medicine.
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STEAM ENGINES AND BOILERS
Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by
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New Inventions!
Of real merit, if brought plainly before the public when fresh, are most likely to become profitable to the patentee. For this reason, patentees (of worthy devices) should have the best of Engravings Made, and published in the Press. Superior Engravings Made, at reasonable rates, by artists in this office. bp-1f

Machinery.

N. Seibert's Eureka Lubricators.



THE HIGHEST PREMIUM

Awarded by the Mechanics' Institute Fair, San Francisco, and State Fair, Sacramento, 1871.

These Lubricators are acknowledged by all engineers to be superior to any they have ever used; feed constantly by pressure of condensed water, supplied by pipe A, regulated under the oil by valve J, and forced out through check valve and pipe B into the steam pipe C; it then becomes greasy steam, passes to all the valves and cylinder at every stroke of the engine; glass tube I indicates amount used per hour. Packing on rods and stems lasts longer, and the rings on the piston will not corrode. One pint of oil will last from three to six days, according to speed and size of engine; I, sliding gauge; K, valve to shut off when engine stops; H, F, valves to shut off in case of frost; steam does not enter the cup; it is always cool; warranted to give satisfaction. Patented February 14, 1871. Made by California Brass Works, 125 First street, S. F. 24v23

BALL'S

SWEEPING DREDGE,

A NEW AND VALUABLE

CALIFORNIA INVENTION,

Has been very lately well proven by performing a job of dredging at the mouth of San Antonio Creek, at Oakland, Cal.

There is but this one machine that has ever had these improvements employed. It is an old machine, formerly built for another device, and is unfavorably constructed for Ball's improvements; yet this first temporary experimental machine has filled a scow of eighty-five cubic yards in sixteen minutes in unfavorable digging. For durability, digging hard material and fast work, it has a reputation (supported by leading engineers) as having no equal.

Testimonials and references will be given on application to the inventor, who is the sole owner of patents (excepting having made an assignment of the one machine now belonging to the Central Pacific Railroad Company) Having resolved not to sell any rights unless upon a basis of actual work performed by a machine built by myself for the purpose of fairly establishing the worth of the invention, I therefore offer to sell machines or rights on the following plan, which is warranting the capacity of the machine by actual work:

I will enter into an agreement with any responsible party to build and sell a machine, scows and tender, all complete, and right of all my improvements in dredging machines throughout the Pacific Coast for \$20,000, warranting the machine to dredge six cubic yards per minute (to fill a scow at that rate). \$20,000 will but little more than pay the cost of building the machine, scows, etc., all complete; therefore I am proposing to ask nothing for my patents unless my machine dredges more than six cubic yards per minute. But it shall be further agreed that in case (at a fair trial) to be made within a stated time) the machine shall fill a scow at the rate of more than six cubic yards per minute, then \$10,000 shall be added to the price above stated for each and every such additional cubic yard thus dredged per minute, and for additional fractions of a cubic yard thus dredged in the same ratio the \$10,000 is to be added to said price above stated.

I will sell any other Territorial or State rights (either United States or Foreign) upon the same plan and at a lower price proportionately than the rights for the Pacific Coast.

I will sell a single machine with scows and all complete, and right to use the same in a limited territory, for \$20,000 on the same plan as above stated, but will add only \$2,000 to each additional yard over the six cubic yards per minute. Each machine is not to employ more than two 10x20 inch engines.

Payments to be made in U. S. gold coin on delivery of machine, as may be indicated by agreement.

Address, **JOHN A. BALL,**
9v28-1f Oakland.

TWELVE COLUMNS OF PRICES EVERY WEEK.

SAN FRANCISCO
JOURNAL OF COMMERCE
—AND—
Weekly Price Current.

NO MERCHANT SHOULD BE WITHOUT IT.
W. H. MURRAY, Business Manager,
414 Clay Street.

RELIABLE REVIEWS OF THE MARKETS.

NONPAREIL OIL.

140 Degrees Fire Test, for Family Use.

OWNERS OF MILLS AND MANUFACTORIES, your attention is particularly called to this beautiful and safe ILLUMINATING OIL. Its use is urgently recommended by the New York Fire Commissioners and Insurance Companies. For sale to the trade in lots to suit.
A. HAYWARD, 224 California St.
19v23-3m

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS OF AND DEALERS IN

ASSAYERS' MATERIALS

Chemical Apparatus and Chemicals,
Druggists' Glassware and Sundries,

PHOTOGRAPHIC GOODS, ETC.,
512 and 514 Washington street, SAN FRANCISCO

We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our large and well adapted stock

ASSAYERS' MATERIALS

—AND—
Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast. 177 Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Ores, Grammes, will be sent free upon application.

7v25-1f **JOHN TAYLOR & CO.**

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Sellers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and sellers for themselves, at the office, 229 Fremont Street, San Francisco.

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.
Ores sampled.
Assaying in all its branches.
Analysis of Ores, Minerals, Waters, etc.
Plans furnished for the most suitable process for working Ores.
Special attention paid to the Mining and Metallurgy of Quicksilver.

E. N. RIOTTE,
C. A. LUCKHARDT,
Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS.

ADVANCES MADE

On all kinds of Ores, and particular attention

PAID TO

CONSIGNMENTS OF 6000 LB.

4v16-3m

LEOPOLD KUH,
(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical CHEMIST.

No. 611 Commercial Street,
(Opposite the U. S. Branch Mint
SAN FRANCISCO CAL. 7v11-3m

California Assay Office—J. A. Mars &

Wm. Irelan, Jr., Chemists and Assayers, Rooms 47 and 48 Merchants' Exchange, San Francisco. Analysis of Ores, Mineral Waters, Etc. 8v28-3m

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tanned Manila Rope; Hay Rope; Whale Line, etc., etc.

TUBES & CO.,

611 and 613 Front street, San Francisco.

Glasgow Iron and Metal Importing Co.

Have always on hand a large Stock of
Bar and Bundle Iron, Sheet and Plate Iron
Boiler Flues, Gasand Water Pipe, Cast
Steel, Plow and Shear Steel, Anvils,
Cumberland Coal, Etc.

WM. MCGRINDLE, Manager, 22 & 24 Fremont St., S. F.
10v12-1f

Buy Real Estate while at Low Rates.

NINE WATER-FRONT LOTS, CHEAP,
On Gift Map 4.
Forming about half of a block fronting on the broad ship channel of Islais Creek; will be sold so low as to make it an inducement to the buyer. Inquire for the owner at this office, bp-1f

The United States of Colombia.

We had a conversation this week with a gentleman who has recently returned from the United States of Colombia. He speaks hopefully of the prospects of the Americans who are opening up the gravel mines in the interior. The gravel mines owned by Weaver & Co. are 30 miles from Barbacoas, on the Nyambas river. They have plenty of water for hydraulic and have one monitor at work, employing seven or eight men. The other mines are 15 or 20 miles above Barbacoas, and a company of San Franciscans expect to take down the requisite machinery to work them. There are some five or six companies, some getting their claims in order to work. Brown & Gentry have a large estate on which one monitor is at work, and three or four more will be added. These mines are on the Yacura river. The gravel is pretty good, and where water can be had, will pay well. Some of the gravel will pay handsomely. Labor is pretty cheap and men can be employed for from 37½ cents to \$1 per day and board. Weaver & Co. pay 37½ cents and board for common men and \$1 per day and board for drifters. Most of the companies have just started in and have done little as yet. On all the large estates the natives mine in a rude way for a share of the profits. All the mines pay well where the water can be brought on; some, however, have very little water.

The gentleman who gave us this information brought up with him a number of articles from the country which are interesting. He showed us the Brazil nuts in the cone-shaped cover in which they grew. Also, some "milk" of the India-rubber tree which grows up in the mountains. He brought some coffee from the Cauca valley, which is of excellent quality; an American there has a plantation of 70,000 coffee trees which yield an average of 3½ pounds to a tree. The coffee grows there plentifully and his trees are of such a growth that he is continually gathering, as some trees are in while others are out of season. The owner of this plantation also has 160 acres in sugar cane. This sugar cane takes 15 months to mature after each cutting, the roots of course remaining. We were shown also from the Cauca valley, some excellent wild cotton. This valley is about 48 miles from the coast on an air line, and has an elevation of 3,000 feet. The cotton has a first-rate fibre. It has never been cultivated there to any account. Our informant, a practical cotton grower and manufacturer, thinks the Cauca valley the best locality for an investment for a cotton mill there is in the world. The natives would cultivate the cotton if there was a demand for the product. A small cotton mill of 50 looms would do exceedingly well, and our informant thinks it would clear \$600 per day right along. Common cotton cloth, without print, could be sold there in quantities at 20 cents per yard. There is plenty of water power to run a mill and plenty of ground to be had to cultivate the cotton, and the product would meet with ready sale. We should judge from the figures shown us, that this favorable opportunity will not long lie idle, for some enterprising American will take it up. We were shown among other things several of the "ivory nuts" grown there, from which small articles are made. Also a species of cloth, resembling the Kapa cloth of the South Sea islands, made from the inner bark of a tree. It is tough and thick, and in a cold climate would do very well for clothing. Some of the wood grown there is very hard and fine grained.

There are no roads in the mining part of the country, except the trail from Barbacoas, all the travel being done in canoes or on the backs of Indians. The trail to the mines has been traveled for 300 years, and worn down in places from ten to forty feet. The government is now building a road from Barbacoas to the interior 80 miles long, 20 miles of it being finished, and 200 men being at work on the rest. To the upper mines they go by the trail. The road will give access to the mines so that horses can be used. To the Cauca valley there is a trail or small road, which is pretty good for this country.

A ledge of silver ore has lately been discovered in the State of Cauca, in the foothills, which assays \$50 per ton in silver and \$6 in gold.

THE MECHANICS' INSTITUTE FAIR.—The Board of Trustees of the Mechanics' Institute announce the opening of the next Mechanics' Fair for the middle of August next. They have already commenced making arrangements for it. It is intended to make the horticultural display one of the most marked features of the next exhibition. The garden, which was arranged last year by the Bay District Agricultural Society, will be flooded over and used for other purposes. The lot adjoining the pavilion on the east, which has a frontage of 170 feet on Mission street and runs back to the boiler house, a distance of about 300 feet, will be laid out with walks, avenues, shady groves and fountains.

THE PARTNERSHIP OF CONROY, O'CONNOR & CO., the well known hardware dealers in this city, has expired by limitation and the entire interests of the firm have been purchased by W. F. Dunham, E. W. Playter, B. Hayden, W. L. McCormick and A. Carrigan, who have been clerks and partners in the establishment for 15 years. The new firm is known as Dunham, Carrigan & Co.

General News Items.

CONGRESS.—A large amount of work is in preparation for Congress, during the recess and upon the reassembling there will be a rush of business as well as great political activity. The Arkansas Investigation Committee's report will then be forthcoming; to be followed soon after by the reports of several select committees now in various sections of the South and the Civil Rights bill must be acted upon shortly, as it is at the top of the pile on the Speaker's table. The new finance bill comes up by special order on January 7th. The Senate Census Committee will make their report on cheap transportation. The Committee on Appropriations expect to have the remaining Appropriation bills completed by the time of re-assembling, and their consideration will be pressed upon the House forthwith; indeed, all the most important subjects are in such a shape as to be presented almost simultaneously for action.

THE SPANISH REVOLUTION.—A very sudden termination has been given to the Spanish Republic, by the proclamation of the son of ex-Queen Isabella, as King of Spain, under such circumstances as secured his immediate recognition by almost the entire army and navy and a large majority of the leading civilians throughout the country. Even Castelar, it is understood, with other leading Republicans, gives in his adherence. There seems to have been a very general impression that nothing else could restore that distracted country to tranquility. The European Government appear to be very well satisfied with the result, and will recognize the accession of the young Prince of Asturias to power, as soon as he arrives and assumes the reigns of Government, which will be in a few days. The Prince is now about 16 years of age, but well educated and possessing a full understanding of the responsibility he is assuming.

TERRIBLE EXPLOSION.—Two miners were instantly killed in the Suto tunnel on the 30th ult., and a number of others seriously injured—one fatally. The accident was of quite a singular nature, and should be studied and borne in mind by all persons using nitro-glycerine. It happened at the time of changing shifts, and a blast was about to be exploded in the face, or header, of the tunnel. The men retreated back about six hundred feet, where the battery used in exploding blast was situated. Several boxes of giant powder had been left near the battery, and when the blast in the header was touched off, the powder near the battery also exploded, by what means is not fully understood.

THE PACIFIC MAIL INVESTIGATION makes slow progress. The testimony thus far looks bad for somebody, and especially for Mr. Congressional ex-Postmaster King. A Washington special says: If the testimony given in New York concerning Mr. King proves true this gentleman has subjected himself to the punishment attached to perjury, since in his examination before the committee in the last Congress, he testified then that he did not receive one dollar, either directly or indirectly, in behalf of the subsidy schemes. Efforts are evidently being made on the part of certain persons to cover things up.

THROWN FROM A WAGON AND KILLED.—The body of A. Roscoe, a farmer, about 70 years of age, residing about a mile from Sheridan, Placer county, was found Friday morning on the plains, north of the Rancho de Passa. The jury of inquest decided that he was killed by being thrown from his wagon.

GARIBALDI.—After all that has been said and done Garibaldi cannot be induced, even in his poverty, to accept of aid from any source—either public or private. He has just refunded the substantial aid which the Italian Government offered him, on the plea that that the finances of the Government were suffering.

COLD WEATHER.—Halleck station, east of Elko is said to be the coldest point on the Central Pacific railroad. The mercury went to 9 degrees below zero there a few days since. Considerable floating ice from above was seen in the Yuba river at Marysville, yesterday something unusual in that region.

FIRE IN THE TULE.—During last week the tules on the Sacramento river, directly west of Marysville, were on fire, giving forth lurid flames at night, and clouds of smoke during the day time, when viewed from Sacramento city.

SPONTANEOUS COMBUSTION.—Some wool in the Oregon woolen mill at Portland took fire from spontaneous combustion, last week, out was extinguished before much damage resulted.

THE BEECHER-TILTON CASE.—Five hundred witnesses were subpoenaed for the Beecher-Tilton case which went to trial on Monday. It is said that Beecher received 1,000 calls on New Years.

VASQUEZ.—The trial of this noted bandit commenced on Tuesday last. The law's delay could not be forced any farther.

DEATHS FROM FAMINE.—Accounts from Aelia Minor show that deaths from the famine is increasing, and that many deaths occur daily.

NEW POSTMASTER AT QUINCY.—T. F. Hersey has been appointed postmaster at Quincy.

Industrial Items.

OUR BUILDING INDUSTRIES.—The value of houses erected in this city during the past year cannot be less than five millions of dollars. The total number of workmen employed during the year in the building trade has not averaged less than 3,000, who with their families, etc., represent not less than 10,000 of the city's population. There is no sign of any decrease in the number, as at the present moment not less than 400 houses are in course of construction in various parts of the city, and the incoming year is regarded as likely to be more active for the building business than even the last.

MANUFACTURING of every description is flourishing in this city and State as never before. The mills, the boot and shoe manufactories, the manufactories of case goods, and, in fact, every description of industrial productions are increasing their number of employees. The increase in this direction in this city during the past year has been over 1,000 hands. We are just entering upon a new year with most extraordinary evidences of prosperity.

THE foundries and machine shops in this city were never more busy than now, on account of the demand from the mines for machinery and house work in this city.

ANOTHER PALACE.—Milton S. Latham has made a large purchase of property on the southeast corner of Pine and Jones extending down to Bush street. He means to build a fine city residence there.

THE last spike of the railroad from Saucelito to Tomales was driven on the 29th ult., and the road will soon be open for travel.

MERCEN City is moving for a flinning mill.

THE Nevada Legislature met at Carson on Monday last, was duly organized and listened to the message of Governor Bradley, which is a plain, straightforward document, presenting a most encouraging account of the general condition of the State, particularly in relation to the State finances. The net indebtedness of Nevada is next to nil—aggregating only \$84,164, with a school fund in the treasury amounting in round numbers to \$250,000. The assessed value of real and personal property in the State is \$26,866,605, with a revenue for State and county purposes of \$930,888. The Republican members of both Houses met in convention on Wednesday, and unanimously nominated Mr. Sharon for U. S. Senator, which is equivalent to an election by a large majority over all competitors. Subsequent to the nomination Mr. Sharon received the congratulations of his friends at his rooms in the Ormsby house. The Legislature is now prepared to enter upon the business of the session, which will doubtless be a short and successful one.

IMPROVED CONCENTRATOR.—Mr. John Vincent, familiarly known as the "One-eyed Scissors-grinder," who keeps a stand on nights on the corner of Pine and Kearney streets, besides being a poet and scissors-grinder has also proven himself to be an inventor. He has invented a dry ore concentrator for which he has applied for letters patent, through the MINING AND SCIENTIFIC PRESS Patent Agency. The machine is very ingenious and appears more than ordinarily effective. When Mr. Vincent gets his patent we will favor our readers with a description of his concentrator.

HOT WATER.—The water encountered in the main east drift of the 2000-foot level of the Imperial mine, is the hottest on the Comstock. The temperature, carefully noted, was found to be 150½ degrees.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch, Dated Washington, D. C., Jan. 5th, 1875.

FOR WEEK ENDING DEC. 22d, 1874.

HARROW.—David T. Gillis, Stockton, Cal.

GRAIN HEADER.—David T. Gillis, Stockton, Cal.

ANIMAL TRAP.—Garnos Richardson, San José, Cal.

SAFETY PIN.—Lucy Emma Andrewes, S. F., Cal.

WATER GAUGE FOR STEAM BOILERS.—Charles C. Redmond, San José, Cal.

CHUCK.—William F. Footbaker, S. F., Cal.

DISTILLING SPIRITS.—Robert C. Brooks, S. F., Cal.

LOCKING LATCH.—Henry Rogers, Eureka, Cal.

TRADEMARK.

FOR BOOTS.—S. W. Rosenstock & Co., S. F., Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible.

WOODWARD'S GARDENS embraces an Aqueduct, Museum, Art Gallery, Conservatories, Tropical Houses, menagerie Seal Ponds, and Skating Rink.

[Business Notice.]

Mining and Scientific Press

A VALUABLE WEEKLY FOR

Miners, Mechanics and Manufacturers on the Pacific Coast.

Volume XXX of this first-class, standard journal commences with the year 1875. Its proprietors, having the successful experience of ten years publication of the Press, have no hesitation in saying that for the ensuing year the paper shall, in keeping with the times, reach a higher mark of merit than ever before. With our own printing press, folding machines,

Able Editors, Correspondents,

And skilled workmen in different departments of our now extensive and growing establishment, we mean to print a journal throughout the year, which all citizens, whether patron or not, may be proud of seeing published and supported on this side of the continent.

No kindred journal in America furnishes more real

Fresh, Novel, Interesting Information

In its volumes than the MINING AND SCIENTIFIC PRESS. We have the

Largest Mining Field in the World

To report from. It embraces the largest variety of mines and mining; methods of working; and innumerable wonderful discoveries than any other section of the globe. It is the birth place of many of the

Latest and Best Inventions in Gold

Silver and Labor Saving.

With brief, reliable, well chosen and prepared editorials; varied and condensed correspondence and selections; tables and statistics arranged for ready reference,

Superior Illustrations,

Of local and general interest to its readers, forms a weekly journal of individual character and unrivalled worth to its intelligent and industrial patrons at home and abroad. It is the

Leading Mining Journal of America,

And in its practical, interesting and substantial make up, it is unrivalled by any mining or mechanical journal in the world.

Home Manufacturers and Home Inventors

Will be constantly encouraged. Both help build up the brain and material wealth of the country. They are kindred to our individual enterprise. Our interests are mutual with a home atizens and producers. Where on the face of the globe do inventors and manufacturers either need or deserve more encouragement?

Its Value to the Community,

In disseminating important information; dissipating false notions; checking expensive follies; investigating important enterprises; by wise counsel and scientific direction, enriching the reward of honest labor, we are annually saving and adding

Millions of Dollars

To the products of our country. The Press has already

A Large Circulation,

And is deserving of more universal patronage from those whose interests it specially represents. This sparsely populated portion of the Union is a difficult one for publishers to present the claim of their journal in to all who should subscribe. In these times of seeming cheap (but largely, trashy and worthless) journalism, it is desirable and proper that those who know the real merits of a faithful journal should

Speak and Act in its Favor.

We shall not spare our efforts to make some and improved issues, maintaining constant the rights of all, and forwarding the material and intellectual rights of our patrons, and our sturdy, progressive community.

Necessarily, scientific and mining publications generally are costly and high priced, but considering the size, character and location of our publication, our rates are favorable for valuable a print.

We invite correspondence from all sections. Subscriptions, payable in advance, \$4 a year. Single copies, postpaid, 10 cents.

Address, **DEWEY & CO.,** PUBLISHERS, No. 224 Sansome St., S. F.

THE NEW OREGON MINES.—Speaking of the new quartz mines in Southern Oregon, the Times, of Jacksonville, says: "A late dispatch from Rock Point says J. L. Colvig and James Birdseye have just arrived at this place from the new quartz mines. They say the road is lined with men and pack-trains going to the land of gold and silver. The great Mammoth ledge is about 180 feet in width at a point where the Rogue river has worn its way through to a depth of 500 feet. About 200 claims are now taken up. It has been traced for twenty miles through a very rough country. Guides get from \$10 to \$20 a day to trace the lead. Colvig says he crushed a few pounds of the ore, and it averaged ten cents per pound in gold. A town has sprung up in a few weeks. It is to be known as Mammoth City. Hotels, feed stables, shops and other buildings are going up."

The first beds of coal were discovered in Washington Territory in 1852, and since that time coal has been discovered in all parts of the Territory west of the Cascade range.

ONE hundred and fifteen mining locations were recorded during 1874 by the Recorder of Tuolumne county.

FATAL INFATUATION.—Do not, as you value your life, entertain the idea that a cough is one of those casual affections which require but little attention. This species of infatuation is fatal to thousands. A cough is the first menace of consumption—remember that. Annihilate the danger by extinguishing the complaint. The means await you at every drug store. *Hall's Honey of Hyacinth and Tar* will, in every instance, effect a perfect cure of the threatening ailment without causing nausea, for it is pleasant to the palate as well as infallible.

Pike's Tooth-Ache Drops—Cure in one minute

METALS.

WEDNESDAY M., Jan. 6, 1875.

American Pig Iron, 4 ton	42 00	46 00
Scotch Pig Iron, 4 ton	42 00	46 00
White Pig Iron, 4 ton	42 00	46 00
Oregon Pig Iron, 4 ton	42 00	46 00
Refined Bar, good assortment, 4 ton	42 00	46 00
Nail Rod, good assortment, 4 ton	42 00	46 00
Boiler, No. 1 to 4	42 00	46 00
Plate, No. 5 to 9	42 00	46 00
Sheet, No. 10 to 13	42 00	46 00
Sheet, No. 14 to 20	42 00	46 00
Sheet, No. 24 to 27	42 00	46 00
Horse Shoes, per keg	42 00	46 00
Nail Rod, good assortment, 4 ton	42 00	46 00
Norway Iron, 4 ton	42 00	46 00
Roller Iron, 4 ton	42 00	46 00
Other Irons for Blacksmiths' Alms, etc.	42 00	46 00
Strainers	31 00	32 00
Copper Tins	45 00	46 00
O. N. E. Pat.	45 00	46 00
Sheathing, 1/2 in.	25 00	26 00
Sheathing, 3/4 in.	25 00	26 00
Sheathing, Old Yellow	25 00	26 00
Corrugation Nails	24 00	25 00
Corrugation Bolts	24 00	25 00
Plates	13 00	15 00
Plates, 1/2 in. 10 ft. box	13 00	15 00
Plates, 1/2 in. 10 ft. box	13 00	15 00
Roofing Plates	12 50	13 00
Banna Tin, 1/2 in.	32 00	33 00
PERL—English Cast, 3/4 in.	20 00	21 00
Anderson & Wards American Cast	15 00	16 00
Drill	15 00	16 00
Flat Bar	15 00	16 00
Flow Steel	15 00	16 00
Zinc	11 00	12 00
Zinc Sheet	11 00	12 00
NAILS—Assorted sizes	4 25	9 00
PICKETTS, per 100	1 55	

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Calaveras Hydraulic Mining Company.

Principal place of business, San Francisco, California.

Location of works, Calaveras county, State of California.

Notice is hereby given, that at a meeting of the Trustees of said company, held on the 15th day of December, 1874, an assessment of five (5) cents per share was levied upon the capital stock of said company payable immediately, in United States gold coin, to the Secretary of the company, in the office of the United States Internal Collector, No. 321 Battery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Saturday, the ninth day of January, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the twenty-first (21st) day of January, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, No. 321 Battery street, (office of the U. S. Internal Revenue Collector, San Francisco, Cal. dec19-4t

California Beet Sugar Company.

Location of principal place of business, San Francisco, California.

Location of works, Sonoma, Santa Cruz County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 23d day of December, 1874, an assessment of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 314 California street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 31st day of January, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on the 21st day of February, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, No. 314 California street, San Francisco, Cal. dec19-4t

Geneva Consolidated Silver Mining Company.

Principal place of business, City and County of San Francisco, California.

Location of works, Curry Creek Mining District, White Pine County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of January, 1875, an assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, Room 14, 302 Montgomery street, San Francisco.

Any stock upon which this assessment shall remain unpaid on the 9th day of February, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the first day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 14, No. 302 Montgomery street, S. F.

Electric Mining Company—Location of

Principal place of business, San Francisco, Cal.

Notice—There are delinquent upon the following described stock, on account of assessment, levied on the twenty-eighth day of November, 1874, the several amounts set opposite the names of the respective shareholders, as follows:

Names. No. Certificate. No. Shares. Amount.

Geo. Haesen.....301 300 15 00

C. J. Rader.....302 150 7 50

C. J. Rader.....303 1000 50 00

C. J. Rader.....304 300 15 00

C. J. Rader.....305 100 5 00

C. J. Rader.....306 1200 60 00

T. B. Wingard Trustee.....320 1000 50 00

T. B. Wingard Trustee.....322 60 2 50

T. B. Wingard Trustee.....326 100 5 00

T. B. Wingard Trustee.....327 200 10 00

T. B. Wingard Trustee.....347 2825 141 25

J. B. Houghton.....90 50 2 50

J. B. Houghton.....91 25 1 25

J. B. Houghton.....392 41 2 05

J. B. Houghton.....202 1/2 2 1/2

J. B. Houghton.....314 475 23 75

Wm. R. McCaw.....348 750 37 50

John Malen.....55 50 2 50

G. W. Malone.....57 50 2 50

G. W. Malone.....58 50 2 50

G. W. Malone.....59 50 2 50

G. W. Malone.....60 50 2 50

G. W. Malone.....176 1000 50 00

G. W. Malone.....187 9 50

G. W. Malone.....206 500 25 00

M. Ellsworth.....178 50 2 50

G. W. Mullen Trustee.....88 100 5 00

G. W. Mullen Trustee.....604 150 7 50

Mrs. Annie Woods.....75 100 5 00

Mrs. Annie Woods.....131 500 25 00

Mrs. Annie Woods.....327 200 10 00

Mrs. Annie Woods.....303 147 7 35

Mrs. Annie Woods.....318 300 15 00

Mrs. Annie Woods.....346 600 30 00

Herbert Eastwood.....102 50 2 50

Herbert Eastwood.....224 7 35

E. Wolle, Trustee.....105 1 25

E. Wolle, Trustee.....113 100 5 00

E. Wolle, Trustee.....114 100 5 00

E. Wolle, Trustee.....115 100 5 00

E. Wolle, Trustee.....116 100 5 00

E. Wolle, Trustee.....117 100 5 00

E. Wolle, Trustee.....118 100 5 00

E. Wolle, Trustee.....119 100 5 00

E. Wolle, Trustee.....120 100 5 00

E. Wolle, Trustee.....121 100 5 00

E. Wolle, Trustee.....122 100 5 00

E. Wolle, Trustee.....123 100 5 00

E. Wolle, Trustee.....124 100 5 00

E. Wolle, Trustee.....125 100 5 00

E. Wolle, Trustee.....126 100 5 00

E. Wolle, Trustee.....127 100 5 00

E. Wolle, Trustee.....128 100 5 00

E. Wolle, Trustee.....129 100 5 00

E. Wolle, Trustee.....130 100 5 00

E. Wolle, Trustee.....131 100 5 00

E. Wolle, Trustee.....132 100 5 00

E. Wolle, Trustee.....133 100 5 00

Gold Mountain Mining Company—Loca-

tion of works, Lower Kern County, Cal.

Notice is hereby given, that at a meeting of the Board of Trustees of said Company held on the 4th day of January, 1875, an assessment of twenty-five cents per share was levied upon the capital stock of said Company, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, 116 Leidesdorff street.

Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, shall be deemed delinquent, and will be duly advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the 21st day of February, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Trustees.

Office, 116 Leidesdorff street, San Francisco.

W. A. D. KNAPE, Secretary.

Office, 330 Clay street, San Francisco, Cal.

"Golden Rule" Silver Mining Company—

Principal place of business, San Francisco, California.

Location of works, Ophir Mining District, Utah Territory.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of December, 1874, an assessment of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, No. 530 Clay street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the fifteenth day of January, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the fifteenth day of February, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, 530 Clay street, San Francisco, Cal.

K. WERTHEIMER, Secretary.

Keystone Quartz Mining Company—

Location of principal place of business, San Francisco, California.

Location of works, Butte Township, Sierra County, California.

Notice—There are delinquent upon the following described stock, on account of assessment levied on the tenth day of November, 1874, the several amounts set opposite the names of the respective shareholders, as follows:

Names. No. Certificate. No. Shares. Amount.

C. H. Simpkins.....37 1248 \$1248 00

J. Clem Uhler, trustee.....66 500 500 00

J. Clem Uhler, trustee.....67 274 274 00

And in accordance with law, and an order of the Board of Directors, made on the tenth day of November, 1874, so many shares of each parcel of said stock as may be necessary will be sold at public auction, at the saleroom of John Middleton & Son, No. 310 Montgomery street, San Francisco, on the eleventh day of January, 1875, at the hour of one o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office—Northwest corner Sansome and Pine streets, San Francisco, Cal. dec28-3t

J. F. NESMITH, Secretary.

Orleans Mining Company—Location of

principal place of business, San Francisco, Cal. Location of works, Grass Valley Township, Nevada County, Cal.

Notice is hereby given, that at a meeting of the Trustees held on the 14th day of January, 1875, an assessment (No. 2) of one dollar (\$1) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 8, 315 California street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 9th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 9th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 8, No. 315 California street, S. F.

Page Tunnel Company—Location of

principal place of business, San Francisco, California.

Location of works, Big Cottonwood District, Salt Lake County, Utah.

Notice is hereby given, that at a meeting of the Directors, held on the 12th day of December, 1874, an assessment of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 2, No. 408 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of January, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 9th day of February, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

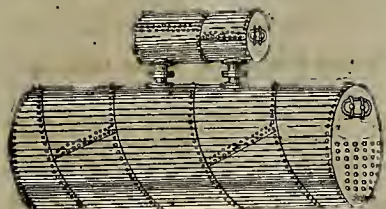
Office, Room 2, No. 408 California street, San Francisco, California. dec19-4t

JACOB HARDY, Secretary.

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James D. Walker.

WM. H. TAYLOR.....President
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LEWIS R. MEAD.....Secretary
24v17-qy

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24v22-3m JOSEPH MOORE, Superintendent.

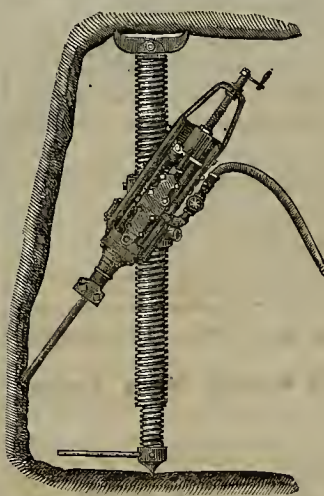
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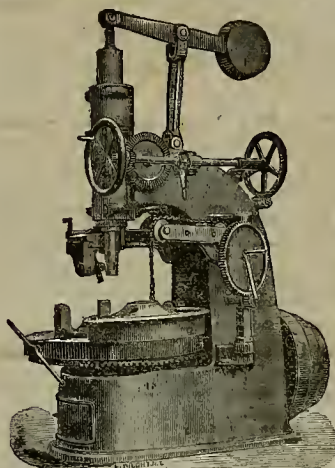
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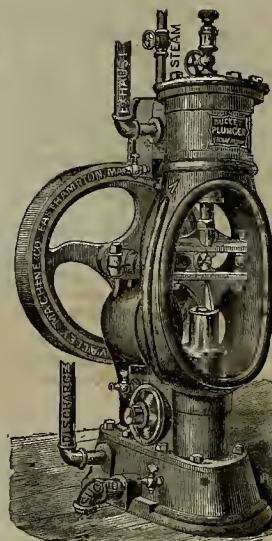
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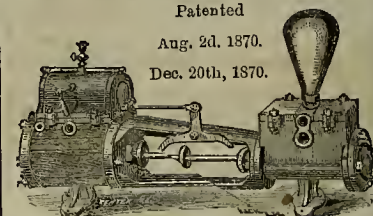
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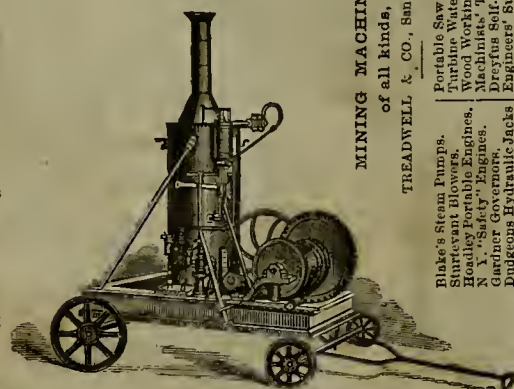
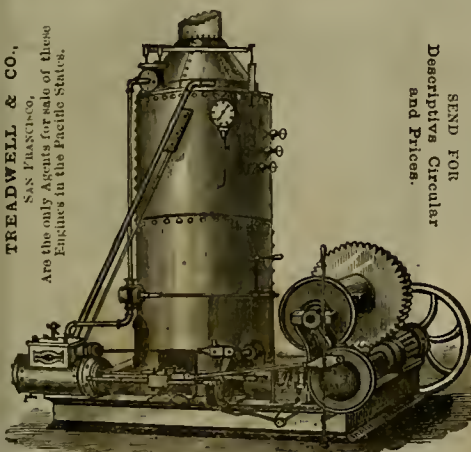
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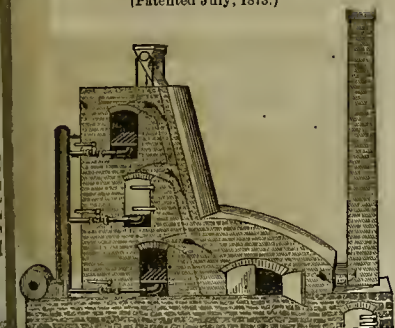
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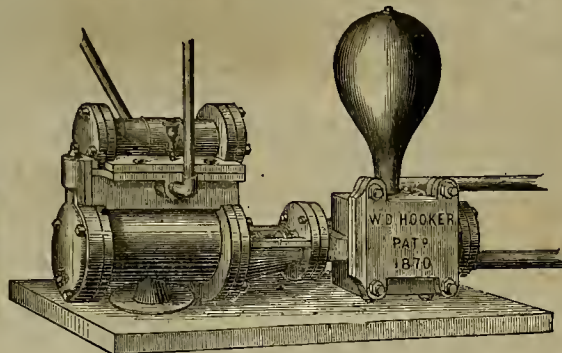
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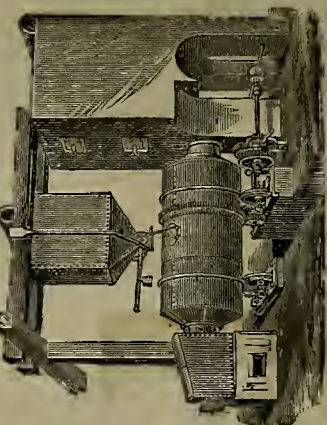
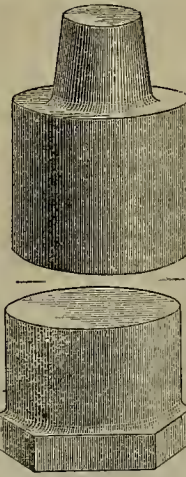
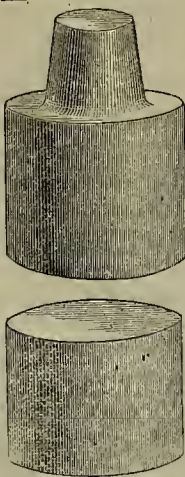
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12v29-3m



TEATS' PATENT FURNACE.

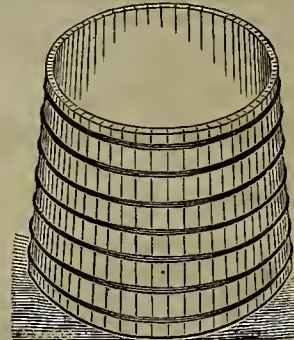
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For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces; controls them with ease, adding heat or air; stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, heating the water for amalgamation and the boilers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln" for drying ores direct from the mine or breaker, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874. For particulars address

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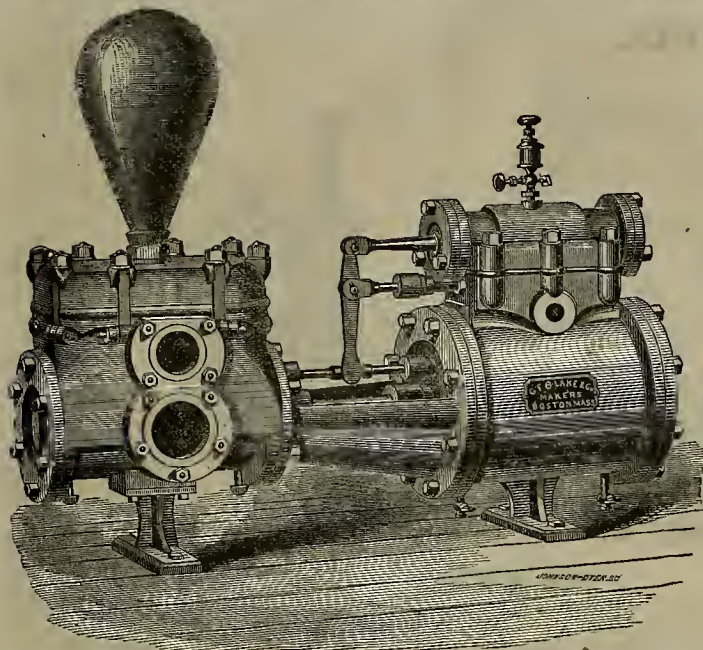
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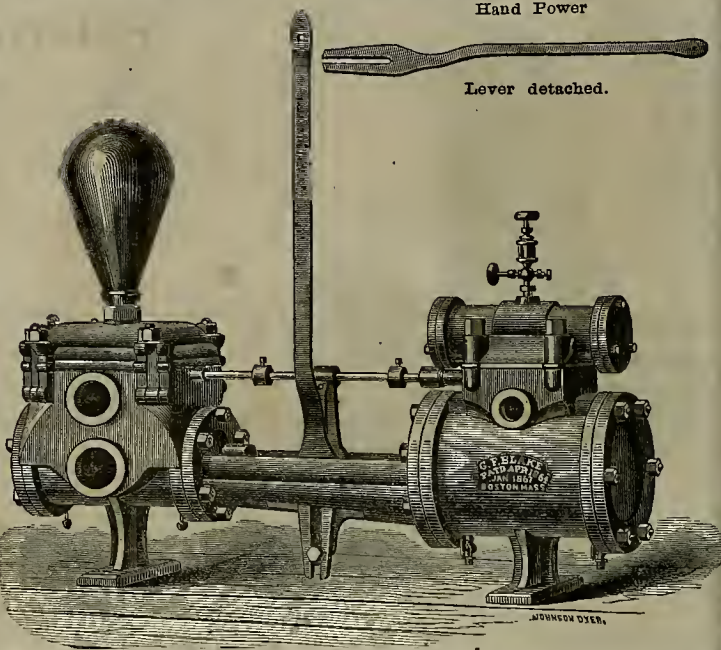
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[Covered by Letters Patent of July 2d, 1872, and recent applications.]

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Added to a battery of stamps these machines constitute a full system of ore concentration, sufficient in most cases for the requirements of western mines, with a capacity of 15 or 20 tons per 24 hours.

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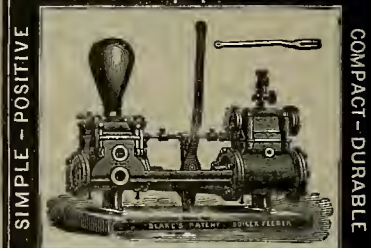
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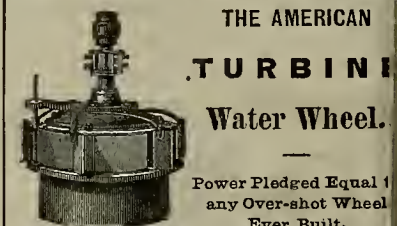


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Percentage of part gate, $\frac{1}{4}$ 50.08; $\frac{1}{2}$ 69.64; $\frac{3}{4}$ 78.1
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Mr. Emerson says: "These are the best average results ever given by any Turbine Wheel in my experience."

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 16, 1875.

VOLUME XXX
Number 3.

Hydraulic Mining in California.

No. 8.

Connections With old Workings.

The foregoing remarks about the opening of hydraulic mines refer chiefly to those mines or gravel deposits which, having never worked before, offer all the difficulties of new and undrained ground. Whenever other mines have been worked in the same deep gravel deposit, and a neighboring claim has reached its boundaries, thus setting free one side of the gravel bank, which shall be submitted to the hydraulic process, the tunnel can be connected with the free side by large drifts, constructed on a grade sufficient to receive sluice boxes. These drifts must be placed deep enough in the bed rock to permit the washing of the gravel into the sluice boxes from all sides.

It must be borne in mind that, under the conditions mentioned, the very gravel bank through which these drifts or cuts run will have to be washed away, and the closing up by cavings of the mouth of one or the other drift can hardly be avoided.

The best way to clear a mass of caved matter from the mouth of a drift is to wash a small channel close to the gravel bank, so that the caved matter itself forms a wall and barrier on the outside, confining thus the water and gravel work to a small stream. In this way an opening is soon made, and the bulk of the caved matter can be dispatched through the drift whose mouth was cleared.

The Working of Hydraulic Mines.

This is done by the power of water and powder. The power of the former depends on its quantity, and the pressure under which it can be applied. It is therefore most desirable to have the supplying ditch, or reservoir, not only at a high elevation above the mine, but also in its close proximity. The first condition insures a great hydrostatic pressure; the second a short line of feeding or conveying pipes.

To give an idea of what a powerful agent water can be made under pressure, it may be stated that a quantity of water, equal to a thousand inches, miners' measure, and yielding 1,579 cubic feet per minute, can be discharged under a pressure of from 275 to 300 feet, through a 6-inch nozzle, with a velocity of 140 feet per second, and in a quantity of 1,645 pounds, for the same length of time. Such a quantity of water uninterruptedly striking the bank, with one-tenth the velocity of a cannon ball, must necessarily do great execution, and suffices, in many instances, to produce the caving of the gravel bank, without resorting to bank blasting.

After a hydraulic mine has been opened for washing operations, a long line of sluice boxes, with under-currents, grizzlies, etc., laid down, and water under a high pressure connected through an iron pipe with one of the improved hydraulic nozzles, the real mining work can be commenced. The description of the different mechanical appliances will be given further on. At present the operation itself will be described.

A single hydraulic nozzle, connected by an iron pipe of any length, with a distributor—which latter is again connected with the feeding pipe, receiving the water from the bulkhead of a ditch or reservoir—has been placed at a safe distance from the gravel bank to be washed. A screw, attached to the distributor (for the purpose of opening or shutting a gate commanding the connection and flow of water between the distributor and the hydraulic nozzle,) is turned, and a stream of water issues from the hydraulic nozzle. This stream increases in size and strength as the gate opens more and more, and after a few minutes a body from five to seven inches in diameter, and representing from 500 to 1,000 inches, plays with magnificent force against the opposite bank of gravel. The water issuing from the nozzle is to the touch as hard as a bar of steel, and retains, when thrown from a good nozzle, its cylindrical and condensed shape, till it strikes the gravel bank. The effect of this lance-thrust of water against the bank is soon visible. At the first shock, a thousand rays of water fly in all directions; a little later, the lance has buried itself deep in the bosom

of the bank, and the water boils and hisses over the lips of the aperture, carrying with it gravel, sand, clay, and whatever matter may be at hand. The opening widens; flakes of gravel tumble in all directions; an arch, wide and deep, is made in the gravel bank. The "jams" of the arch to the right and left are demolished by turning the jet of water upon them, and the first "cave" in the hydraulic mine takes place.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

The Ladies' Friend.

We give herewith an illustration of a very useful device for dressmakers and those who have much cutting to do, it being really a lap



Improved Lap Board.

board upon legs which are so arranged that when not in use they can be folded up and fastened to the under side of the table so as not to be in the way. The cut shows the board opened out in readiness for working. The two pairs of legs, c, c, are hinged to the ends of the table, and have suitable bracing cross bars to keep them steady. At the back of the table the two cross bars, d, are hinged so that when opened their lower ends pass

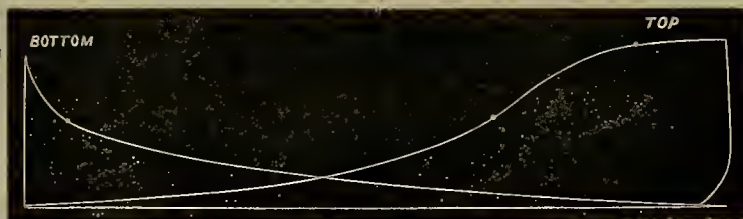


Diagram taken from Engine at the New Mint.

through mortice slots in the legs, c, and are secured by a simple button, a, which fits into a notch cut in the brace. By this construction the whole table is rendered very steady and when it is desired to put the table away it is only necessary to fold the braces, d, down and the legs, c, c, across each other beneath the table where the whole can be held by means of a button shown upon the braces, d. In weight these tables do not exceed that of an ordinary lap board, and those who have tired themselves with holding one of the old kind, or who have seen the inconvenience of putting them down with all the work when they have to get up for anything, will recognize their value and the reason for calling them "The Ladies' Friend."

A patent has been obtained upon this invention through the MINING AND SCIENTIFIC PRESS Patent Agency by Mr. Benjamin Strawbridge, of Stockton, Cal., where he can be addressed for town, shop, or State rights or for single tables.

The shipments of treasure from British Columbia by Wells, Fargo & Co., during the year 1874, amounted to \$1,382,454.78, being more than any other year since 1868, and \$404,228.29 more than in 1873.

An Improved Harrow.

Frank Donohue, of Mayfield, Santa Clara county, has recently patented through the SCIENTIFIC PRESS Patent Agency an improved harrow, which we illustrate on this page. It is so constructed that by its natural hanging and draft, without extra weights, the outer edges will keep down to their work and preserve as nearly as possible a uniform level and penetration of the teeth. It is usual to employ a weight on each wing of a sectional harrow to keep the edges from buckling upward, but by the improvement of Mr. Donohue the harrow is so constructed that the edges will keep down without a weight.

Two hinged sections of a double harrow are made, each being rhomboidal in shape and consisting of as many parallel timbers as desired to hold the teeth. These timbers are united together by a transverse timber near each end. At one end of each section a partial parallel timber is secured, so that when two rhomboidal sections are placed together in the usual



Donohue's Improved Harrow.

way of uniting the two sections of a harrow, the two partial timbers of the two sections will stand in the same line, and will, in effect, be a divided timber in the middle of the harrow. The hinge straps or plates are secured upon the parallel timbers so that the hinges at the opposite ends of the harrow will come on opposite sides of the divided timbers. If a line should be drawn through the two hinges it would cut the harrow into two trapezoidal figures, thus causing the weight of the corners to be nearly at right angles to the breaking line or joints of the two hinges, so that their superior leverage, owing to their greater dis-

The Colusa Quicksilver Mines.

From a private letter to a gentleman in this city with regard to the quicksilver mines in and near Colusa county, we make the following extracts: The Abbot mine, which is just over the county line, according to the statement published by the Secretary, has produced since the first of October 125 flasks of mercury. They are said to have considerable quantities of ore in sight, and have flattering prospects. On the same side of the hill are several other "prospects." One of them called Excelsior, owned by Disturnell Brothers has turned out some very fine ore, having brought in for reduction considerable that has run from 11 to 15 per cent. The Excelsior is an extension of the Abbot on the south. Adjoining it on the south is another mine called the Jackson, which from all accounts is prospecting very well, having 30 or 40 tons of pay ore on the dump.

On the Colusa county side of the hill is the Elgin mine, which is about four miles from the present Wilbur Springs. The mine is under the management of J. O. Smith. They have one retort of about 800 pounds capacity per 24 hours. Mr. Smith started up the retort on the 20th of August, and has produced 52 tanks of quicksilver. They have some very fine ore in sight, and large quantities of furnace ore.

The Montezuma claim is owned by Hughes, Rood and others, who are having a tunnel run under their prospect on the surface. They have both gold and cinnabar ore. The Manzanita is one of the oldest claims in the district, and the most of it is owned by C. B. Hughes. It produces some very good ore.

The Buckeye mine, notwithstanding the difficulties they have had to overcome in law suits, lack of means, etc., has produced over 600 tanks of mercury since starting. The mine is looking very well. They cleared up last week, after seven days' run about twenty-two flasks of mercury, which would be from eighty to ninety per month. They expect to exceed this when the drain tunnel is completed. It is now in ore 500 feet, and the shaft will be reached in about 100 feet more. Two more winzes are being sunk from the main level, 150 feet apart, to the grade of the drain tunnel, and they will then work in from different directions. So that by March or April the Superintendent expects to have it right in the heart of the mine with a heavy body of ore overhead which they can break down as it suits their convenience.

The New Mint Engine.

Most conspicuous among the lavish equipments of the new Mint in this city, in the mechanical department, and claiming the attention of the numerous visitors, stands the massive high pressure beam engine, built by Booth & Company, with its polished engine bed, pillars, and entablature. We have already described this engine and now present a diagram taken from it with a Richards' indicator, one of the first taken. The diagram is on a scale of 30 pounds to the inch. The engine has a four-foot stroke, and had a comparatively light load at the time the diagram was taken, 9:30 A. M. The points to be deduced from the diagram are as follows:

Commencing with the stroke at the top of the cylinder we see the steam valve begins to shut at one-eighth and closes at one-third of the stroke (the points dotted) whence we have the expansion curve the remaining portion of the stroke and returning get a well proportioned lead of steam, shown by the rounded curve.

Starting from the bottom of the cylinder we have steam shut off at one-sixteenth, the steam expanding and falling in pressure, as shown by the expansion curve the remainder of the stroke. Returning we notice that the steam valve requires a little steam for cushioning, i. e. helping the piston over the dead point, which would give a rounded corner in the diagram similar to the top. The load is comparatively light and the pressure small, but it would be desirable for top and bottom stroke to give the same reading in points of cut-off, etc. The valves are each worked by a separate cam, and as this admits of independent and exact adjustment, doubtless are this the points we have remarked have been carried into practical operation by the very competent staff of mechanical engineers.

tance from the hinges, will cause them to keep closely down to the ground when the harrow is working.

The double-tree is attached to the harrow so that its middle will be in a line with the two hinges, and in order to accommodate it to the harrow, the inventor constructs it in two parts and hinges them together as shown. The draft will, therefore, be in a direct line with the hinges, and consequently the sections will have equal rise and fall, and as the diagonal corners are further away from the line of draft than any other portion of the harrow, they will keep close to the ground.

GROUND was broken, last week, at the yard of the Vallejo Ship-building Association, for the foundation of the first building that is to be erected. This is a two-story building, 75 long by 30 wide; the upper story being designed for use as a loft, on the floor of which ships are to be "laid down."

The coin dies of the United States mint at Carson for the year 1874 were defaced last Wednesday, with the usual ceremonies, all the officers of the mint being present.

CORRESPONDENCE.

- Among the Quicksilver Mines.

EDITORS PRESS:—Arrived here last evening by saddle from Capay valley, over a tolerably good mountain wagon road, the distance being from D. C. Ramsey's ranch, the highest up Capay valley, about 32 miles. But by trail up Cache Creek valley from same ranch, I could have reached Knoxville in about eight or nine miles, and that, too, over an excellent route for a good wagon road. From Ramsey's to Woodland, 46 miles of level road down Cache creek, thus making the entire distance to railroad at Woodland 45 miles. To Napa city it is 53 miles. It seems strange that Yolo county should fail to see that this little internal improvement is much needed in her own county, and where so small an outlay would be sure to return a quick profit. Private enterprise will soon take hold of it as a profitable investment, if the county does not move in the matter. After a weary day's travel it is truly a treat to dismount in so pleasant a camp, which, by the way, would be a fully incorporated city in Nevada State.

The whole aspect of the place here, however, speaks business, not town lot speculations, etc. One large hotel with ample accommodations for man and a good stable for horses. After an excellent night's rest, I sallied forth to take a peep into some of the beauties of a quicksilver camp. After a cursory view of the quiet, but yet busy town, I took a two mile walk up the fine graded road to the Manhattan Co.'s mines, under superintendency of Joseph Osborn, who being absent, Mr. Charles Howard kindly showed the various parts of the mine. The mining operations were being carried on very successfully under 'H. Greenman and J. H. Morse, Foremen. By aid of drills, powder, cars and long chutes the ores are very cheaply transported from their native beds to the reduction works, where I found Mr. Joseph Meyer, superintending the furnace operations. Time does not allow me to detail this furnace matter further than the simple statement that they run a Knox & Osborn furnace, of 24 tons capacity, and are working 16 to 20 tons daily, employing 65 to 70 men in all. Wages, to miners, \$45.00; helper, \$40.00; common laborers, \$35.00 per month and board, with cabin accommodations. Every thing seems to move along in a systematic, common sense order, and is done by first-class white labor. The deepest work in the mine is about 200 feet, but now finding plenty of good ore at a depth of not over 60 feet from the surface, where it is well ventilated and healthy working.

But I must pass on over the hills to the California company's works, on the Reid mines, 3 miles north of Knoxville. These mines, situated just across the line of Napa into Yolo county, are esteemed highly among valuable claims. Through the kind attention of the Superintendent, T. J. Hall, his Assistant, J. S. Lambert, and Stephen Maynard, Foreman of the mine, I had abundant opportunity to visit and examine the principal points of interest at the furnace and mine. The lower tunnel, through which as a thoroughfare, all the ore from the various tunnels and surface workings for the 300-foot above it will be discharged, is about 500 feet long, with a well ironed car track. Above this is another tunnel 600 feet long, with its cross sections and stopings. Above this is a still a third tunnel, between 400 and 500 feet long. And above, and "sky-ward" as they term it, are open surface workings, yielding good mineral, worked to the depth of 40 or 50 feet. They employ genuine first-class, intelligent labor in every part of their operations. They are using at present one of the best constructed Knox & Osborn furnaces, with ample condensing chambers with vapor draught extending nearly a quarter of a mile away, up the mountain side, thus freeing the whole premises of any danger from hurtful gases or mercury poison. Capacity of furnace, 24 tons daily. I noticed also, one peculiar feature, introduced by Mr. Hall with successful results for economy. The fine metal bearing dirt and gravel he concentrates by aid of water, so that he need pass but a small amount through the furnace and gets more satisfactory results.

The amount of metal yield varies according to quality of ore used; last week gave a yield of 40 tanks of 76½ pounds each, but some weeks run less.

They employ on all their works, including extensive wood and farm operations, 100 men. The company erect all necessary dwellings and own all improvements made on their lands.

They have plenty of water running through their valley into Cache creek and thence down Capay valley, past Woodland in Yolo county. Eight miles of easily graded road would connect them with the road at the head of Capay valley and thus enable them to reach their county seat, and also carry their metal over a beautiful down grade road to the railroad at Woodland. This California company alone

could soon build the road if allowed to spend the road tax collected by Yolo county from their hands on that road. As now situated, they feel that there is some injustice done them.

Napa county pursues a more liberal course with the Redington company, at Knoxville, in the disposition of road monies, and will be the gainer thereby. This Redington Quicksilver Mining company being a great representative mining operation has been fully written up and needs little to be said. Through the obliging clerk of the company, Mr. Hall, I obtained the following items—not having time to inspect the interior of the mine. Mr. C. E. Livermore superintends the entire operations.

They employ 250 men. They have three Knox & Osborn furnaces and one more is being erected. These are old style furnaces that work about 200 tons per week. The K & O. furnaces yielded about 600 to 1,000 flasks per month for the past few months. Plenty of good ore in the mine on the 400-foot level.

The company own the entire town and miles of surrounding lands, with a vast store of all the ordinary and extraordinary necessities; provisions, clothes, medicines, etc.; hotel and stable, shops, and even the church edifice, a very creditable emblem of civilization. Perhaps it is one vast monopoly! Who knows? If so, this fact failed to appear in any form of complaint from their tenants and operatives. I had a long talk with one who has been 8 years in their employ, and occupying a very responsible position. I heard no words of dissatisfaction. This same feature is common to all the three companies. Each having an entire ownership of extensive domain and supplying the principal wants of their operatives. They even employ a first-class physician at a trifling expense to each. Dr. Sweet, now employed by all three companies, seems very popular with all; but very little sickness in the camp. C. Knoxville, Dec. 25.

The Sumner Mine.

The Sumner mine, in Kernville, Kern county, is an old mine which has been worked for several years without profit, but which will shortly be heard from, and is likely to rank with the most famous mines on the coast. It might have lingered along, occasionally worked and oftener idle, had not the attention of Senator Jones been attracted to it about three years ago. It now belongs to the Senator and E. K. Banks. Since that time it has yielded \$8,000 to \$10,000 a month from so much ore as could be crushed by an old rattle-trap 15-stamp mill. Most of the time since then has been spent in perfecting the title, which was very much involved. The difficulties have all been removed, and United States patents obtained. The Sumner mine now includes the old Sumner and the Big Blue mines. The claim is 8,000 feet long, with a vein 60 to 80 feet wide, of which 15 to 40 feet is pay ore. The character of the rock is free milling. A new water power mill of 80 stamps is just being completed. Hoisting works of the most approved Comstock pattern, and larger than anything yet erected in California, are building, and will be finished in April, when the new mill will be set to work on \$35 rock, of which the mill will crush 160 tons a day. As the Kern river runs past the mine, and the productiveness of the mine with the new hoisting works cannot be estimated until it reaches the quantity necessary to feed 1,000 stamps. With such facilities a mine of this extent must contribute largely to the enrichment of its owners and the filling up of Kern county with inhabitants of every occupation. Senator Jones' investment in the mine alone is said to be \$500,000.

ALL ALIVE TO THE NORTHWARD.—L. H. Torp, keeper of the Gelger Grade toll-house, informs us that there was a straggling army of men on the move along his road to the northward last night, all excited about their mining claims in that direction. The time for doing the required \$100 worth of work expired at 12 m. last night, and the owners of claims felt that it was time for them to be up and doing. A great many parties of jumpers were out. Some whose claims are doubtless all right were out to guard against these and warn them away, while others who are probably not at all right went out in order that they might be found on their claims and at work when the hour of twelve should strike. The jumpers were very numerous, and it was feared that there would be bloodshed during the night. It is said that no less than four different parties went out north to jump a certain claim which all have been long watching. Those who first succeeded in posting their notice when the witching hour of midnight arrived would be the lucky ones. The parties leaving town went provided with provisions and otherwise fully equipped. Such was the demand for teams and riding animals that the stock of all of the livery stables was exhausted.—*Virginia Enterprise*.

CHEEKY.—Two well-known mining Superintendents of this city were yesterday discussing the bonanza, when one of them propounded the following question to his brother silver-hunter: "Supposing the Almighty to have given you full power and authority to make such a body of ore as you pleased, could you have made a better one?" "I don't know," said the other; "but I should have made it still bigger." "Well," said the first speaker, "you have more cheek than any man I ever saw—you have, by thunder!"—*Enterprise*.

The Sheep Ranch Mine.

A correspondent of the *Call* writing from Sheep Ranch mine says: Our camp being only eleven miles from the "big trees," tourists could make this call with scarcely any extra expense of time or money. Here is the well known Sheep Ranch mine, owned by Messrs. Ferguson, Wallace and Early, without paying the best, for the money invested, of all the mines in the State. Their mill is running continually. They have just finished new hoisting works at the old shaft near the east end of the claim, and are now reftumbaring it. Walter and I had a little game the other day. Faking a tub of water to the dump we tried to see which could find gold first. He rather beat me, but I believe we did not pick up a piece of rock that did not show gold. Sums of the ribbon rock was besprinkled with it. Now and then a little galena was seen, but this mine has but few sulphurates.

Adjoining, and on the same lead to the east, is the McNair claim. This has been prospected sufficiently to warrant the belief that it is a first-class mine. A shaft about one hundred feet in depth has been sunk, and considerable drifting and stoping done, the rock paying well. This mine has not been worked for several years, but a new shaft is about to be sunk near the west end, where, in the claim adjoining, excellent ore was taken out. There the water will not bother, as the contiguous mine has been worked up to the line. There is probably no better place for the investment of capital than right here, and I understand the claim is offered for sale, as the owner wishes to remove. Here on these mines were corralled for years a band of sheep, the shepherds daily stumbling over rich croppings, as unsuspecting of the wealth below as the woolly quadruped they tended.

A little to the south is a new claim owned by Messrs. Bean, Smith & Hicks. They have only crushed nineteen tons of rock, which paid \$61 to the ton. This mine was discovered by Mr. Bean, an old prospector, and one of the best on the mineral belt. A little further to the south is the Lodi. It has paid well, but has not been worked for the past two years. Messrs. Hull & Tichner, the present owners, are now preparing to resume work.

A little to the east is a new mine discovered by Joseph Mason; he is busily engaged in getting out good-looking rock. Near this mine is one owned by Messrs. Toon & Hull, which has not been prospected much on account of water. So all are at work.

COAL STATE.—Jeremiah Gibson has shown us a specimen of coal slate, taken from a discovery he has made but a short distance from this city. The substance is sufficiently carboniferous to burn with considerable coaxing, which the discoverer thinks is a splendid indication that genuine coal will be found on digging sufficiently far into the ground. It is to be hoped that these surmises will prove correct, and we shall be pleased to record the fact as soon as made clearly evident. So many indubitable evidences of the near presence of the genuine article have been found heretofore and subsequently dwindled to a fine point and finally to nothingness that faith in genuine indications short of the real article itself has become somewhat shaken. It is to be hoped Mr. Gibson will persevere in his prospecting labors in this locality and finally bring an undoubted specimen of coal. Such a discovery would be invaluable to this city. The gentleman named has already made several discoveries of material of a useful character.—*Deseret (Utah) News*.

WARD AND JULIA.—The *Gold Hill News* says that an agreement was entered into on the 23d ult. between the Julia Gold and Silver Mining company and the Ward Mining company, whose mine adjoins that of the former company, by which, for the space of eighteen months, the Ward Mining company have the privilege of working their mine through any of the levels of the Julia mine to the north line of the Ward claim, with the use of the tracks, shaft and hoisting apparatus of the Julia company.

THE NEW STANDARD.—A meter is three feet, three inches and three-eighths. Consequently, five centimeters are nearly two inches. The nickel half-dime is two centimeters in diameter, and weighs five grammes. Eight kilometers are nearly five miles. Sixty-six kilometers are about forty-one miles. Twenty-five millimeters make almost an inch. All this is to become familiar after the Centennial.

MINING DECISION.—The Secretary of the Interior has affirmed the decision of the General Land Office in the case of the Kempton mine, Utah. The question involved was the citizenship of the original locator and intermediate owners. The Secretary decides that applicants for patents must furnish proof of their own citizenship only.

A NUGGET weighing 68 ounces was last week taken out of the Bald Mountain, Sierra county. The company have again washed up the dirt in the small dump at the mouth of the tunnel, and the result was a dividend of \$1,000 to the share, \$20,000 in all.

JAMES MARION, a miner working in the Chalcedony mines, near Gibsonville, was last week found dead in a tunnel, having been suffocated with smoke from the engine room.

THE town of Panamint stands directly in the midst of the mines.

New Locations.

The *Virginia Chronicle* says: A large number of locations of mining ground have been made since the law of Congress took effect on the first of January. On this hills surrounding town notices are met with everywhere, some of which are in out of the way localities, which had been abandoned years ago, and where there is no more probability of finding a paying mine than out in the Twenty-six-mile desert. Perhaps, however, the object of these prospectors is to form companies, issue stock and dispose of it for whatever can be realized, as was common in Washos in early days. Some of the locations have been made in the most ridiculous manner, and without any regard to the points of the compass. Some run directly east and west and one at least extends 1500 feet directly across the Comstock ledge. What this mining sharp expects to accomplish is not easy to conjecture. Other property which has been taken up is really valuable. In some cases good claims had been abandoned years ago by the owners, who had followed other excitements and gone off to new countries, while in other instances companies had been working on properties to which they had no title, and took no pains to secure one, when the time arrived. A number of persons are still traversing the hills north and south of the ends of the Comstock, looking for eligible locations. The weather has been as propitious as if set apart especially to favor prospecting at the right time. Had the ground been covered with snow a foot or two in depth for the last week, nothing could have been done, but the mild temperature and balmy atmosphere seems to draw persons out into the hills for amusement as in the early days of spring.

GOOD FOR THE "C AND C".—There are those among our mining men who predict that the new C and C shaft now being sunk near the works of the Virginia City Gas company, will strike ore before attaining a depth of 600 feet. This would be a big thing and a fine send off for the C. and C. We all know that General Thomas H. Williams found fine prospects three or four hundred yards further east in boring down from 600 to 800 feet with a diamond drill. The progress of the C and C shaft will be watched with the keenest interest by all our mining men, as all have looked upon the surface configuration of the ground thereabout with a wistful eye. In the whole basin extending across the eastern front of all of the bonanza claims nothing that could be called a shaft has ever been sunk—nothing but the old-fashioned circular prospect holes.—*Enterprise*.

FOUNDRYMEN EXEMPT FROM LICENSE.—An agreed case was recently made in this city to test the power of the City License Collector to demand license tax from foundrymen. Mr. Palmer of the Miners' foundry was arrested for refusing to pay license and the case went to trial. The defense set up in this case was that the defendant and his partners only manufactured articles in their line of business to order, and did not keep any merchandise on hand for sale. The court held that this was not a vendor within the meaning of the law, and therefore dismissed the complaint.

PANAMINT is supplied by water from spring located in the cañon above town, brought down in pipes and retailed at present at five cents per gallon. The supply is and will be ample for quite a city, and may be increased indefinitely by wells of about 100 ft in depth, two of which are now in use. About a sluice head of the finest water bursts out two miles down the cañon and continues to the sands three miles below, and along the only road by which team can reach the town.

THERE are on exhibition at the office of Samuel Poorman, Sacramento, two bars of silver weighing 216 pounds, and valued at about \$4,000, smelted at the Sacramento smelting works, from ore which had been looked upon as very difficult to reduce, but the new superintendent finds no trouble in reducing it by simple process of his own.

THE *Tribune*, in its annual review of the mines, says that Utah produced in 1874 near \$8,000,000 in silver bullion. This is nearly double the product of last year, and places Utah next to California in the production of the precious metals.

THERE are some of the richest gravel mines in the State near Central hill, Calaveras county. A clean-up of the Haskins claim, after washing the gravel obtained by two week drifting, yielded 180 ounces of the precious metal.

ORE SHIPPER.—Captain Richards shipped yesterday four car loads of copper ore for Battle Mountain to San Francisco. The ore from the English company's mine at Copper canyon, and will be shipped from San Francisco to Liverpool.—*Silver State*.

THE old Green mine, on Gold canyon, short distance below the Justice, after a rest a couple of years, is now being reopened with view to its thorough practical development under the superintendence of W. W. Turner who is also superintendent of the Pictou.

LAST week, says the Lake County Bee, W. Williams discovered a ledge of silver bearing rock in the vicinity of the Highland Spring. On last Tuesday a ledge, supposed to be of the same character, was discovered in Scott's valley.

MECHANICAL

PROGRESS.

Improvements in Glass Manufacture.

Considerable attention appears to be given at the present time in relation to improvements in the manufacture of glass, with a view to its more general utilization. The latest announcement we have noticed in this direction is the following: A French chemist professes to have discovered the secret of a chemical composition which has the property of giving to glass extraordinary hardness. Immersed in a bath of the new invention the ordinary material acquires such a degree of cohesion that it opposes to shock of hard bodies or action of fire a resistance ten or fifteen times greater than before. The novelty of the discovery is evident, as, if employed windows will not be broken by hail, and up glasses will not be cracked by the flames; and many even fall from a height of several yards without danger. The material being no longer fragile may be employed for many uses for which it is not at present fitted.

A French journal of a late date alludes to the above invention as follows: "The invention is termed 'steeped glass'; that is, a glass which has acquired its peculiarity by liquid absorption—by being 'steeped' in some liquid. A number of experiments were made with the 'steeped glass' at Bourg, where a company had been organized to introduce the article into commerce. A sample of only three millimeters in thickness resisted the weight of 100 grammes falling from the height of five meters. Thrown on the ground with force it rebounded without breaking, and emitted a sound like a leaf of metal; and, in fine, it was found to be incombustible to any definite heat. The company will first introduce it in kitchen articles. This seems to be the re-discovery of one of the lost arts of the ancients, which was well known to the artificers of the Ptolemies, and even as late as the time of Archimedes. It promises to make a revolution in the material of nearly every article of domestic utility.

[We have taken measures to learn more definitely with regard to the truth or falsity of this asserted invention, and shall communicate to our readers whatever information we may obtain as soon as received.—Ens. Press.]

Single Rail Steam Towing on the Belgian Canal.

We learn from the *Moniteur Industriel Belge* that a system of steam towing is about to be established on the Bourgogne canal, over a distance of about 150 miles. The tow path will be laid with a single rail weighing some 16 pounds to the yard, and fixed on traverses placed 3-2 feet apart. The locomotive has four wheels, two of which are placed directly along the axis of the vehicle, one in advance of the other, and two, one at either side. The former are directing, the latter driving, wheels. The directing wheels are grooved, and fit the rail; the others have rubber ties which give purchase on the macadamized road, and which rest thereon only to the extent of 0-07 pounds per square inch. By means of simple mechanism, the weight of the machine may be thrown either upon the driving or directing wheels at will. In the first case the maximum and in the last the minimum of adhesion is obtained, to suit the conditions of a loaded or an empty rail. A single road is to be used, with relay engines provided at suitable distances. Each locomotive tows one boat; and when a meeting takes place of two traveling in opposite directions, the engines change boats and retrace their paths.

This single rail system has already been satisfactorily tested for short distances on the Belgian canals, and the projector, M. Larmanet, has obtained a government concession for its extended construction for 40 years. The locomotives are to weigh four tons each, and will travel at the rate of 3-1 miles per hour, with full boats carrying a cargo of 150 tons each.

INDIA-RUBBER TIRES.—Messrs. Bird & Co., London, have lately brought into notice a new and improved wheel, with India-rubber tire, which is claimed to be capable of wearing long as, or longer than an iron tire, and to give the great advantage of perfect noiselessness and absence of injurious jar. The draft of the carriage is said to be reduced by the use of this tire nearly one-third. It appears to be simply a tire of solid rubber, fastened on the interior of an ordinary wheel by bolts, such as are used with iron tires, and it may be thinner than the usual kind, merely serving the purpose of a band to hold the wood work firmly together.

A HANGING railway car, suggested by Mr. Beyer's steam system, has been tested with success on the northern railway of France. Mounted in this car, which hangs on elastic springs, the traveler experiences the sensation of a hammock, free from vibrations and bumping. The movement is described as very gentle.

IMPROVED STUCCO.—M. Landrin, recommends a mixing of the crude plaster in water containing 8 or 10 per cent. of sulphuric acid. After allowing the compound to rest for fifteen minutes, he calcines the plaster. This gives a stucco of excellent quality in which all ganic matters are burnt out leaving the material of exceptional whiteness.

Relative Cost of Water and Steam Powers.

The cost of the water power equipment at Lowell, for canals and dams, \$100; for wheels, etc., another \$100, per horse power. But this, as a first experiment, was more costly than a similar equipment need be. At Saco the expense incurred was \$175 per horse power; but at a later period, for turbines with high heads, the expense would be less. A construction and equipment, solidly carried out, with the latest improvement in wheels, would not cost over \$200 for horse power, and would, under favorable circumstances, cost less. An estimate at Penobscot was for \$112.50 per horse power. If the construction be with wooden dams, and the equipment with lower grade wheels, then the cost would be about \$50 per horse power; and although the construction would be less permanent than the more solid, it would outlast any steam apparatus. On the other hand, Fall River estimates of steam equipment, exclusive of foundations and engine houses, run from \$100 to \$115 per horse power. A Boston authority gives \$115 per horse power for nominal 300 horse power and upwards, inclusive of foundations and masonry. Similarly a Portland authority places it at \$100 per horse power. The actual cost of steam equipment in the water works of various cities of the United States varies from \$150 to \$300 per horse power.

As to the cost of work done, it appears that in Philadelphia in 1867 the cost of raising water by water power was only 2½ cents per 1,000,000 gallons feet; whereas the cost by steam power was in four cities 8-3-10, 11-1-10, and 19-1-10 cents, with coal at \$5.50 per ton.

A New Wonder in Steam.

A correspondent of the *American Manufacturer* writes from the vicinity of Pittsburg, Pa., as follows:

A conundrum for steam engineers to solve: Two gentlemen who engaged in engine building on the North Side, one of whom is largely interested in Butler county and Alleghany oil regions, made a special trip this week to the Steel (originally the McClutock) farm, to investigate a new system of using and utilizing steam power. The owner first had a 40-horse-power locomotive boiler, and had attached, separately, with the boiler two engines with 12x8 inch cylinders, to pump wells, making each 56 revolutions per minute. He afterwards attached a third engine to work from the escape steam from one of the first engines, which made 65 revolutions. He then detached one of the first engines from the boiler and worked it by the escape steam from the second, being successful in running three cylinders of same size. He then branched off the escape pipe from the third engine, and is now running two of the same power by the escape steam, after doing duty in three next the boiler, all being same size, and two last escaping in the open air, the boiler only consuming one-half the fuel as when all connected separately. My informant being fully satisfied of the facts as stated, left orders with his manager to experiment on the farm of his company, having quite a number of wells now pumping by separate engines. Now who will be able to account for this new increased power from one-half the fuel consumed, if by adding engines indefinitely and gaining power by each additional attachment, we have room yet to learn something about steam power.

A NEW PAPER BOARD.—A new method of manufacturing paper board, to make that article more generally useful and durable, is described as follows: When a sheet of paper is immersed in an ammoniacal solution of copper, and then dried, it is said to be quite impregnable to water, and does not lose this quality even though the water be boiling. Two sheets of paper thus prepared, and passed through a cylinder, adhere to each other so completely as to be quite inseparable. If a large number of sheets so prepared be cylindered together, boards of great thickness are obtained, the resistance and cohesion of which may be increased by interposing fibrous matters or clothes. The substance so prepared is quite as hard as the closest grained wood of the same thickness. The ammoniacal solution of copper is prepared by treating plates of copper with ammonia of the density of 0,880 in contact with the atmosphere.

IMMENSE PHOTOGRAPHS.—Photographs have been made of the new Opera House, Paris, four feet three inches in length, and three feet four inches in height. They were obtained in one single piece, by well known processes, and with the aid of a large and specially constructed camera. All the lines of the pictures are of remarkable excellence, the moldings, the busts, the medallions, and even the minutest details being reproduced with rare perfection. The attempt is being made to secure pictures even larger than this.

PAPER MANUFACTURE.—Upwards of one hundred firms are engaged in the manufacture and sale of paper in Philadelphia, the first established in the country being the Rittenhouse Mills, where the old Continental paper money was made. At the present time all our bank note and fractional currency paper is made by the old and wealthy firm of J. M. Wilcox & Co., of that city.

SCIENTIFIC

PROGRESS.

A NEW BLEACHING MATERIAL.—The essence of terebinthina has recently been found to possess extraordinary bleaching properties. Nearly every kind of organic matter subjected to its action becomes rapidly bleached. The discovery was accidentally made in the Jardin des Plantes, while soaking the skeletons of birds in the essence of terebinthina, for the purpose of cleansing them of the fleshy matter adhering to the bones.

[The "essence" above referred to we presume is obtained from the terebinth tree—*P. Terebinthus*—of the genus *Pistachio*, form which resinous substance known as *Chian turpentine* is obtained. This tree flourishes in the island of Chio. One of the varieties of the tree produces the *Pistachio* nut, the kernels of which are of a green color, and of a very agreeable flavor. The discovery may prove of some considerable importance.—Ens. Press.]

PHENOMENON IN IRON DRAWING.—In drawing certain numbers of iron wire, it often becomes necessary, in order to continue the use of the drawing bench, to anneal the iron. This is done in a hermetically closed receptacle, so as to avoid, as much as possible, the oxidation of the metal. In spite of this precaution, however, the latter becomes covered with an ochraceous film, which it is necessary to remove by an acidulated bath. It frequently happens, however, that, subsequent to this process, the metal becomes so brittle as to render its further drawing impossible. M. Serrez, engineer of the Societe des Forges de La Frenche Compte, has examined into this phenomenon, and finds that the iron becomes charged with a condensed gas. On breaking the wire under water in a test tube, inflammable bubbles were generated, which detonated in the air. The exact nature of the gas has not yet been decided, nor that of its direct action upon the metal; but it is believed to be either hydrogen or carbonic oxide.

SCIENTIFIC DISCOVERIES IN CYPRUS.—It is reported that Dr. Dethier, director of the museum at Constantinople, has, in conjunction with the American Consul General, Signor Cesnola, secured an interesting collection of antiquarian objects in the island of Cyprus. The mass of treasures accumulated by these indefatigable explorers was so great that more than a fortnight had been absorbed in packing the forty-four crates and thirty chests required for their reception. The discoveries of M. M. Dethier, and Cesnola include several cylindrical grave-stones bearing Greek inscriptions, which may probably be referred to the early Christian ages and the closing period of paganism; but here, as in numerous other remains of the same kind, there is no trace of a cross or any analogous religious symbol.

IMPROVED CHROMO-LITHOGRAPHIC PROCESS.—Messrs. Johnson, of Hatton Gardens, London, have invented a new and very economical process for producing chromo-lithographs. In place of using a special stone for each color, necessitating as many separate impressions as there are colors, the entire subject is drawn upon a single stone and a proof is taken on a thin sheet of copper. This sheet is then cut out carefully according to the desired contour of the colors, and upon each of the portions is fixed a solid block of color previously prepared. The whole is combined into one form, and is printed on an ordinary press—all the colors at once.

ELECTRO-MAGNETS FOR BLASTING.—An officer in the French army has communicated to the Paris Academy of Sciences the results of experiments during the siege of that city, which, he believes, may prove important for firing military and other mines. It is found that, when two bars of soft iron, armed with thin coils, are placed side by side, and one is magnetized, the other becomes also magnetized by induction, and the charge of the second is nearly twice as strong as that of the other. Hence the idea originated of employing auxiliary bars to increase the power of the coil used for such purposes.

ELECTRICITY AND MUSCULAR ACTION.—Scientists and the afflicted will await with interest the result of a trial of electricity in support of a pedestrian in a prolonged feat. In connection with a challenge to a rival he announces his purpose to rely largely for physical support upon the electrical bath as administered in all the large cities. The test will doubtless attract great attention and perhaps develop facts but little understood by the general public.

SUNSPOT AND OZONE.—If it would appear from the records of Mr. T. Moffat for nineteen years, 1851-1869, that the maximum of sunspot gave a maximum of ozone, and that the minimum of sunspot gives the minimum of ozone. The years 1854 and 1863 appear to be exceptional. In 1854, however, ozone observation at Hawarden were suspended for three months; which may account for the irregularity in that year.

PROFESSOR MARSH and party returned to New Haven from the West on Saturday, Dec. 12. The scientific results of the expedition are important, and will soon be published.

The Great Telescope.

The magnificent donation of Mr. Lick, of this city, for the construction of a telescope which shall embody all that science and mechanics, at the present day, can do to reveal to us more of the wonders of the starry universe, has excited much attention all over the world. Already a competent scientist has been commissioned to visit the leading observatories of Europe and learn all that can be of advantage to the commission designated by Mr. Lick for carrying out his praiseworthy purpose.

Previous to Mr. Lick's purpose in this direction heing made known, measures had been taken in France to construct a telescope of mammoth dimensions. This was first projected by M. Foucault, in 1865, but was laid aside in consequence of the death of its projector. It has since, however, been resumed under the direction of a well known astronomer, Mr. Wolf, and the construction of the instrument is being pushed forward as rapidly as possible. The tube of this gigantic instrument is nearly 50 feet long, and 6 feet 8 inches in diameter, while that of Herschell's is only five feet. The reflector is to be produced at the Saint Gohin glassworks, and the production of the mould alone, which is already completed, occupied six months. The mirror will be produced spherical, and will afterwards be worked up nearly to a parabolic form; finally it is to be covered with silver or gold. It is said that the staircase and stages to be used with this giant telescope will present fine specimens of mechanical ingenuity. The power of this instrument will greatly exceed any telescope hitherto constructed.

The experience gained in the construction of this will doubtless afford many useful hints in the construction of the San Francisco instrument, which will probably not be commenced until the former is completed. The Lick telescope will greatly exceed the power of the French instrument, and will no doubt furnish some most important revelations in astronomical science.

NEW DISCOVERIES IN THE MAMMOTH CAVE.—Professor F. W. Putnam, of the Peabody Academy of Sciences, Salem, Massachusetts, has recently explored the Mammoth Cave in Kentucky in the aid of science, and has visited several caverns never before entered. His investigation have resulted in finding colored fish without eyes, thus exploding the theory hitherto held that all eyeless fish are colorless. White fish with eyes, and crayfish both with and without those organs, were obtained, presenting many new features of great interest to naturalists. Skeletons of human beings, monnds, and a large variety of valuable archeological relics were found in the new chambers.

A new quality has lately been discovered to reside in autumn crocus, meadow saffron, or *Colchicum autumnale*, formerly used as a remedy for the gout and rheumatism—that of emitting a poisonous exhalation when its blossoms are opening. The touch of the flowers then imparts to the skin a yellowish green hue, described by M. Isidore Pierre, of the French Academy of Sciences, as being like that which "characterizes the human body in the early stages of decomposition." The effect passes off in a few seconds, but continued handling of the flowers in this stage induces numbness in the hand for some hours.

PROFESSOR YOUNG, of Dartmouth college who was one of the observers of the transit of Venus, will return home by way of Egypt and India. He and Professor Watson, of Michigan University, intend to make meteorological and astronomical observations in those countries. Professor Davidson, of this city, it will also be recollected will return by way of India, for the purpose of making scientific observations in that interesting portion of the East.

SCIENCE PROVING ITS FRUITS.—Professor Tyndall's experiments on sound are already bearing fruit. The French government has appointed a commission to conduct experiments upon a steam organ—the Calliope—heard 15 leagues in fine weather at sea. These new experiments are to be made during the period of the equinoctial gales.

IRREGULARITY IN THE EARTH'S ROTATION.—Professor Newcomb, of the Naval Observatory, Washington, asserts that the time of the earth's rotation on its axis is not strictly uniform. For twenty years prior to 1860 the rotation was slightly slower than the average. Since 1860 it has been accelerated.

SPONTANEOUS COMBUSTION.—In a paper on the spontaneous combustion of hay, H. Ranke says that in consequence of a prolonged fermentation, hay can be transformed into a true coal, which, when exposed to the air at somewhat elevated temperatures, acts as a pyrophorus.

An encouraging feature of the times is the increase in the number of scientific lectures, and the advance made in scientific literature.

PROFESSOR W. D. Whitney has been elected an honorary member of the London Philological Society.

Mining Stocks.

While there has been considerable excitement in the stock market during the past week prices have declined very materially. The cloudy and rainy weather seems to have had a depressing effect, though the contrary should be the case. The "little piece of porphyry" struck in Ophir has had the effect of tumbling that stock down and bringing others with it. The decline is not considered permanent, and most people think it is not yet time for the big break. The letter from California dated the 10th says:

On the 1400-foot level, 200 feet north of the southern boundary, cross-cut No. 1 is now in 203 feet, and has penetrated the ore vein a distance of 25 feet. The ore vein as crossed varies very much in value, assaying from \$52.80 to \$300 per ton. The face of the drift to-day does not look so favorable as it did yesterday. Judging from the cross-cuts on the level below, the vein on this level must be of great width. On the 1500-foot level east cross-cut No. 3 has been extended the past week 10 feet, and is now in 98 feet. The ore is identical in appearance and value with that found in cross-cut No. 1 on the southern boundary. Cross-cut No. 2, 100 feet from the southern boundary, is now in 78 feet, and has not as yet reached the ore body. The rock passed through is very hard. Cross-cut No. 1 on the southern boundary is now in 230 feet. The ore passed through the past week and now in the face of the drift is of a very high grade.

A dispatch three days later than the letter states that the rich ore improves in the face and all signs of the wall have disappeared. The ore is now 314 feet broad. The new shaft is 1040 feet east of the old one. One-third of this distance is already covered by the ascertained breadth of the ore, and the same trend of the vein may carry the No. 1 cross-cut quite to the new shaft, which will then not be far enough east.

The Lady Bryan trustees have caught the "increase of capital stock" fever. They propose with the consent of the stockholders, to increase from \$50,000 to \$300,000—six for one.

The Iowa mining company also propose to increase the capital stock from \$3,000,000 to \$9,000,000 in 90,000 shares.

The dividends declared this month are as follows: Belcher, \$3 per share, or \$312,000; Crown Point, \$2 per share, \$200,000; Consolidated Virginia, \$3 per share, \$324,000; Enreka Consolidated, 50 cents per share, \$25,000; Rye Patch Consolidated, 25 cents per share, \$7,500. This makes a total of \$868,500.

San Diego county yielded \$193,000 in gold bullion in 1874. There are now 60 stamps at work in Julian and Banner districts, and the yield for 1875 will be much larger.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, JANUARY 7.	THURSDAY, JANUARY 14.
MORNING SESSION.	MORNING SESSION.
220 Ophir.....311/2@315	140 Ophir.....165@183
100 " ".....325	20 " ".....30
335 Mexican.....80/2@80	300 Mexican.....82/2@85
1750 G. & C.....61/2@62	1000 G. & C.....62/2@65
145 Best & Belcher.....61/2@62	600 Best & Belcher.....61/2@65
100 " ".....70/2@71	200 " ".....70/2@71
260 Sava.....152/2@159	400 Sava.....152/2@159
150 Chollar.....40/2@41	50 Chollar.....40/2@41
250 H. & N.....65/2@66	40 Chollar.....65/2@66
45 Crown Pt.....45/2@46	170 H. & N.....45/2@46
275 Jacket.....147/2@150	700 Crown Pt.....147/2@150
100 " ".....10/2@11	100 " ".....10/2@11
1200 Imperial.....119/2@120	70 " ".....119/2@120
645 Empire.....140/2@145	200 " ".....140/2@145
150 Con G Hill.....22/2@23	700 Imperial.....22/2@23
240 Kentuck.....55/2@56	100 Con G Hill.....55/2@56
1000 Belcher.....55/2@56	200 Kentuck.....55/2@56
100 Am Flag.....24/2@25	100 Belcher.....24/2@25
310 Ande.....14/2@15	100 Am Flag.....14/2@15
1225 Belmont.....14/2@15	310 Ande.....14/2@15
500 Caledonia.....30/2@31	1225 Belmont.....30/2@31
210 Eureka Con.....14/2@15	500 Caledonia.....14/2@15
85 Excheq.....50/2@51	210 Eureka Con.....50/2@51
3210 Koseuth.....50/2@51	85 Excheq.....50/2@51
225 Justice.....120/2@121	3210 Koseuth.....120/2@121
2515 Julia.....130/2@131	225 Justice.....130/2@131
1820 Lady Wash.....130/2@131	2515 Julia.....130/2@131
2300 Lady Bryan.....71/2@72	1820 Lady Wash.....71/2@72
364 Levee.....3/2@4	2300 Lady Bryan.....3/2@4
625 Confidence.....45/2@46	364 Levee.....45/2@46
200 Con Vir.....84/2@85	625 Confidence.....84/2@85
100 " ".....60/2@61	200 Con Vir.....60/2@61
175 Sierra N.....22/2@23	100 " ".....22/2@23
580 Deney.....22/2@23	175 Sierra N.....22/2@23
200 California.....22/2@23	580 Deney.....22/2@23
790 " ".....790/2@791	200 California.....790/2@791
10 Excheq.....330/2@331	790 " ".....330/2@331
700 Oregon.....115/2@116	10 Excheq.....115/2@116
115 Justice.....115/2@116	700 Oregon.....115/2@116
355 Sucker.....70/2@71	115 Justice.....70/2@71
2170 Lady Bryan.....70/2@71	355 Sucker.....70/2@71
275 Julia.....130/2@131	2170 Lady Bryan.....130/2@131
350 Caledonia.....28/2@29	275 Julia.....28/2@29
545 Knickerbocker.....60/2@61	350 Caledonia.....60/2@61
420 Globe.....100/2@101	545 Knickerbocker.....100/2@101
1140 Balt Con.....100/2@101	420 Globe.....100/2@101
720 Alpha.....40/2@41	1140 Balt Con.....40/2@41
150 Meadow Val.....64/2@65	720 Alpha.....64/2@65
415 Ray & Ely.....22/2@23	150 Meadow Val.....22/2@23
425 Rye Patch.....40/2@41	415 Ray & Ely.....40/2@41
110 Seg Bel.....140/2@141	425 Rye Patch.....140/2@141
AFTERNOON SESSION.	AFTERNOON SESSION.
705 Ray & Ely.....25/2@26	705 Ray & Ely.....25/2@26
540 Eur Con.....140/2@141	540 Eur Con.....140/2@141
200 W Creole.....22/2@23	200 W Creole.....22/2@23
170 Am Flag.....22/2@23	170 Am Flag.....22/2@23
300 Picoche.....34/2@35	170 Am Flag.....34/2@35
1225 Belmont.....131/2@132	300 Picoche.....131/2@132
25 Independence.....34/2@35	1225 Belmont.....34/2@35
85 Charlot Mill.....22/2@23	25 Independence.....22/2@23
340 Golden Charlot.....22/2@23	85 Charlot Mill.....22/2@23
100 Ida Elmore.....12/2@13	340 Golden Charlot.....12/2@13
125 Mahogany.....24/2@25	100 Ida Elmore.....24/2@25
100 Newk.....24/2@25	125 Mahogany.....24/2@25
500 Belmont.....24/2@25	100 Newk.....24/2@25
750 Tread South.....24/2@25	500 Belmont.....24/2@25
50 Cherry Creek.....12/2@13	750 Tread South.....12/2@13
350 Charlot.....12/2@13	50 Cherry Creek.....12/2@13
650 Bullion.....47/2@48	350 Charlot.....47/2@48
580 Uab.....47/2@48	650 Bullion.....47/2@48
65 Bacon.....12/2@13	580 Uab.....12/2@13
510 S Hill.....10/2@11	65 Bacon.....10/2@11
115 Eolipie.....12/2@13	510 S Hill.....12/2@13
70 Trench.....12/2@13	115 Eolipie.....12/2@13
700 Challenge.....13/2@14	70 Trench.....13/2@14
235 Dayton.....13/2@14	700 Challenge.....13/2@14
175 Rock Is.....9/2@10	235 Dayton.....9/2@10

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
American Flat M Co	Washoe	4 100 Dec 7	Jan 9	Jan 27	C A Sankey	331 Montgomery st
Andes S M Co	Washoe	3 20 Dec 7	Jan 11	Feb 1	M Landers	507 Montgomery st
Arizona & Utah M Co	Washoe	11 75 Dec 10	Jan 14	Feb 2	J Maguire	419 California st
Arizona S M Co	Unionville Nevada	1 100 Nov 30	Jan 8	Jan 23	Wm Willis	401 California st
Baltimore Cons M Co	Washoe	1 100 Dec 5	Jan 8	Jan 23	D T Barclay	401 California st
Bonanza M Co	Placer Co	10 50 Dec 10	Jan 14	Feb 4	D F Verdenal	409 California st
Bowery Cons M Co	Ely District	3 20 Dec 15	Jan 25	Feb 23	O E Elliott	419 California st
Caledonia S M Co	Washoe	10 300 Jan 8	Feb 12	Mar 5	R Wegener	419 California st
Charlot Mill & M Co	San Diego Co	1 50 Dec 24	Jan 25	Feb 13	P Swift	419 California st
Daisy M Co	Washoe	12 75 Jan 12	Feb 16	Mar 9	G R Spinney	320 California st
Empire Mill & M Co	Washoe	17 80 Dec 28	Jan 29	Feb 18	W E Dean	419 California st
Florida S M Co	Washoe	1 100 Jan 8	Feb 10	Mar 2	L Herman	419 California st
Globe M Co	Washoe	4 25 Dec 10	Jan 14	Feb 2	J Maguire	419 California st
Golden Charlot M Co	Idaho	12 150 Jan 4	Feb 8	Feb 23	L Kaplan	Merchants' Ex
Hale & Norcross S M Co	Washoe	45 50 Jan 8	Feb 12	Mar 5	J F Higgins	438 California st
Imperial Salt Co	Washoe	20 100 Nov 25	Dec 29	Jan 19	W E Dean	419 California st
Indus & S M Co	Washoe	25 25 Dec 30	Jan 30	Feb 18	D Wilder	419 California st
Iowa M Co	Washoe	2 25 Jan 13	Feb 15	Mar 10	A D Carpenter	605 Clay st
Justice M Co	Washoe	12 100 Jan 12	Feb 12	Mar 5	J F Higgins	438 California st
Knickerbocker M Co	Washoe	11 150 Dec 28	Jan 30	Feb 19	E Swift	419 California st
Lady Washington M Co	Washoe	2 80 Dec 17	Jan 21	Feb 3	H Boyle	Stevensons Bldg
Mahogany S M Co	Idaho	3 20 Jan 5	Feb 17	Mar 1	H C Kibbe	419 California st
New York Cons M Co	Washoe	11 50 Dec 5	Jan 6	Jan 25	J S Kennedy	402 Montgomery st
Original Gold Hill G & S M Co	Washoe	2 50 Dec 12	Jan 14	Feb 1	D A Jennings	401 California st
Overman S M Co	Utah	1 50 Dec 12	Jan 20	Feb 20	O E Kibbe	419 California st
Pago Tunt Co	Ely District	8 100 Dec 11	Jan 21	Feb 16	W M Holman	Fresman Fund Bldg
Picoche S M Co	Ely District	8 100 Dec 11	Jan 21	Feb 16	J Hady	419 California st
Picoche West Ex M Co	Idaho	3 20 Dec 11	Jan 21	Feb 16	O E Elliott	419 California st
Red Jacket M Co	Idaho	3 20 Dec 11	Jan 21	Feb 16	L Kibbe	419 California st
Savage M Co	Washoe	16 50 Dec 5	Jan 1	Jan 27	Wm Willis	419 California st
Sierra Nevada S M Co	Washoe	30 300 Dec 1	Jan 5	Jan 26	E B Holmes	419 California st
Silver Cord M Co	Idaho	12 100 Jan 9	Feb 16	Mar 9	G D Edwards	419 California st
South Charlot M Co	Idaho	3 20 Dec 11	Jan 21	Feb 16	Frank Swift	419 California st
Thrift G & S M Co	Calaveras Co Cal	50 50 Nov 24	Dec 26	Jan 16	O H Bogart	402 Montgomery st
Tyler M Co	Washoe	7 50 Nov 19	Jan 21	Feb 12	H R West	210 Montgomery st
Uab S M Co	Washoe	1 100 Dec 11	Jan 14	Feb 2	D Squire	Stevensons Bldg
Washington & Creole M Co	Ely Dist	13 50 Dec 8	Jan 11	Feb 4	W E Dean	419 California st
Yellow Jacket S M Co	Washoe	19 500 Dec 10	Jan 13	Feb 13	D D Cleary	Merchants' Ex
					G W Hopkins	Gold Hill

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Baltic Cons M Co	Washoe	1 15 Nov 18	Dec 20	Jan 20	B Burris	507 Montgomery st
Calaveras Hydraulic M Co	Cal	5 50 Dec 7	Jan 9	Jan 25	A Shear	321 Battery st
Combination G & S M Co	Panamint	5 100 Dec 23	Feb 1	Feb 1	D Wilder	Merchants' Ex
Con Refractor S M Co	Lower Cal	2 50 Dec 24	Jan 30	Feb 20	A D Carpenter	605 Clay st
Edith Quicksilver M Co	Cal	2 20 Dec 23	Feb 3	Feb 23	W Stant	113 Liederdorff st
Enterprise Cons M Co	Cal	1 124 Dec 26	Feb 3	Mar 3	C F Hermann	418 Kearny st
Equitable Tunnel M Co	Utah	1 100 Dec 1	Feb 17	Feb 3	C S Healy	Merchants' Ex
Fluence M Co	Humboldt Co Cal	1 100 Dec 5	Jan 8	Feb 3	I E Dolave	270 Mont omercy st
"220" M Co	Washoe	9 100 Dec 29	Feb 2	Feb 20	E F Stone	419 California st
Gold Mt G M Co	Holcomb Valley Cal	3 50 Dec 19	Jan 20	Jan 23	J F Caldwell	419 California st
Gold Run M Co	Nevada Co Cal	3 20 Dec 11	Jan 11	Feb 3	C O Palmer	41 Market st
Golden Bell S M Co	Utah	5 50 Dec 8	Jan 15	Feb 15	K Wertheimer	500 Clay st
G & S M Co	Robinson Dist	6 20 Jan 4	Feb 12	Mar 8	G R Spinney	402 Montgomery st
Illinois Central M Co	Idaho	1 100 Jan 9	Feb 17	Mar 10	F H Hermann	418 Kearny st
Independence Cons M Co	Idaho	2 100 Dec 16	Jan 21	Feb 10	C S Neal	419 California st
Junata Cons S M Co	Aurora Nev	8 100 Dec 16	Jan 20	Feb 10	A Wissel	210 California st
Kennedy M Co	Amador Co Cal	8 100 Dec 16	Jan 20	Feb 10	W R Cowland	605 Clay st
Keystone No 1 & 2 M Co	Arizona	1 100 Dec 12	Jan 12	Feb 1	E Ohatin	808 Montgomery st
Kyle & Ralston S F Water Works	Cal	6 25 Nov 18	Dec 23	Jan 18	J W Tripp	408 California st
Martin & Walling M & M Co	Cal	1 50 Dec 7	Jan 8	Jan 23	H C Kibbe	419 California st
New York M Co	Washoe	11 50 Dec 5	Jan 6	Jan 25	I Derby	320 California st
North Bloomfield Gravel M Co	Flumas Co Cal	7 75 Dec 5	Jan 4	Jan 19	A Martin	520 Washington st
North Fork M Co	Amador Co Cal	10 100 Dec 11	Jan 16	Feb 3	L Kaplan	Merchants' Ex
Owida V Co	White Pine	10 100 Jan 9	Feb 10	Mar 8	A Durharow	35 California st
Pinto M Co	Cal	2 125 Dec 21	Jan 23	Feb 19	A Baird	316 California st
Rattlesnake Quicksilver M Co	Cal	5 50 Dec 7	Jan 8	Feb 1	H Knapp	306 Montgomery st
South Fork M & Canal Co	Cal	1 100 Dec 11	Jan 12	Feb 1	L Kaplan	Merchants' Ex
Star King S M Co	Elko Co Nevada	9 25 Dec 4	Jan 8	Jan 26	A C Lister	321 Montgomery st
Wells, Fargo & Co M Co	Washoe	5 50 Jan 13	Feb 13	Mar 1	W J Gunn	410 Montgomery st
Wyming G M Co	Cal	6 30 Dec 23	Jan 31	Feb 23	E Barry	415 Montgomery st
Yarrowagh S M Co	Kern Co Cal	6 30 Dec 23	Jan 31	Feb 23	E Barry	415 Montgomery st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Belcher M Co	Washoe	H C Kibbe	419 California st	Annual	Jan 26
Buckeye G & S M Co	Washoe	Called by Trustees	331 Montgomery st	Special	Jan 20
California M Co	Washoe	Called by Trustees	401 California st	Annual	Jan 26
Consolidated Virginia	Washoe	Called by Trustees	401 California st	Special	Jan 26
Consolidated Virginia	Washoe	Called by Trustees	438 California st	Special	Jan 26
Gould & Curry S M Co	Washoe	Called by Trustees	419 California st	Annual	Jan 19
Iowa M Co	Washoe	E F Stone	419 California st	Annual	Feb 16
Kosuth M Co	Washoe	Called by Trustees	419 California st	Annual	Feb 16
Lady Bryan M Co	Washoe	L Hermann	409 California st	Special	Jan 26
Pattern M Co	Ely District	Called by Trustees	409 California st	Annual	Jan 26
Picoche West Ex M Co	Ely Dist	T W Colburn	418 California st	Annual	Jan 26
Raymond & Ely M Co	Cal	J W Clark	418 California st	Annual	Jan 26
Saw Pit Flat Cons M Co	Cal	T W Clark	418 California st	Annual	Jan 26
Sierra Nevada S M Co	Nevada	R Wegener	419 California st	Annual	Jan 26
Sneor M & M Co	Washoe	Called by Trustees	302 Montgomery st	Special	Jan 20
Union Cons M Co	Washoe	Called by Trustees	Merchants' Ex	Special	Jan 23

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co.	Washoe.	H. C. Kibbe.	419 California st	3 00	Jan 11
Charlot M & M Co	Washoe.	Francis Swift.	331 Montgomery st	10 00	Jan 16
Consolidated Virginia M Co	Washoe.	D. F. Barclay.	401 California st	3 00	Jan 11
Crown Point M Co	Washoe.	O. E. Elliott.	419 California st	2 00	Jan 12
Diana M Co.	Nev.	H. C. Fasset.	220 Clay st.	1 00	Jan 25
Enreka Consolidated M Co	Nev.	T. W. Verdenal.	419 California st	2 00	Jan 9
Rye Patch M Co	Nevada.	D. F. Verdenal.	409 California st	25	Jan 9

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office, San Francisco.

ORIGINAL FLOWERY M. CO., JAN. 7.—Location: Flowery district, State of Nevada. Capital stock, \$5,000,000, in 50,000 shares. Directors: R. H. Graves, O. H. Bogart, Thos. R. Hayes, R. C. Dyer and D. L. McLaughlin.

ALLEN CONSOLIDATED M. CO., JAN. 7.—Location: Storey county, Nevada. Capital stock, \$2,500,000, in 50,000 shares. Directors: Jas. A. Pritchard, F. Vassault, Geo. M. Pinney, Joseph Clark and T. J. Owens.

JACOB LITTLE CONSOLIDATED M. CO., JAN. 7.—Location: Storey county, Nevada. Capital stock, \$100,000,000. Directors: Jacob A. Pritchard, Louis A. Booth, Martin White, Aaron M. Burns and Wm. M. Pierson.

SILVER CENTRAL CONSOLIDATED M. CO., JAN. 7.—Location: Devil's Gate and Chinatown mining districts, Lyon county, Nevada. Capital stock, \$10,000,000. Directors: George Atkinson, A. B. Forbes, Jas. Duff, Oliver Eldridge and Adolphus Walz.

ALHAMBRA MINING M. CO., JAN. 9.—Location: Storey county. Capital stock, \$5,000,000. Directors: Fred Clay, C. D. Morrison, John Sroufe, S. Schreiber and R. Von Pfister.

COLUMBIA S. M. CO., JAN. 10.—Location: Virginia district, Nevada. Capital stock, \$10,000,000, in shares of \$100 each. Directors: Thos. B. Lewis, John Skane, L. Goodwin, T. H. Graves and P. J. Kennedy.

HUMBERT MILL AND MINING CO., JAN. 10.—Location: State of Nevada. Capital stock, \$5,000,000. Directors: George G. Barry, Hill Beachy, J. Guisaca, R. H. Brown and D. Hardy.

CALIFORNIA LINEN CO., JAN. 11.—Object, to purchase, sell, lease and rent real estate; erect buildings thereon; to purchase coal and sell patent rights; to manufacture goods from ramie, fax, cotton, wool and silk; to erect proper machinery, etc. Capital stock, \$1,000,000. Directors: Henry F. Williams, Wm. W. Hanscom, Charles E. Barnes, W. K. Doherty, George Bowser and D. McLaren.

BONANZA M. CO., JAN. 12.—Location: Utah Territory. Capital stock, \$10,000,000. Directors: P. B. Horton, G. H. Simpson, J. H. Johnston, D. C. McGlynn and Jacob C. Johnston.

The following named company has filed a certificate of incorporation in this office of this County

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR COUNTY.

DOWN'S GRAVEL CLAIM.—Amador Ledger, Jan. 9: On Saturday last we visited the claim of R. C. Downs & Co., located on the gravel range lying between Jackson and Sutter creek. It will require considerable labor and money to place the claim in thorough working order, but the company have before them an immense gravel deposit which will require years to exhaust. With the fall (over 2000 feet) aided by the Little Giant, a vast amount of gravel can be run off daily through the sluices. As work advances into the hill, the depth of gravel rapidly increases, and before the crest is reached a face of gravel of over 200 feet will be presented, all of which, from the top to the bed-rock, contains gold.

THE VOLUNTEER QUARTZ MINE.—We are informed that a rich strike was made in the Volunteer mine, near this place, on Tuesday last. The yield of the rock taken out on that day is estimated by good judges to be not less than \$1,000. The rock taken from this mine has paid well from the surface, and increases in quality and richness as the shaft is sunk.

LOOKING WELL.—We learn from Plymouth that the mining prospects of the neighborhood look very flattering.

The Phoenix mine presents a prosperous appearance of ore developed of a high grade.

The Alpine never looked more promising than at present. The main shaft is now down 700 feet with a ledge of pay rock ten feet in thickness, more well defined walls. The quality of the rock improves as greater depths are reached.

CALAVERAS COUNTY.

SCARCITY OF WATER.—Calaveras Chronicle, Jan. 9: The long continued drouth, together with the cold weather in the mountains, is beginning to tell on the supply of water in the ditch. There is scarcely enough to meet the demand at present, and indications of an increase in the near future are not favorable. There is no use in talking; we must have rain.

SINKING COMPLETED.—The sinking of the shaft in the Gwin mine, a hundred ft from the 900-ft level, is completed. The work of running the 1000-ft level, for the purpose of striking the north bonanza, will be immediately commenced. Meanwhile the batteries are steadily employed crushing ore from the levels above, and everything connected with the mine is in an eminently satisfactory condition.

UP COUNTY GLEANINGS.—Citizen, Jan. 9: At Mosquito, the claim owned by Skinner and Luftranchi is being tested by a shaft sinking from the tunnel. The tunnel is run on the vein for a distance of 500 ft and rock above stopped out. The average of ore crushed from the mine has been about \$48 per ton, while we are informed that refuse rock has paid from \$8 to \$10 per ton.

MISCELLANEOUS ore is being hauled from the Josephine to Harris' custom mill for crushing.

Work was recommenced on the Champion last week, the rock looking as well as that recently crushed.

GOULSON & HURBERT had a crushing from the lode lately discovered by them; and were well satisfied with the result. They are still taking out rock.

The new mill on the Enterprise was started last Wednesday.

HENRY & SON having purchased the Thoss mill have repaired it and will commence running in a few days.

The Zacatera has paid off a portion of its debt, and will shortly pay the balance.

EL DORADO COUNTY.

AN IMMENSE STRIKE.—Mountain Democrat, Jan. 9: Information reaches us from Georgetown that in the Woodside mine a five foot ledge has been developed, and our informant, possibly with more force than elegance, assures us that "the quartz is perfectly lousy with gold."

GEORGETOWN ITEMS.—The mining interests of this section of the county are looking up. The Cedarberg company (which I believe is the only one in our county), are drilling holes at a rate that would astonish any one not conversant with the working of the same, and is a decided success.

The International mine, Colonel Belty, superintendent, has developed a large ledge of ore filled with sulphurets, the rock assaying as high as \$1,300 per ton.

The Taylor mine is at present crushing ore at the rate of fifteen tons per day, and under the management of Mr. Walter Schmidt will prove a success.

The Garden Valley Co. have commenced operations of a permanent nature. This mine is an extension of the Taylor mine, and from present indications will prove a success.

LAKE COUNTY.

MINING ITEMS.—Lake County Bee: Ledges of silver bearing rock have been discovered in the vicinity of Highland Springs and in Scott's valley.

A well-defined ledge of gold-bearing quartz

has been discovered on the ridge that divides the waters of Russian river and Clear lake.

MENDOCINO COUNTY.

MINING DISTRICT.—Mendocino Democrat, Jan. 9: The miners hereabout met last Thursday and organized the Ukiah mining district, electing S. Wurtenburg, Recorder. The U. S. general mining laws were adopted; twenty days to record, a claim 1500 feet on the ledge, 300 each side. The district starts from Sanel district on the south, and runs up to neighborhood of Little lake.

The miners of our Ukiah silver mine are preparing to send a ton of their ore to the city for reduction, as a test of the working capacity of their mine. Assays are made from small specimens of ore, and are, consequently, often deceptive; but it is believed that a ton of the ore will give a reliable knowledge of the richness of the mine.

NAPA COUNTY.

NEW DISCOVERY.—St. Helena Star, Jan. 7: Dr. Michel and J. J. Dickinson have struck a three-foot copper ledge on their chrome iron claim, in Mowee canyon. It is very rich ore, and we should judge will go over fifty per cent. Anyone who may wish to see a specimen, can do so by calling at Dickinson's store.

LIVELY QUICKSILVER TROUBLES.—Napa Reporter Jan. 9: In the Fifteenth District Court on Thursday, a week ago, the Mammoth Consolidated quicksilver company commenced suit against the London quicksilver mining company, to recover 15,000 feet of ground of the Mammoth ledge situated in Lake county. Suit was also brought by Isaac Frank and others, against W. W. Cook and Aaron Cook, to recover 13,200, or 3,000 feet of the Oriental quicksilver mining ground in Lake county. The Mammoth Consolidated quicksilver mining company also brought suit against the Lake County quicksilver mining company, to recover possession of 4,000 feet in length by 1,000 feet in width of the Mammoth location. The Mt. St. Helena quicksilver company also commenced suit against the American quicksilver company to recover 2,700 feet of the Dead Broke, or Mt. St. Helena company's ground in Lake county.

NEVADA COUNTY.

OLD BLOCK MINE.—Grass Valley Union, Jan. 4: John Trenberth and others are working on the "Old Block" mine, which is located somewhere in the neighborhood of Grass Valley slide. Trenberth says they are putting down a shaft, and they are preparing to put in a "ninety." A "ninety" is a big steam engine, we believe.

OMAHA MINE.—Work on the Omaha is still being prosecuted with vigor, and the mine continues to show well in good milling ore. The ledge is now nearly four feet in thickness and free gold can be seen in satisfactory quantities all through the quartz.

NEW TUNNEL.—Transcript, Jan. 1: The South Yuba canal company, are running a tunnel about 1,200 feet long under the hill beyond the Manzanita mine, for the purpose of conveying the water of the Snow Mountain ditch through it to the town and adjacent mines. The work was considered necessary, from the fact that the Manzanita company have washed away the hill nearly up to where the present ditch runs, and there is a liability of there being a cave which will carry away the ditch at any time, and shut off not only the mine, but the town from water. The tunnel is eight feet wide and six feet high. Men are at work on both ends, and they have about 650 feet completed. The work was commenced in October, and will be completed in about two months more. It is under the supervision of John W. Hart, who is doing a first-class job.

The North Bloomfield mining company are at work piping and using their long tunnel for a flume. We understand it works to a charm and it is thought it has capacity enough to run off all the dirt they have water to wash.

The Union gravel mining company have completed their tunnel at Kennebec hill, and are taking out gold in large quantities.

ROCK STRIKE.—We understand very rich rock has been struck in the Home mine, situated on Deer creek about two miles below town, just in front of the Wyoming mine. The ledge is owned by the Hon. Thomas Findley. Machinery and hoisting works were erected on it several years ago, and work done on it, but for some cause it was shut down. Recently work was again commenced and we learn very rich rock has been struck. We are pleased to hear of any rich strikes and are none the less glad because Thomas Findley is the owner.

PLUMAS COUNTY.

DUTCH HILL.—Plumas National, Jan. 2: The water was turned into the North Fork company's big pipe one day last week. Only fifty inches was started, and it seems that the workmen expected several hursts, as such a length of pipe is certain to have weak places in it. It had only hurst twice, at last accounts, and the managers were sanguine of the most complete success. It is thought best to wait for the freezing weather to end before turning in the water again.

SAN MATEO COUNTY.

COAL.—San Mateo Times, Jan. 9: Prof. Heruch, the mining expert, in company with J. O. Maynard visited the tunnel on the San Mateo and Half Moon Bay toll-road on Wednesday, and made an examination of the coal measures which Mr. Maynard has been prospecting. The indications are said to be extremely favorable, so much so that arrange-

ments will shortly be made to prospect the measure by means of boring. The principal obstacle hitherto has been water, in itself a favorable indication, and this will be avoided by boring.

SIERRA COUNTY.

STAUKE IT ROCK.—Mountain Messenger, Jan. 9: The boys at Bunker hill, Little Grizzly, have at last run through the "big rock," and sunk down 17 feet into a fine bed of blue gravel, said to be very rich.

The Sierra Buttes and Independence mines are as prolific as ever of the yellow ore, and the numerous ledges around the town promise a rich strike any day. All in all this mining district is one of the most promising in the county.

FOREST CITY was never better. The two prospecting tunnels are being run, the North and South fork have made good headway recently, "and every prospect pleases."

The Empire mining claim at Howland Flat, is paying finely, say report.

Miners are beginning to find fault with the fine weather on account of the scarcity of water in the foreshadows.

NEGOTIATIONS are in progress for the sale of the American company's claims at Morristown. It is one of the best mines in the county.

SCALES DISCOVER.—The miners are busy at work running powder drifts and tunnels. Water for hydraulic purposes has long since ceased, and from all appearances it will be a long time before there will be any more. Owners of mines say naught, but like the Dutchman's boy, think considerably.

TRINITY COUNTY.

IMPORTANT TRANSACTION.—Trinity Journal, Jan. 9: The Bullychoop quartz mine is bonded to a San Francisco company for \$60,000. Of this amount \$10,000 is to be paid before any work is done on the ledge. The company is to erect a mill and other works, which, if the property is not satisfactory, can be turned over to the original company. A wagon road is to be built to the mine next spring.

TUOLUMNE COUNTY.

THE MARKS AND DARROW.—This mine, situated between the Raw Hide and Patterson, is to be developed as fast as possible. Work has already commenced, and the Superintendent, G. P. Fisher, is confident of its proving one of the best mines in the county. A main working-shaft will be put down to strike the vein 50 feet below the surface at the shaft. From this a level will be run north, and as the hill rises very abruptly, a short distance will carry the tunnel 300 feet beneath the croppings, exposing enough ore, by stopping, to supply milling machinery for some time to come, and while the work of further development still goes on.

NEW ALBANY.—Sonoma Democrat, Jan. 9: A few days since the workmen in this mine ran into a vein of rock; samples of which we have seen; they are profusely filled with metal, gold being visible to the naked eye plentifully. This body of ore is reported seven feet wide where the samples were taken from, and gives a future prospect that must be very gratifying to the owners.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—Gold Hill News, Jan. 7: Daily yield, 400 tons, from 1550, 1500, 1400 and 1300-ft level. At the 1550-ft level, good progress is being made in the winze being sunk 300 feet from the northern boundary. It is now over 100 ft deep in very high grade ore. The main north and south drift at this level has passed through into the California ground 35 ft, and the face is still in high grade ore. The last 400 feet of this drift, northward, has no poor ore in it. The east cross-cut, at this level (the 1550) 300 ft from the northern boundary is in 65 ft from the main north and south drift, all the way very high grade ore, and the face shows still higher grade ore. At the 1500-ft level, the cross-cuts east, continue in high grade ore, and have not yet reached the east wall. Cross-cut No. 2, which is the most advanced, is now in over 300 ft in excellent ore, and has not yet reached the east wall. This cross-cut is 130 ft from the northern boundary line. Cross-cut No. 1, 14 feet from the northern boundary line is now in considerably over 100 ft, in the richest kind of ore. At the 1400 ft level, the ore breasts are looking splendidly, and the north drift, which is far in advance of the ore breasts, continues in fine ore, and is yet over 200 ft from the northern boundary line. The width of the ore at this point is as yet unknown. The ore breasts at the 1300-ft level also continue looking and yielding finely.

CALIFORNIA.—At the 1550-ft level the main north drift, from the Gould & Curry has penetrated this mine a distance of 35 ft, passing through very high grade ore. At the 1500-ft level, cross cut No. 3 east, 200 ft from the southern boundary, has penetrated the ore about 8 feet. The ore is of the same rich character as that found in cross-cut No. 1 at the southern boundary. Cross-cut No. 2, 100 feet from the southern boundary, is in a distance of 70 ft, and is expected to reach the ore vein in a further distance of 40 ft. At the 1400-ft level, cross-cut No. 1, 200 ft from the southern boundary has penetrated the ore a distance of ten feet. The ore assays from \$200 to \$350 to the ton. A cross-cut east at the 1300-ft level, directly above that last mentioned, was commenced yesterday to run for the ore body. It will have to run 200 feet to reach it.

UTAH.—The work of grading for the new pumping machinery is well advanced. On the 400-ft level the north drift has been extended

14 ft into the vein and looks favorable.

LADY BAXAN.—New shaft 389 ft in depth. The various cross-cuts for the ledge and also to connect with the old workings of the mine are getting along finely. The ledge is very wide, probably 300 ft and some very rich bunches of ore have been found in its former workings.

CHOLLAR-PORTOS.—Daily yield 35 to 40 tons, from old upper workings. The average assays from car samples is \$25, the quality of ore yielded not being quite so good as heretofore. The ore sections show no change for the better.

OPHIA.—Daily yield 250 tons from the 1465 and 1300-ft levels, and the stopes and floors between. The average richness of this product is constantly increasing, giving better bullion returns. At these two important levels the ore bodies both east and west are looking and promising splendidly, and the north winze below the 1465-ft level is now down about 30 ft in very rich ore which shows still richer as the winze penetrates deeper into it. Ore of extraordinary richness is found in the cross-cuts from the bottom of the winze below this level, near the California line. The other prospecting and developments are progressing finely and most auspiciously under the best of management. From what is seen and developed of the great bonanza in this mine, it evidently bears to the north and east, and the Ophir will get a very good slice of it. It may even extend entirely across it into the Mexican.

BELOHEA.—Daily yield 450 tons. The old ore section, from the 1400-ft level up, are holding out pretty well, with no new ore developments, however in any direction.

GOULD & CURRY.—The double winze sunk from the 1500-ft level, has attained a depth of 268 ft below that point. The work in this winze is being vigorously prosecuted in order to connect sooner with the 1700-ft level, and thereby enable the company to cross-out the vein and develop the lower level.

JUSTICE.—The powerful and costly new hoisting and pumping machinery was started up for trial last Monday for the first time, and operated finely.

BEST & BELOHEA.—On the 1500-ft level the double winze has been sunk to a depth of 268 ft below it. This level will soon connect with the 1700-ft level drift, and the company is pushing the work in this winze with great energy.

PHIL SHERIDAN.—Main west drift in 195 ft to day. Over half the face is in very promising quartz; and the rest in dark clay and quartz.

OCCIDENTAL.—The extensive body of ore exposed by the several cross-cuts contains sufficient metal to be remunerative when actively worked, and at present looks very favorable.

CROWN POINT.—Daily yield, 550 tons. The old ore producing sections from the 900-ft level down, continue to give forth their regular yield, and will hold out for a long time yet, and some is coming from the 1500-ft level.

MEXICAN.—The drift from the 1465-ft level of the Ophir has advanced to within about 30 ft of the south line of the Mexican, and shows a small streak of good ore, which is considered encouraging.

SIERRA NEVADA.—Sinking the new shaft is progressing at a lively rate in favorable material. The machinery at the old shaft is being repaired and put in good order; the requisite repairs to the timbering of the shaft is being done preparatory to sinking 100 ft deeper, giving a total depth to the shaft of 800 ft.

HALE & NONOCROSS.—Daily yield about 100 tons from the old upper workings of the mine.

JULIA.—The main north drift at the 1900-ft level is being advanced at the rate of three ft per day.

GLOBE CONSOLIDATED.—In the face of the west drift at the 400-ft level, the character of the rock is changing fast for the better.

WOODVILLE.—New shaft down 78 ft. The ore stopes south in the 200 and 300-ft levels, are looking better than at our last report.

ANNES.—This mine, which lies directly west of the Consolidated Virginia and California mines, and adjoins the old Mexican mine on the south, is located on a west ledge, which from the present good showing bids fair to develop a bonanza of ore that will rival that of its neighbors. Ore heretofore thrown aside as waste, is now found to assay \$46 to the ton. A fine large body of black sulphuret ore is developed in this mine.

DAYTON.—The third compartment of the shaft is completed, and the total depth of the mine is 330 feet. Sinking deeper is now about being resumed. No change to report in the ore sections. Daily yield of ore, 60 tons. The amount of ore extracted in December was 1,755 tons. Amount shipped to Woodworth mill for reduction, 1,755 tons. Average car samples assay, silver, \$7.10; gold, \$34.96; total \$42.06.

NEVADA.—A fine showing of ore is developed in the old upper workings of this mine, there being a large chimney of it. This is not high-grade ore, but will pay well for milling.

ROCK ISLAND.—Sinking the main shaft goes on vigorously, and the winze below the 200-ft level has been giving a better showing in the way of good little bunches and spots of ore the last few days.

DANEY.—The face of the north drift at the 400-ft level is in low grade ore which shows considerable improvement.

SUCCESS.—The main drift at the 550-ft level is to-day in 105 ft., with its face in very encouraging vein matter, including considerable quartz. The ledge is evidently near by. The shaft is down 536 feet, or 45 ft below the 550-ft level.

Panamint—What "The Company" is Doing.

The Panamint News says: The Surprise Valley Mill and Water company, H. A. Jones, General Superintendent, Capt. James Messie, Manager, is invariably known as "The Company," and doubtless always will be known as THE Company, on account of its gigantic operations, although dozens of other companies may be operating at the same time. To give some idea, though by no means complete, of what the company is doing at the present time, we will state that work is being actively prosecuted on the following mines: Hudson River, Harrison, Alabama, Hemlock and Wyoming, all on the south side of town, and on the Jacobs' and Stewart's Wonders, on the north side. Several of these, particularly the Wyoming and the Wonders, are being attacked by shaft and tunnel in four or five places each. Not one but what is yielding splendidly, and have large piles of good ore on each dump. Good trails or narrow roads have been blasted out at great expense to all; these trails are from one to three miles in length; most of them have been cut to a grade suitable for tramway. At present the ore (all shipping or sack ore) from the Wyoming is brought down upon strong iron-shod sleds, each drawn by a powerful mule, and each bringing three loads a day of about eleven hundred pounds each; six of these sleds are in use at this mine, but numbers of others are being made ready as fast as possible. Two fine rock-breakers, driven by steam, are engaged a good share of the time upon ores from this and the Jacobs' Wonder. Before breaking, the ore is sorted, the second quality being piled up for concentration here as soon as the mills are ready for work, the best quality being broken up fine and sacked for shipment. Forty tons of this class of ore was shipped during the last three days from the breaker at the upper end of town, and there are about sixty tons of the same sort ready for shipment. The average shipment from the Wyoming is nearly ten tons per day of sack ore. The foundation for the twenty stamp mill, with four Krom concentrators, is about ready for the masonry, but owing to the frosty nights this portion of the work may be delayed a short time. The warehouse is ready for the metallic roof; it is sixty feet square inside, with stone walls three feet thick. The present large canvas store is soon to give way to one of wood, still larger. The company ran four boarding houses, and we are told furnish good "grub." They have stabling in the course of erection for about two hundred animals. The whole number of employees is a little over 250. They have one mill complete and ready to run as soon as the pump to supply it with water arrives and is put in place, which will require not to exceed five days from date, the pump being due to-day. They have good second class ore on hand, or easily attainable, to keep one hundred stamps in constant operation, together with a corresponding number of concentrators. They will make this an exceedingly lively camp in a very few months, as they will need at least one thousand men when all their works are in full blast. There is one other thing worthy of especial mention as regards the management of this company. That is, they have taken every possible precaution to obtain perfect and undisputed titles to every mine in their possession or claimed by them. They have undertaken huge work, taken altogether, and are managing it well. They are worthy of success, and we have not the slightest doubt they will attain it, and in so doing effect wonders for the welfare of Inyo county generally.

The Belmont Courier tells of a settlement made by the men lately working for the Morey Mill company. The company failing to pay, the men demanded the delivery of a lot of bullion on hand, belonging to the Morey Mining company. This was at first refused, but the men finally got away with the bullion, and took it to Belmont and sold it—paying themselves with the proceeds, 80 per cent. of their demands.

Rich mineral discoveries are reported near San Fernando, Los Angeles county. A man named Slater has discovered within five miles of the town a silver ledge of some richness. Several finely prospecting gold ledges have been found in the same vicinity; also a cinabar mine of apparent richness. Coal is also reported to exist in the same vicinity.

Or coal from a mine in Shaeta county the Sacramento Union says: "It is a superior article, equal to, if not better, than any other found in the State; it is of a glossy black, heavy and apparently free from sulphur."

The Big Bonanza.

The Enterprise of the 6th instant says: The cross-cut 200 feet north of the south line of the California, on the 1400-foot level has reached the big bonanza, and penetrated it to the distance of five or six feet. They reached the ore evening before last, and already the rock in the face of the cross-cut will go \$300 per ton. The ore was reached much sooner than was anticipated, which shows that the west wall did not bear so much to the eastward as it seemed to do when cut across in the Consolidated Virginia. It is now demonstrated that from the north line of the mine last named the west wall gradually curves back to the west. This being the case, and the east well still bearing to the east, it would seem that we have as yet by no means seen the "bulge" of the bonanza. That grand center of interest—the "bulge"—is crowded still further north. Something is now known of the west side of the bonanza, but the east side is still widening away into the unexplored regions. The cross-cut 200 feet north of the California line, on the 1500-foot level, is also said to have been in ore a distance of two feet yesterday afternoon—much sooner than was expected—though its face has been showing much quartz for some days. The mine was visited yesterday afternoon by Captain Taylor,

are stowed away, and at the Eureka Consolidated 75,000 bushels, while enough is being received to supply the daily demand, averaging 1,500 bushels to each furnace in operation. The product and shipments for the month of December, 1874, were as follows:

DECEMBER.		
Furnaces.	Product.	Shipment.
Richmond.....	1,300,000	831,000
Eureka Consolidated....	784,744	775,284
K. E.....	260,000	287,000
Hoosac.....	221,000	251,000
Total pounds.....	2,565,744	2,114,284

Peavine.

This mining district is so near to us, says the Truckee Republican, that we cannot do better than devote a portion of our space to what is now being done to develop the interests there. Should this district prove to be as rich as all indications now promise, it will be an important market for our lumber and wood. From Mr. B. Johnson, of Reno, who called at our office yesterday, we were able to learn the following items of interest: The prospects in the mines there have been improving greatly within a short time past, and are now much better than ever before. A consolidation has been effected between the Paymaster and Poe mines under

State, Golden Fleece, Buckeye, Nellie Grant and others, all watching with great interest the result of the coming experiment at the Consolidated Poe. There are already between twelve and twenty families already located there, and 300 men employed and no idle men. The city supports a store, a livery stable and three hotels. Since Thanksgiving eight houses have been built. Stages leave daily from Reno at 9 A. M. and arrive at 3 P. M. The place is called Poe City in preference to Peavine in honor of the company. The indications at this place are said to be better than those at Virginia city at the same stage of development and some venture to predict another great bonanza.

Bee-Hunting.

The large illustration which we give on the first page of this, our holiday sheet, is descriptive of one of the notable incidents of country life, namely, bee-hunting. Although bee-hunters in their reports of these adventures generally report satisfactory returns in honey, they almost invariably dwell most on the pleasurable excitement attending the hunt.

The programme of the bee-hunt varies somewhat in different localities.

A very common mode, and one which we will suppose is being used by the parties in the accompanying picture, is as follows: The hunters resort in the daytime to localities where these wild swarms are supposed to exist, and endeavor to entice the bees away from their tree-hives. A common method to accomplish this purpose is to create a strong but agreeable odor, by filling the cells of old honey combs with eniseed and burning it between heated iron or stones. This attracts the bees, and in the vicinity of these enticing fumes, honey or some other bee food is placed. The bees feed on this.

"Which pillage, they with merry march bring home
To the tent regal of their Emperor!"

The hunters follow them in their flight and thus ascertain their retreats. At night they repair to the detected hiding place, provided with axes, torches and vessels for transporting their sweet treasures to their homes.

We see them in the picture after the tree has been "felled," removing the honey from the mammoth hive, or rude city of hives. The full moon is affording all the assistance she can under—or rather over—the circumstances, but the additional light of their pine torches is needed. Two or three hundred pounds of honey is not an unusual yield from one of the bee trees. It happens sometimes that there is a

large amount of old comb in the tree; the quality of the honey being injured thereby, and sometimes too the honey is badly broken up by the breaking or jarring of the falling tree; but in many cases the stock is equal in every respect to the best hive honey, and is removed in good marketable condition.

THE CARSON MINT employs a force of 73 persons. It coins about \$300,000 in gold per month, and about \$200,000 in silver. The silver coinage has recently been confined to trade dollars, of which \$50,000 were delivered to-day, and about \$240,000 within the last month. Superintendent Crawford and Coiner Doane and the other officers state that the capacity of the mint is hardly half so large as it should be. Since its operations have become so extensive and important it is found to be crowded in every department. The Congressional delegation from Nevada is being urged to secure an appropriation for the enlargement and improvement of the building. The sum needed for the work is about \$250,000.

NEW DITCH.—A company of capitalists, John Thomas, agent, will, as soon as the weather will warrant, commence the construction of a large ditch to convey water for mining, from the lakes in the vicinity of Gold Lake to the northern portion of the county. It will be a canal rather than a ditch, and capable of carrying at least 20,000 inches of water. The ditch will probably be 25 or 30 miles long and will furnish a full head of water the year round.—Downieville Messenger.

WELLS, FARGO & Co. shipped for the Manhattan company, of Anet, during the month ending December 31st, ninety-one bars of bullion, weighing 9,228 pounds, and valued at \$116,673.38.

The new pumping machinery for the Utah mine, on the Comstock, is being made in this city. It will equal in capacity and strength any similar machinery on the Comstock.



BEE HUNTING.

Superintendent of the Yellow Jacket, Mr. P. Deidesheimer, the well-known expert, Oscar G. Sawyer, correspondent of the New York Herald, Mr. Channey Lend, mill man, formerly of the Land mill, Seven-mile cañon, and by several other gentlemen taking an interest in mining matters, and all came to the surface perfectly stunned with the wealth seen by them during their underground travels. The only place where the bonanza has yet been crossed is at the south end, where cross-cut No. 3 passes through it. At this point they are beginning to breast out, and the breasts are opening into ore of wonderful richness, disclosing much of that character of ore known as "stephanite." While below the foreman of the mine dug out and presented to Mr. Land a lump of this ore weighing about ten pounds. It was a beautiful specimen, and on reaching the surface Captain Taylor offered Mr. Land \$20 for it, an offer which was promptly refused. We asked Mr. Taylor why he did not take a pick and dig out a specimen for himself. "Well," said he, "I thought it would look a little too much like digging into a man's safe." Mr. Sawyer says that if he writes the Herald a full account of what he saw they will think him the biggest liar on this side of the Rocky mountains. The grand developments in the California were everywhere the subject of conversation on the streets and in the saloons yesterday afternoon and last evening. On the 1550-foot level the main drift north from the Gould and Curry has passed through into California ground a number of feet and is still in the same very rich ore through which it passed for such a great distance in the Consolidated Virginia.

EUREKA BULLION.—The Eureka Sentinel says: The amount of bullion produced at the furnaces for the month of December far exceeds the figures of the same month of 1873. This is owing to the favorable condition of the weather, the easy transportation of ore from the mines and the abundant amount of charcoal being brought to the furnaces. At the Richmond over 200,000 bushels of charcoal

the name of the Consolidated Poe. This company are now having a furnace built, and expect to have it in operation Friday of this week. This is built by Mr. McGlew who is given \$500 and takes the balance from the results of the experiment. The furnace is built at an expense of about \$5,000. The company have already about 350 tons of rock on the dump pile awaiting the completion of the furnace. This rock has been assayed. Twelve assays from the dump were shown our informant, which averaged from \$42 to \$108 per ton. As soon as this furnace is completed and this rock worked a reliable test will be obtained, and calculations can be made with great probability of their being accurate whether it will be advantageous to continue developments in this district or not. The other companies are equally interested in the coming test, for in the event of this amount of rock paying according to the assay, they will have sufficient encouragement to put in capital enough to develop them all. There are croppings along the road between Reno and Peavine, where, in a thousand places prospects have been made with indications enough to induce further outlay of money in the event of success at the Consolidated Poe. The stock of this company is divided into 60,000 shares which have a market value of about \$3—30,000 shares are held by Mayor Brown, of St. Louis, Mo., 17,000 by the Bank of California, as collateral, it is said, and the remaining 13,000 by other men, many of them those that are at work developing the mine. There is a difficulty in working the rock from this mine, on account of the presence of antimony and iron which are separated with some difficulty. The rock after being milled, has to be roasted before it can be amalgamated. This difficulty seems to grow less as a greater depth is reached. This difficulty seems to grow less as greater depth is reached. Our informant went down to the 100-foot level and found the ledge three feet in thickness and well defined. They have reached a depth of 175 feet with increasing prospects. Besides the Consolidated Poe there are the Nevada

GOOD HEALTH.

Fatal Effects of Filth.

X. A. Willard in a late address before the Connecticut Farmers' Convention discoursed as follows:—Many cases of fever have been traced to the consumption of swill milk; diseases have been traced to the milk drawn from cows by the attendants of sick persons; also to the impure water with which milk-pans were washed. Cows that drink impure water give a wholesome milk. Milk becomes impure from particles of dust falling from the cow's udder, which has been gathered by passing through sloughs or mud-holes. Farmers do not as a rule appreciate this matter, but if they in dispose of their milk or butter before any great change is effected, they think all responsibility is off their shoulders. The fine character of English cheese may be attributed to great care in all the operations, running from the conditions of the pasture, as to the cleanliness of the milking-houses, through the stable, the milking-house, washing of pans, etc., to the production of the cheese. Cesspools or dead animals found upon the premises of English farmers are subjects for prosecution.

Putrid water is often the only kind by which a cow can slake her thirst, and yet it is productive of disease. We have a law to prevent watering milk, and yet a farmer is allowed to permit his cows to quench their thirst in the most filthy and poisonous water. Which is the most deserving of punishment? A case of anthrax in a family was traced to the milk obtained from a cow confined in a stable without proper ventilation. While the cow is under a violent excitement, or in an exceedingly nervous condition, the milk becomes highly poisonous, as many cases have abundantly proved. A child fed from the milk of a cow that drank from water oozing out of a hog-pen was covered with sores and pustules. Every factory or milk should have a schedule of questions for its patrons, covering the whole ground of cleanliness, treatment of the animal under all conditions, while in the pasture, at the stable, in their passage from one to the other; condition of pasturage as regards grass, etc., and every direction affecting the product of milk.

Deaths from Lamp Explosions.

There are so many circumstances under which accidents, more or less severe and often fatal, occur from lamp explosions, that people ought not to be too studious in informing themselves with regard to such accidents, or too careful in seeking to avoid them. But a few days since the following case occurred at the house of a friend on Perry street, in this city. A gentleman entered a room late at night in which a kerosene lamp had been burning low through the evening, stepped towards it and was in the act of extending his hand to turn it down, and just before his fingers reached the thumb-screw the lamp exploded with a loud report which sent it in fragments to every part of the room. Fortunately there was no fire set and no person injured. The next morning a careful examination of the fragments to learn the cause of the explosion led to the theory that the tube, which was rather a large one, had been fitted with a very small wick, thus leaving a large air space by means of which, in all probability, the movement of the air in the room, caused by the opening of the door, forced the small, flickering flame down into the tube far enough to communicate with and explode the gas which would naturally, under the circumstances, have accumulated therein.

In this connection it may be interesting, as well as useful, to call to mind the fact that Prof. Chandler, of New York city, says: "The fatal result for the year 1869, for the city of New York, which I myself have cut from newspapers, is fifty-two fatal accidents from dangerous kerosene, fifty severe and six slight—in all one hundred and eight persons, to my knowledge, from my own reading, have been injured by kerosene in one year."

EFFECT OF WARMTH IN PREVENTING DEATH FROM CHLORAL.—Dr. Brunton (who, by the way, has succeeded the lamented Anstie as editor of that excellent medical journal, *The Practitioner*) confirms the observations of Liebreich and others, and finds that the subcutaneous injection of a solution of chloral induces sleep, which is light and easily broken if the dose be small, but passes into coma if the dose be large. In dogs, considerable restlessness was observed before sleep came on, and the respiration was at first rendered rapid but subsequently became slow. A remarkable diminution of temperature was observed, which appears to be partly due to greater loss from the surface, caused by the vessels of the skin becoming much dilated under the influence of the drug, and allowing the blood to be cooled more readily by a low external temperature. It is partly due also to the diminished production of heat, which cessation of muscular action always induces. Dr. Brunton found that an animal wrapped in cotton-wool may recover perfectly from a dose of chloral which is sufficient to kill it when exposed to the cooling action of the air, and that recovery from the narcotic action is much quicker when the temperature is maintained in this way, and still more rapid when the animal is placed in a warm bath, providing this is not excessive. The

bearing of these experiments on the treatment of persons suffering from an overdose of chloral is obvious. The patient should be put to bed, and the temperature of the body maintained by warm blankets and hot-water bottles applied to various parts of the body, especially the cardiac region. Warmth over the heart is an excellent stimulant to the circulation, which, like the respiration, is enfeebled by chloral. If respiration threatens to fail, it should be maintained artificially so as to allow time for the chloral to be excreted and the normal functions to be restored.

COLIC IN YOUNG CHILDREN.—Put a lump of assafetida, about as large as a hazel nut in a three ounce vial, one teaspoonful of magnesia, and two or three teaspoonfuls of whisky, to preserve it; then fill up the vial with soft water. About the time the child begins to cry with the colic give of the mixture from half to a teaspoonful, according to age, diluted in water and well sweetened with white or lump sugar. One dose is generally sufficient to relieve the little sufferer; but if necessary, repeat after a time. It may be unpleasant at first, but the patient will soon learn to like it. This acts on the bowels sufficient to keep them regular. Cordials and soothing syrups are usually astringent—just what a child does not want.

Eat but three times a day, at regular periods, and see that at least a five hours' interval occurs between each two meals.

USEFUL INFORMATION.

Black-Leading Iron.

In these days of general diffusion of chemical knowledge it is scarcely necessary to state that the "black lead" or "plumbago" of commerce, is not lead at all, or any compound of its composition. Neither is it a carburet of lead, and that it includes no lead whatever in iron, as is sometimes stated. It is simply carbon. Pure plumbago is pure carbon, impure plumbago is impure carbon. Its proper name is graphite, that is, writing stone. We may venture to describe it as the softest of all true solids, and have often pondered wonderingly upon the apparently unnoticed, but very curious chemico-mechanical paradox that the hardest and softest of all the solids existing upon the earth are, chemically speaking, the same substance, graphite and the diamond being both carbon.

It is this wonderful softness, combined with persistent solidity, that enables us to smear it over any other solid surface, and thus obtain a solid paint, all body and no medium. For the class of castings to which it is commonly applied where its application can be readily repeated and where it is not exposed to the direct action of water it is unrivalled as a protecting film for iron. Its chemical action, so far as it does act when cold, is reducing, or anti-oxidizing. Its color and tone are so similar to iron that Mr. Ruskin himself could scarcely make any aesthetic objection to its use, and the film is so marvelously thin that it obliterates nothing. There does not appear to have ever been any attempt to estimate the thickness of a well brushed film of graphite, but it would seem that if a hundred strata of such films could be piled in contact with each other, their combined thickness would fall short of that of the thinnest gold leaf.

CHEAP TELEGRAPHY.—President Orton's report of the affairs of the Western Union Telegraph company is calculated to inspire much hope in those who believe that the Government can run the lines at cheaper rates to the public. On the first of January, 1873, a reduction of more than 50 per cent. was made in the maximum tariff between the most remote points on the company's line. This, though occasioning a temporary loss of revenue, has resulted, during the last few months, in a large increase. The reduction was from \$7.50 and \$5 to \$2.50. President Orton now adds that, owing to Messrs. Edison's and Prescott's quadruplex apparatus, which is, at the present time, working successfully between Chicago and New York, and by which two messages are sent in the same direction and two more in the opposite direction simultaneously on a single wire, he believes it practicable before long to cut rates down still lower, and ultimately to establish but four rates for day messages, namely, twenty-five, fifty, seventy-five cents, and one dollar, with half charges (except for the lowest) for night messages.

TO REMOVE NITRIC ACID SPOTS.—The yellow spots produced by nitric acid may be removed from brown or black woolen goods, while fresh, by repeatedly dipping them into a concentrated solution of permanganate of potassa and then washing them with water. The yellow spots on the hands may be removed in the same way, the brown stain produced by the permanganate being removed by an aqueous solution of sulphurous acid.

The United States is now paying over \$100,000,000 per annum for freight and passage on foreign ships, to be carried abroad and expended in the employment and support of other peoples beyond a fair percentage of what should go to foreign vessels, estimating on the tonnage and travel of each respectively.

GREEN wood can be easily finished by scorching the piece after it is shaped out. A few lighted shavings will suffice.

Guns Discharged Without Caps.

It seems almost impossible that a gun should be discharged without the presence of either cap or flint; yet a well authenticated case of the kind seems to have occurred, recently, near Napa, as narrated by the *Register* of that place. It seems that Benjamin Berger, being out with some companions duck shooting, had just fired one barrel, and hearing the shot loose in the other, turned up the gun into his left hand to pour out the charge, taking the precaution to first remove the cap. Notwithstanding the absence of the cap, the gun went off and made a bad wound in his left hand. It seems almost incredible that a gun could be discharged after the cap is removed, but the phenomenon is accounted for by experts on the hypothesis that the percussive quality of the cap had—the weather being damp—adhered to the nipple of the gun and been sufficient to explode it on being jarred incident to shaking the charge out, the hammer being down. That this theory is a correct one, is confirmed by a similar accident which occurred a few days previous to one of the Asylum apprentices, who had been shooting, and having both charges left in his gun, thought to save them by leaving them in till next day, when he would go out again. To this end he removed both caps, let one hammer down carefully, and was lowering the other, when it slipped from his thumb on to the nipple, and discharged the barrel. The other barrel went off at the same instant, as is supposed, by the shock of the first one—both discharging their contents up through the roof. The youth had a narrow escape, and the two accidents confirm the theory of the total depravity of guns, "dangerous without either lock, stock or barrel," because a man once whipped his wife to death with a ramrod."

INSECT ANATOMY.—Dr. R. U. Peper, the naturalist, in giving an account of some microscopic investigations, in which he has recently been engaged, says: I have managed to make a very careful dissection of the tongue of a house fly, and now I can show the so-called *tracheae* on the tip of the tongue very neatly dissected by my own hand. I can also show a very fine specimen of a parasite from a *blowing fly*, with all its organs perfect. I have noticed what I think is a fact that the flies which survive the winter are all, or nearly all, perhaps females; and have just dissected a house-fly, in which I find 106 eggs. I have also demonstrated what is, perhaps, an ontological discovery—that the central lancet of the horse-fly is tubular. For what reason, as he has a snicker from which he draws blood from the wound he makes? The lancet of the horse-fly—the female, for the male has no biting organs, is a compound instrument. When closed it presents a point; when open it shows several points radiating from its base. The two outside lancets have rows of teeth, like those on the jaw of a shark. I suppose the creature introduces the lancet shut, like the sticks of a fan. When it is withdrawn it is opened in the process, and thus makes that ugly tormenting wound which these insects inflict upon horses and cattle. The hollow lancet perhaps carries some kind of fluid to poison the blood or render it more fluid. There is, however, no gland to be found by which this fluid is secreted. That the lancet is hollow, however, I have shown without a question, as I have contrived to make fluid pass through it.

GUM ARABIC.—This useful product came from Morocco, instead of Arabia, as its name would imply. About the middle of November, that is, after the rainy season, a gummy juice exudes spontaneously from the trunk and branches of a species of the acacia in that country. It gradually thickens in the furrow down which it runs, and assumes the form of oval and round drops, about the size of pigeons' eggs, of different colors, as it comes from the red or white gum tree. About the middle of December the Moors encamp on the borders of the forest, and the harvest lasts a full month. The gum is packed in large leather sacks, and transported on the backs of camels and bullocks to the seaports for shipment. The harvest occasion is made one of great rejoicing, and the people for the time being almost live on gum, which is nutritious and fattening. Such is the commercial story of this simple article.

HOW TO USE A GRINDSTONE.—Common grindstone spindles, with a crank at one end, are open to the great objection that the stone will never keep round, because every person is inclined, more or less, to follow the motion of his foot with his hand, which causes the pressure on the same to be unequal. The harder pressure is always applied to the very same part of the stone, and will soon make it uneven, so that it is impossible to grind a tool true. To avoid this, put in place of the crank a small cog-wheel of 13 cogs, to work into the former. The stone will make about .07 of a revolution more than the crank, and the harder pressure of the tool on the stone will change to another place at every turn, and the stone will keep perfectly round if it is a good one. This is a very simple contrivance, but it will be new to many of our readers.—*Cabinet Maker*.

CLEANING OUT-DOOR STATUARY, ETC.—It is recommended, in cleaning moss-covered statuary in gardens, etc., first to kill the vegetation by the application of petroleum or benzine, which will not injure the stone, and to remove it when dry by brushing, finally rubbing with a rag.

DOMESTIC ECONOMY.

Care of Glass and China.

It ought to be taken for granted that all china and glass-ware is well tempered; yet a little careful attention may not be misplaced, even on that point; for though ornamental obnoxious glass-ware is not exposed to the action of hot water in common domestic use, yet it may be injudiciously immersed in it for this purpose of cleaning; and as articles intended solely for ornament may not be so highly annealed as others, without fraudulent negligence on the part of the manufacturers it will be proper never to apply water to when beyond a tepid temperature. But when fractures take place, the best cement, both for strength and invisibility, is that made from mastic. The process, indeed, may be thought tedious; but a sufficient quantity can be made at once to last a life-time. To an ounce of mastic add as much highly rectified spirits of wine as will dissolve it. Soak an ounce of isinglass in water until quite soft; then dissolve it in pure rum or brandy until it forms a strong glue, to which add about a quarter of an ounce of gum ammoniac, well rubbed and mixed. Put the two mixtures together in an earthen vessel over a gentle heat; when well united the mixture may be put into a phial and kept well stopped. When wanted for use the bottle must be set in warm water and the articles to be mended must also be warmed before the cement is applied. The broken surfaces when carefully joined should be kept in close contact for at least twelve hours, after which the fracture will be scarcely perceptible and the adhesion perfect. The broken portion will also be as strong as the unbroken. The same cement may be applied to marble and even to metals.—*English Exchange*.

POISONED BUTCHERS' MEAT.—It is well that all housekeepers, and especially all engaged in furnishing meat for the table should be impressed with the undoubted fact that animals ought not to become excited before they are butchered, because their flesh is injured thereby, and it will spoil quickly. It is frequently the case that some mishap occurs when a hog or a fat steer is to be butchered, or when a hurt is given of great or less moment which puts the animal in deadly fear, and he is likely to break away; in which case men, boys, and dogs give chase, which makes matters decidedly worse, and if, finally, life is taken, it is under pitiable circumstances. There is no doubt that much of the butchers' meat of the large cities is injured by reason of long journeys, inducing a condition of fear and trembling or a high state of nervous excitement which can but effect the flesh. There ought to be special regulations to guard against this in all slaughter-houses, and on farms the utmost care and deliberation should be taken so that butchering may be quickly and successfully performed.—*Dr. Cross*.

ROLLED HERRING.—Herrings having hard roes appear larger and finer fish than those with soft roes; nevertheless the latter are to be preferred, as they really have more flesh and are more delicate. Having scraped the fish, cut off the heads, split open, cleanse and take out the roes. Take the herring in the left hand, and with the thumb and finger of the right press the back bone to loosen it, then lay the fish flat on the board and draw out the bone; it will come out whole, leaving none behind. Sprinkle the herring with pepper, salt and a little chopped green parsley; lay on the soft roe, roll up tightly, leaving the fin and tail outwards, and bind round with a piece of tape to keep it in shape. Have ready some water well seasoned with pepper, salt and vinegar, and when it boils put in the herring and let it simmer for ten minutes, or until cooked. Serve it with butter, parsley or egg sauce poured over.

ARTIFICIAL CHEESE.—As a successor to artificial butter we have now an article of artificial cheese. The experiment of its manufacture has been made in Tompkins county, New York, it is said with great success; and the theory is simply that skim milk cheese, a food material of little value, may be so improved by the addition of foreign enriching material as to be much more valuable. The cream is therefore taken from milk and made into butter, and the skimmed material is made into cheese by the addition of a pure and wholesome, but cheap oil.

FRIED VEGETABLE MARROW.—Cut the marrow in strips an inch and a half long and three-eighths of an inch square; sprinkle freely with fine salt, and place the strips under an inverted plate in a basin. In a couple of hours put them in a cloth, and thoroughly dry them by wringing them in the cloth; then flour them in the same manner as whitebait, and throw them into plenty of boiling lard. As soon as they begin to take color drain thoroughly, sprinkle with salt and serve hot.

OYSTER OMELET.—Whisk four eggs to a thick froth; then add by degrees one gill of cream; beat them well together; season the eggs with pepper and salt to taste. Have ready one dozen fine oysters, cut them in half, pour the egg into a pan of hot butter, and drop the oysters over it as early as possible. Fry a light brown and serve hot.

MINING AND SCIENTIFIC PRESS

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Tule Bottle Cover.

Earl K. Cooley, of this city, has recently secured a patent through the MINING AND SCIENTIFIC PRESS Patent Agency, for a machine for making bottle covers out of tule grass. The machine consists of an endless belt, feeding to a clamp a series of lengths of the stalks of the tule grass or other rush, the clamp seizing and holding them until a series of needles with threads, carried upon a sliding frame, puncture them and string them, the thread remaining through the stalks as they are withdrawn. It also consists in hooked claws, operating intermittently and conjointly with the needles to serge the thread and prevent it from being withdrawn by the needles, and in a reciprocating knife operated by the movement of the sliding frame, to cut the threads in proper lengths as the needles recede. The invention and letters patent have been purchased by Ire S. Warring, of this city, to whom all communications can be addressed.

POCKET MAP OF THE COMSTOCK.—We received this week a pocket map of the Comstock lode, showing the latest changes up to Jan. 1st, 1875. It was compiled and drawn by Edward B. Lasalle, Topographical Engineer, room 19, Montgomery block. It is on a scale of 1200 feet to the inch. This little map was one much needed, and that it supplied a demand was proved by the sale of over 500 copies in the first three days. The map shows some 18 or 20 more locations than the other maps of the same region. A list of Washoe stocks in the Stock Boards is given, with the number of feet and shares. The map is a very convenient one, neatly prepared and bound, and, as far as we can see, seems to be correct. It is much cheaper than the large roller maps and answers every purpose as a means of reference.

An asbestos deposit is being worked on the line of the Amador canal, about ten miles above Jackson.

Big Capitals—Small Profits.

Most of the new mining companies recently organized, have been incorporated with capital stock varying from five to fifteen million dollars. Ten millions seems to be the favorite of late, and few promoters think of putting anything before the public at a less amount. Moreover, the mania to increase the capital stock of companies which have been long in existence, prevails to a greater extent than ever before. These companies increase their capitals from one and two million dollars in ten and twenty thousand shares, to five and ten millions divided into from one hundred to five hundred thousand shares. Where all this business will end can not be seen, as there is precisely no limit to the amount the capital stock may be increased on paper. But unfortunately the shares bear a proportion to the capital stock of course, and how numbers of mines which have never paid a dividend on thirty and forty thousand shares can ever pay a respectable one on a hundred or two hundred thousand shares we do not see.

It may be all very well to divide up each mine as the California, Consolidated Virginia, etc., which are supposed to contain countless millions, and the shares of which are held at such enormous prices in consequence; but there is very little real benefit in doing the same thing with dozens of other mines, which are only kept running by the expectation of striking ore.

Taking the Comstock mines for instance, which are listed on the Board: Best & Belcher, with 542 feet in the mine is divided into 100,800 shares; Belcher, with 1,040 feet, has 104,000 shares; Bullion, with 943 feet, has 100,000 shares; California, with 600 feet, has 108,000 shares; Cosmopolitan, with 1,000 feet, has 100,000; Cons. Virginia, with 710 feet, has 108,000; Crown Point, with 600 feet, has 100,000; Dayton, with 1,600 feet, has 100,000; Imperial, with only 180 feet, has 100,000; Kossuth, with 2,800 feet, has 108,000; Leviathan, with 2,000 feet, has 100,000; Mexican, with 600 feet, has 100,800; Ophir, with 675 feet, has 100,800; Silver Central Cons., with 1,500 feet, has 110,000; Sierra Nevada, with 2,640 feet, has 100,000; Whitman, with 1,800 feet, has 100,000 shares. These are the principal ones called on the Board which have more than 50,000 or 60,000 shares. It will of course be noticed that the size of the mine bears no proportion to the number of shares, and that the number of shares is not in proportion to the value of the mine.

When we come to think, however, of mines with a capital stock of \$54,000,000 divided into 540,000 shares, as will be the case with the California and Consolidated Virginia in a few weeks, it is pretty hard to base any calculations about the real value of a share, even if the ground were all pure silver. California, with 600 feet will have a capital stock of \$54,000,000 divided into 540,000 shares. This is 900 shares to a foot, making each share cover a space of ground one seventy-fifth of an inch in thickness. Thus, a man owning one share owns one seventy-fifth of an inch of the mine, and he would have to own 75 shares to own an inch out of 600 feet. With paper of ordinary thickness and each share on a separate certificate, if he set his 75 shares up on edge it would cover all he owned. If these shares sell at only \$5 or \$10 each, the mine will have to be nearly pure silver to pay any respectable dividend on the capital stock for a year. In Consolidated Virginia the buyer will own a little more ground in proportion to the share. It will have the same number of shares, and with 710 feet, will have about 760 shares to the foot, so that each share will represent an ownership of about one sixty-third of an inch in the whole mine.

This is running things pretty close, even for mining ventures; but the examples of these large mines with their immense bonanzas is not one to be followed by ordinary companies. The much maligned Emma and several other American mines owned in England, would have paid a fair profit on a reasonable capital; but when people expect mines to pay what investors expect at least—three per cent. per month—on capitals of from 10,000,000 to 50,000,000, they are unreasonable. The two mines mentioned may be exceptions; and if half what is said is true, probably will prove so; but this is no argument in favor of putting every new mine in the market with a capital stock of such enormous figures that not even the most sanguine buyers expect a fair dividend on the amount, but trust to owning a large number of shares. Times of excitement like the present are just the occasion of these moves, which of course every one knows are only intended as stock-jobbing operations. "Giving poor men a chance" is, however, too thin an excuse to be swallowed by everybody.

The miners about Ukiah, Mendocino county, have organized the Ukiah mining district, electing S. Wrentzen Recorder. The United States general mining laws were adopted. The district starts from Sanel district on the south and runs up the neighborhood of Little Lake.

W. FRANK STEWART has located a valuable claim on Mount Davidson, nine miles from Virginia City.

Eastern Mining Excitements.

What queer ideas they have about mining for gold and silver in the Eastern States. Their heads are very level on coal and iron, but when they find, or think they find, precious metals, they immediately become demented. They hunt up an "old, experienced California miner" who perhaps lived here, or worked in a mining town, and knew nothing of mining, to tell them all about it. If he has been in California, it is enough for them, and his predictions are implicitly believed. Now, not one man in 500 in this State knows anything about practical mining whatever; and nine-tenths of those who have worked in the mines here would not be competent to take charge of one. Very few men are good managers, and still fewer are the experts whose judgment as to the future of a mine may be relied on. Still these Eastern people believe anything the "California miner" tells them, especially if it is favorable.

The latest excitement we have heard of is the discovery of "six miles of silver," at Newburyport, Mass. A man named Rogers found some metal, thought it was valuable, and then studied geology and mineralogy to find out what it was. He kept his secret until he bought the land, in company with a rich farmer, paying \$350 for it. He found float and at six feet struck the "true vein." The Boston Advertiser contains a long account of the matter, which for ignorance of mining is rich, but we have only room for a few extracts:

The pieces taken from the pit, as dug by Mr. Adams, exhibited vein structure, the upper five inches being composed of galena, while the under three inches—the three inches next the supposed foot-wall—contained considerable gray copper ore or tetrahedrite, galena, quartz, copper end iron pyrites. Four specimens were assayed. The first, coarse-grained galena, assayed for silver, yielded \$56.37; and the second, fine grained galena, \$75.23 per ton; the third, a comparatively pure piece of gray copper, containing also some quartz and galena, assayed for silver, copper and incidentally for gold, yielded, of silver, \$1,270 per ton; gold, \$129 per ton; and about 27 per cent. of copper. The fourth specimen, weighing about three pounds, tried for lead, was found to be nearly pure, and hammered quite readily. The lead was 52 per cent. of the whole matter. The mine has been bonded for \$100,000.

The Advertiser then goes on to state that systematic mining operations were commenced by sinking a shaft ten feet square. "As the shaft increased in depth the vein, which is what is known as a fissure vein—that is, metal between two walls of granite, where, in all probability it was thrown by volcanic action—the vein broadened from three feet at the surface to seven feet at present working—twenty-five feet down. As the men descend the vein grows richer and purer, the proportion of silver and gold increasing, while that of the lead remains about the same. The south wall has not yet been reached. The men are therefore working on the pure metal, the north wall being perfectly perpendicular. In consequence of this fact, which is totally without a parallel in mining history, there is but the smallest possible expense incurred in removing the ore—about \$1 per ton. About ten tons are taken out, being hoisted up in buckets every twenty-four hours. To work this quantity only four men are required by day, and a relieving gang of equal number by night. This ore, which is piled in a storehouse, as at present mined, yields \$90 per ton of silver, \$70 of lead, and \$11 of gold; a total of \$171. The cost of smelting and separating is \$20 per ton, so the profit is \$150 per ton. Another shaft has been sunk almost as deep as the other, and they have a four-foot vein. They have out 125 tons of ore."

The Advertiser then gives us some figures, saying \$1,500 per day is pretty good profit, this what they expect; "and this from a single shaft only 25 feet down, without operating the drifts, or lateral veins." Mining experience, however, has demonstrated that a fissure vein is always without bottom. This vein is estimated by geologists to extend in its general direction twenty degrees east of north about six or seven miles in length. Bearing this fact in mind, the wealth to be reasonably expected from this "find" can only be estimated by comparison. The Comstock lode in Nevada, hitherto supposed to be the richest silver mine in the world, yields only \$45 per ton on the average, while that at Newburyport yields just double that. The Mariposa mines, which were sold a few years ago to a company for \$10,000,000, yielded only \$15 per ton of silver. The Belcher mines, in Colorado, which yield about \$40 per ton, divided \$900,000 among the stockholders as the profit of work during the month of August, 1874. And these mines had not the additional profits accruing from the production of lead. A correspondent of the New York Tribune describes the whole thing in nearly the same language, and that experienced Colorado and Nevada miners are going to work them in the Spring.

All this reads like a pretty good joke to us, of course, although they are evidently in earnest there. It is no exaggeration, whatever, to state that, in all probability, there are from one to five ledges per day found on this coast in different localities, but not more than one in fifty amounts to so very much after all. The

"perpendicular foot wall which is without a parallel in mining history," seems to be going to help them out with the ore, in some way not explained. We strongly suspect moreover that the "yield" spoken of is simply assay value, and when greebombs work the ore they will not get even this 60 or 70 per cent. which we obtain here. Any miner can tell what a difference there is in an assay of specimens and average yield of ore. A piece of ore from a mine may assay \$1,000 per ton and perhaps ten tons of ore crushed just as it came from the ledge may not yield \$100 for the whole ten tons. Any one who knows anything about mining will admit that this often happens. To get of any proper figures of such values, a quantity of ore—several tons—should be crushed, sampled by competent persons, and several assays made. The assays being averaged, if this ore then, will assay \$100 per ton they may be able to get from \$60 to \$80 per ton from it, according to the class of ore. These men have probably taken the best specimens for assay and build all their calculations on the result.

The Transcript says: "The Comstock lode, in Nevada hitherto supposed to be the richest silver mine in the world, yields only \$45 per ton on the average, while that at Newburyport yields just double." There is a nut to crack for the Comstockers with their big bonanza. But isn't it just a little rough to class the whole ledge as yielding \$45 per ton and take it for granted that there is only one mine. We do not know exactly how many mines there are on the Comstock, but there are 103 of them in the list of the stock boards in this city and probably several hundred more locations not listed on the boards. Consolidated Virginia and California have recently struck ore some specimens of which assay as high as \$8,000 and \$15,000 per ton, and is expected to average \$200 per ton. Mr. Dedehelme, the expert, estimates that one pillar alone in Consolidated Virginia will yield seventy millions, but the Newburyport mine is expected to excel this.

The Transcript puts the Belcher mine in Colorado instead of on the Comstock and adds that with \$40 rock it paid \$900,000 in dividends in August 1874. Now the Belcher mine only paid \$312,000 in dividends in August but it has paid \$3,504,000 in dividends during 1874. During the June quarter of the year it hoisted 47,020 tons of ore which yielded \$3,599,892, an average of \$80 per ton. The Transcript thinks that the Belcher had not the profit accruing from the additional product of lead. We do not know anything they would want less in the ore than a quantity of lead. The ore could not be milled and would have to be melted which, when fuel is as high as at Virginia, would be very expensive. Our base metal mines have not, as a general thing, been very profitable as yet.

While we cannot blame people ignorant of such matters for getting excited over rock which assays \$171 per ton, it is to be hoped that they will take the experience of other people before putting any money into "mines" of which they know nothing. Few practical miners pay much attention to what ore from a new ledge is supposed to yield, until they see what it actually yields under the stamps. The property at Newburyport is already in litigation as the man from whom the land was first bought says it was obtained from him by fraud. They may find a mine of some value there, but that it will "rival the Comstock" is simply nonsense. We have perhaps on this coast from fifty to a hundred and fifty thousand mining locations, and some of those on the Comstock are ahead of all. A new mine here is a matter of little moment and even this week we chronicle in different parts of this paper eight or ten new discoveries; but until they prove themselves paying mines, but little attention is paid to them except by the owners. We hope our Eastern friends will go slow, and not base calculations of wealth on the assay of a few specimens without taking into consideration average yield, cost of mining, working ore, etc.

They have proved one thing however, which beats us. They have proved, with a 25 ft shaft, that their vein is a true fissure. And they have also beaten us in finding ore which yields 52 per cent. lead, 27 per cent. copper, \$1270 in silver, \$129 in gold, besides the pyrites, etc. There must be very little gangue left to hold it together.

The Nevada Transcript learns that the Pittsburgh mine, owned by County Treasurer Safford and Cook Brothers, on Deadman's Flat, near Grises Valley, very rich rock has been struck. Some of it panned out as high as \$80 to the pan. The prospect is good for the development of a first-class ledge there. Another ledge has also been discovered at the same place. Some men started in to work a few days ago and found a ledge. They took out a lot of quartz and had it crushed; it yielded them \$7 per day to the hand.

The daily yield of ore during the past week from the Crown Point mine has been 550 tons, Belcher 450 tons, Consolidated Virginia 400 tons, Ophir 200 tons, Hale & Norcross 100 tons, making a total daily product of 1,750 tons of ore from the five leading Comstock mines.

"Rich strikes" are becoming remarkably frequent in the State. It is not alone gold and silver which is being brought to light in untold millions, but precious metals and minerals of all descriptions.

All the mining claims in the vicinity of North San Juan, Nevada county, have shut down for want of water.

North Pacific Coast Railroad.

The opening of a new railroad is an important event in almost any country, but in California, where we have, as yet so few roads in operation, it is even more important than in most of the other States of the Union. The State is so large, and our watercourses and rivers so few that railroads are more of a necessity with us than elsewhere; and as the interior is being rapidly settled up, railroads are being projected and built more rapidly than most people suppose. The North Pacific Coast railroad, our principal narrow gauge road, was formally opened on the 7th instant, being finished as far as Tomales, Marin county, 52 miles from Sausalito. This company was incorporated in 1871, with a capital stock of \$1,500,000 which was afterwards increased to \$3,000,000. Being a narrow gauge road the cost was very much less than would have been the case with a track of the ordinary width. From Sausalito to Tomales the distance is 52 miles, including a branch track into San Rafael. The route selected is as follows: Starting from deep water at Sausalito, where the company have constructed a large and commodious wharf, and have located their machine shops and round houses, it skirts for two miles the shore of Richardson's Bay, thence crossing an arm of the same by means of a substantial bridge 4,000 feet in length, now nearly completed. It passes through Marin county via the town of San Rafael, its county seat, to the head of Tomales Bay; thence skirting the shore of that bay to the town of Tomales; thence passing from Marin to Sonoma county, and via the towns of Valley Ford and Freestone, to the Russian River, along the south bank of which the road is located, to the point of crossing, about four miles from its mouth. From this point it follows near the coast of the ocean to the mouth of the Walhalla river, a total distance of 115 miles, the point of crossing the Russian river is 77 miles from Sausalito and 85 miles from San Francisco, and is the terminus of the first division.

The rails of the track are 3 feet apart, and the iron weighs 35 pounds to the yard. Very serious engineering difficulties were encountered, but these were overcome very successfully, at a moderate cost, with easy grades. The highest grade coming from Tomales to San Francisco, which is in the direction of the largest traffic, is 80 feet to the mile; and in the opposite direction the highest grade is 120 feet to the mile. Construction was begun in 1872, and up to the present time \$1,500,000 has been expended. This includes the purchase of the San Quentin ferry steamer, the "Clinton," and the "Contra Costa," and an expenditure of \$70,000 on the line beyond Tomales. One of the most formidable difficulties was the bridging of Richardson's Bay. This structure is 4,000 feet long. So far there are three tunnels. One of these at White's hill is 1250 feet long; another, on this side of White's hill is 200 feet long; and the third near Tomales is 130 feet long. A barge has been built that will convey 18 cars from Sausalito to San Francisco, the real terminus of the road. The present equipment for traffic is six passenger and two baggage cars, very neatly constructed by the Kimball Carriage Company; four locomotives built at Philadelphia by Baldwin & Furley, and seventy-five freight cars with 50 more in course of construction.

The country through which this road passes is a fine one. Most of it is farming and dairying land, until the road reaches Russian river, where it gets into a timber country. The dairy produce from the Point Reyes and Olema sections can all be brought by this road, and the dairying and farming interests of Tomales, Freestone, Bloomfield and Bodega, will be greatly benefited. The harbors on the coast are few and unsafe, and it has been difficult to stop at all times at Tomales. As a consequence farmers about Bloomfield, and that vicinity, have hauled their grain, potatoes, etc., to Petaluma, which is 16 miles from Bloomfield, in preference to hauling to Tomales and sending by sea to this city. All through the section traversed by this railroad they have been waiting patiently for years for a railroad, and the farmers are now naturally jubilant over its partial completion.

It is expected that the road will pay a gross income of at least \$400,000 a year after the first 12 months, and in 1876 they expect a net earning of \$200,000, as a profit on the first division of the road, which will have cost \$1,700,000. The culverts and bridges on the road are of a very substantial character, and the piling in Richardson's and earthworks at Tomales have been done in first-rate order. The curves on the road are laid out in from 8 to 17 degrees, although there is one curve of 20 degrees. In the course of next summer some changes will be made which will reduce a few of the curves and shorten the road slightly. The highest embankment on the road is 70 feet high, and the deepest cut about 40 feet. The depots at stations have not yet been built, but will be during the summer. After the road reaches Russian river it follows it to the coast and thence runs up the edge of the redwoods

of North Sonoma county to Mendocino county. This is the ultimate destination of the road, unless they see their way by that time to stretch out for the northern counties. This summer they will only attempt to reach Russian river, and will be satisfied if they carry out their expectations of getting to Knowlesville by October.

Howard Schnyler's estimate, as stated in the Post, of entire cost of the line to Knowlesville, 77 miles, including full equipment, was \$1,848,600. The actual cost of the road to Tomales, 51 miles, making with the San Rafael branch 53 miles, and the present equipment, is less than \$1,400,000, the other \$100,000 having been more than expended on earth work beyond Tomales, and the purchase of the San Quentin ferry and steamers, which were not included in his estimate. This is just \$26,415 a mile, or say, when the depots are erected and ballasting finished, \$27,000. Compared with the cost of other roads in the State, which had no such en-

Quicksilver Mining in Mexico.

We have received, through the kindness of the Mexican Consul in this city, the following items relative to quicksilver mining in Mexico from Antonio del Castillo, sub-director of the School of Mines in Mexico.

Since the epoch of scarcity of quicksilver, preceding the discovery of Guadalupe and New Almaden in 1840 and 1845 respectively, this article had not reached its present price of \$200 per quintal in Mexico. Suspension of many mills throughout the country is the natural consequence. Now and old deposits of mercury are, however, being brought into notice. Near San Felipe, State of Guanajuato various deposits are being worked, whose yield, however, cannot supply the demand from the State. Near Guadalupe, and Charcos, State of San Luis Potosi, some veins are yielding quicksilver, though not enough

The Carolina Parrot.

The Carolina parrot, or parakeet, shown in the accompanying cut, is the only one of the two hundred species of its genus, which has been found in the United States. It is restricted to the warmer parts, rarely venturing north and east of Virginia, though it visits much higher latitudes in the West. But it is abundant in the regions of its residence, namely, South Carolina, Georgia, Florida, Alabama, Louisiana, and along the Mississippi up to Kentucky.

These parakeets are exceedingly annoying to the farmers, not only in consuming, but in laying waste and destroying their grain in stacks or standing in the field. They also lay waste orchards of pear and apple trees, merely for the seeds, and this often before the fruit is ripe, when they consequently will not eat the seeds. They come in large numbers, and, though they appear to be concerned for the slaughter of their companions, they will not fly away from the deadly weapon which is destroying them; thus hundreds are often slain by the side of a single stack of grain, which they had covered so densely as to appear like a vast green carpet spread over it.

The roosting places of this species are in hollow trees, and the holes excavated by the larger species of wood-peckers. At dusk, a flock may be seen alighting against the trunk of a large sycamore or other trees having a considerable excavation within it. Alighting on the bark beneath this aperture, as many as can crawl into it do so, and the rest attach themselves by claw and bill to the exterior, and here repose throughout the night.

The flight of this bird is rapid and straight, through the forest or over rivers and fields, accompanied by inclinations of the body, which expose to view alternately the upper and under parts. They deviate from a direct course only when impediments occur, when they glide gracefully aside and continue on. They keep up a general cry when on the wing. They circle wide and high over a spot before alighting, and move with facility upon the trees, often in a sideling way; or hang in every imaginable posture. On the ground they are awkward and helpless. They are easily tamed, being subdued by repeated immersions in water. But as they cannot be educated to utter words, as their screams are very discordant, and especially as they are exceedingly destructive, they ought not to be regarded as desirable pets.

Steel Shoes and Dies.

A correspondent of the *Stock Report*, at Virginia City, writes under date of the 2d:

Considerable interest is being taken among mining men now in regard to the new steel shoes and dies recently introduced by the Cast Steel Shoe and Die company of San Francisco, and I have been examining into it a little myself. I saw to-day a battery of five shoes and dies sent to the Rhode Island mill. They were put in on the 2d of December, and have been in constant use until to-day (31 days). The shoes are worn less than one inch, and are very even. The wearing of the dies is scarcely perceptible. The foreman thinks the shoes will last four months yet. At a shop on C street they have on exhibition a die made of steel, which had been used at the Morgan mill continually for four months, and which was still in good condition, to appearances, for more stamping. I visited the Morgan mill also, and Superintendent Hanson informed me that he had used two sets of steel shoes and dies, the shoes lasting four months and the dies six. At 16 cents per pound for steel and 6½ cents for iron, he finds a great percentage in favor of steel, not taking into consideration the great gain in the increased crushing capacity, by reason of the steel wearing more evenly. Mackey & Fair have ordered a sample set for the Sacramento mill, and if they prove successful they will be introduced into every quartz mill on the Comstock.

In view of the mines already discovered and the strong presumption of other good mines in this vicinity, says the *Mendocino Dispatch*, a miners' meeting was held in Ukiah on Thursday last, at which a code of laws to govern mining in the district was adopted, and S. Wurttemberg was elected Recorder.

A SNOW SLIDE occurred near Alta City, Utah, on the 11th inst., burying to the depth of 30 feet four ore teams, and it is feared that five men were killed.

The Union gravel mining company have completed their tunnel to Kennebeck hill, Nevada county, and are taking out gold in large quantities.

The hydraulic works at the Yellow Jacket quicksilver mine, Napa county, are in full operation.

A RICH STRIKE has been made in the south drift of the Consolidated Poe mine, at Peavine.

IRON ore has been found in the mountains east of San Fernando, Los Angeles county.

LYNO claims to be the richest mineral county in California.



CAROLINA PARROT.

engineering difficulties to contend with, this is a most favorable showing.

Though no experiment, this is a sort of test road, and if the average freight and traffic reaches \$8,000, or even \$5,000 a mile per year, it will settle the future gauge of all our local lines. There are in this State hundreds of valleys which will furnish \$5,000 a mile receipts per annum. And in none of these could a costly broad gauge be made to pay even five per cent. interest per annum at any reasonable tariff of charges.

THE Stock Exchange has elected the following officers for the ensuing year: James R. Keene, President; Coll Dean, Vice President; B. Howard Coit, Chairman; Henry Schmiedell, Treasurer; Franklin Lawton, Secretary; and Thomas M. Blair, Sergeant-at-Arms.

J. P. FRIENDLEY has tendered the Willmette Valley and Coast railway a gift of ten acres of ten acres of land adjoining Corvallis for the use of the road as grounds for machine shops, turn table, depot, etc.

THE Salt Lake *Herald* thinks San Francisco and Virginia should erect a monument of silver to Comstock, the discoverer of the Washoe mines.

THE Supto tunnel is in 8,079 feet.

for the same State. In Zacatecas where there exists great demand for quicksilver, one vein has been discovered near Sainetro, though not indicating great richness.

In Durango there are extensive deposits which have been abandoned for upwards of two years, on account of the company's embarrassment and political difficulties. Some poor miners still work around these old workings and obtain a considerable amount of quicksilver which is used by the mines of Sinaloa. Rich specimens come in daily from various sections of unexplored country, promising vast discoveries. At 40 leagues from this city in Guerrero immense deposits have just been discovered bearing two minerals; one containing mercury, sulphur and antimony; the other oxide of antimony, mercury and silicate yielding 10 to 14 per cent. of quicksilver. Furnaces are needed, the present earthen vases being wholly insufficient. There is an old mine near Pregones between Tasco and Zacualpan, 50 leagues from this capital, which since the time of the Spaniards has yielded rich cinnabar. Ore four inches wide yields 70 per cent. in clay containing 10 to 20 per cent. in a well defined ledge connected with a silver-bearing ledge.

By operating the 50 known deposits, Mexico could produce 2,000,000 to 2,500,000 lbs. required for home consumption and probably have some over for export.

San Francisco Microscopical Society.

The regular meeting of the San Francisco Microscopical Society was held on Thursday evening of last week.

The Secretary announced that additions to the library had been made by the purchase of two volumes of "British Diatomaceae" and "Beck's Treatise on the Achromatic Microscope," also, additions to the object cabinet by purchase of 66 slides mounted with various objects, comprising a series of the fatty acids, bone sections, vegetable fibers, diatoms, many miscellaneous objects, and one of J. D. Moller's Diatom Type Plates. One of Nachet's prisms for oblique light with high powers, was announced as having been received, and its capabilities were tested by Mr. Hyde with satisfactory results.

Mr. Hanks donated two slides mounted by him with iodide of mercury, and some specimens of topaz, from Durango, Mexico.

Dr. Blake donated a slide mounted with a section of calcite, prepared by him from a beautiful specimen which he exhibited.

Mr. Ewing donated two slides mounted with spicules of Gorgonia, and section of spine of echinus.

Dr. Harkness donated 18 slides mounted with a fine variety of interesting objects which he had received in exchange from microscopists in Providence, R. I.

Captain John H. Mortimer sent the Society, through Mr. Kinne, a number of vials containing boilings of diatoms and other objects, from 18 different localities in various parts of the world.

Mr. Kinne stated that he had examined the contents and found most of them very rich in varieties of diatoms, polycystina and ferminifera.

Dr. Thornton presented the Society with a number of samples of soundings from Santa Barbara channel.

Dr. Harkness made some interesting statements regarding the fungus found on the scorched willows in San Mateo county, and which he reported on at some length at previous meeting, to the effect that since then he had forwarded the same to Professor Harlow, of Cambridge, and he had identified it as *molaucomis stilbostoma*—Tulane. The Doctor further stated, regarding the nostoc which he had brought before the Society previously, that it had not been identified at either Yale or Harvard, and had been sent to Paris for the opinion of the highest known authority.

The energy displayed in original investigation by many of the members of this Society is attracting attention in other localities, and their membership is increasing rapidly.

Several new proposals for resident membership were received, and the following named gentlemen were elected, having been proposed at a previous meeting, viz.: Mr. Ed. F. Hall, resident; Mr. Eugene Burgoyne, Paris, corresponding; and Dr. H. W. Harkness, honorary member.

The unanimous compliment bestowed on the last named gentleman is a deserving one, the members fully appreciating what he has done as a corresponding member in the way of giving them freely of what information he had obtained in over twenty years' microscopical research.

The Emma Mining Bubble.

For several years past the Little Emma Mining company of Utah has been a by-word in financial circles and a reproach to Americans. Unable to float the enterprise in this market, its promoters went abroad, and in the London market found people eager to jump at the bait. High hopes were entertained, but they were speedily dashed to the ground. The history of the Emma mining scheme has been too often related by Englishmen and no less indignant but shrewd Americans, to need many words here. What now remains to be told, however, is the fact that the victims in England having come to the conclusion that it was useless to waste further effort in lamentations and denunciations, have resolved upon a vigorous prosecution for the recovery of their money. With this object in view, suits have been begun on both sides of the Atlantic. In England a petition has been filed for the purpose of winding up the company. In this city, however, important proceedings have been instituted against the principals in the scheme. Upon the installation of the present Board of Directors, a committee was appointed to come to this country, inspect the property, investigate the affairs of the company, and take such action as might be necessary to secure the rights of the shareholders. General Gardiner, the chairman of the company, and Mr. Turner, his solicitor, undertook the investigation. They came to this country, visited the mines at Utah, and upon their return to New York ordered Shipman, Barlow Laroque and Macfarland to begin a suit against Trenor W. Park, Senator Stewart, of Nevada, and General Baxter for \$5,000,000, the complaint charging fraud and conspiracy.

The law firm learning that Mr. Park, who is the President of the Panama Railroad, and the promoter or owner of a new set of mines in California, was on the point of leaving this city for California, served a summons upon him to answer, and acquired jurisdiction before he had left the city. In deference to Mr. Park's request, however, no further proceedings were taken, as he wished to have his answer ready for publication simultaneously with the complaint. He has just reached San Francisco,

and it is expected that he will be absent only a few weeks. Upon his return there will be further proceedings.

General Gardiner and Solicitor Turner have returned to England, where they will report to their constituents. The principal ground of complaint on the part of the shareholders was that they had been led to expect dividends of from 70 to 80 per cent. They had only received dividends of from 1 to 1½ per cent. a month for ten months, and the dividend for the last two months of payment had been borrowed. They complain that on the strength of the promises of extraordinary dividends large sums of money were obtained from confiding shareholders.—*N. Y. Tribune, Dec. 30th.*

Mining Operations in Calaveras County.

The Calaveras *Chronicle* says: A review of the field of mining operations in this county develops a most encouraging condition of that interest. In both quartz and gravel mining the progress being made is wholly satisfactory, and the outlook for the future is as promising as could be desired. In the West Point, Mosquito, Railroad Flat and Sheep Ranch districts a greater number of ledges are being worked, more men and capital are employed and more bullion being produced than at any other time since the inception of quartz mining. Increased activity is also observable in other districts throughout the country, and we are constantly hearing of the inauguration of new enterprises. The success attendant upon the extended operations at the Gwin mine, located on the great mother lode of the country, has crystallized faith in the permanency and value of our quartz ledges, into certainty, and been the means of redoubting exertions in their development. The idea of a shaft being sunk a thousand feet upon a quartz ledge in Calaveras would have been sneered at a few years since, and yet ore is being mined at that depth in the Gwin, to day, and better than all that, the operation pays. By the prosecution of this great industry employment is furnished, directly and indirectly to a large number of hands, and a quickening impulse given to other branches of business. Leaving aside the principal fact that quartz mining in this county is now more remunerative than formerly, the next feature in importance is that the hap-hazard, unsystematic style of prosecuting it is giving place to a methodical well ordered manner of conducting operations. Quartz mining has ceased to be regarded as entirely speculative in character. Men engage in it the same as in other legitimate enterprises, with a full understanding that it can be made successful only by a careful observance of the ordinary rules of business life. A great deal of time and money has been spent in ascertaining that fact, but the lesson is well learned and its utility will be felt in the future. Quartz mining in this county is yet in its infancy, but it is an interest of sturdy growth and is rapidly developing into one of first importance.

Even greater progress is being made in gravel than in quartz mining. In this vicinity, especially, that interest has revived wonderfully during the past two years, and we believe there are more sluice-boxes set now than at any time since water was first brought to Mokelumne hill. The reduction in the price of water, the introduction of labor-saving appliances and the knowledge gained by practical experience have combined in vastly enlarging the scope of gravel mining and increasing the product of it. Claims long since pronounced exhausted and abandoned, as well as acres upon acres of ground that the superficial prospecting of early days failed to develop the richness of, are now being energetically and profitably worked. The substitution of gunpowder and hydraulic pressure for muscle in the wearing away of our gravel banks has wrought a revolution in the whole system of mining—a change that is telling every day in the unparalleled development of that interest. And yet the reinvigoration of gravel mining has but just commenced. There are square miles of gold-bearing gravel fields in this county that the hand of the miner has not yet touched—repositories of wealth that the key of enterprise can readily unlock. The future of gravel mining in this county, judging from the rapidly increasing importance of that industry, is indeed promising and encouraging. But one county in the State—Nevada—now exceeds Calaveras in the production of its gravel mines, and the day is not far distant when even that solitary exception will not have to be made.

No other section of the State offers so favorable opportunities for the investment of capital in mining enterprises as Calaveras. This county contains a very large area of mining territory, and in consequence development has been slower than in sections where the mineral belt is confined to narrower limits. The county is now just thoroughly prospected, a fact that enables men of means to step in and make investments, based upon certainties which labor alone is powerless to take advantage of. Mines known to be valuable can be purchased cheap because the owners have exhausted their means in proving the worth of their property and will be forced to relinquish the prize when it is almost within their grasp. Capital is master of the situation, and can make investments upon its own terms. The field is certainly a most inviting one, and it will be surprising if men with money to put into mining enterprises do not make Calaveras the theatre of their ventures in the future.

The new hall of the miners of Ruby Hill was dedicated on the 30th ult.

Quicksilver Production of Colusa County.

The quicksilver production of Colusa county is rapidly rising into importance. Lying in a south west direction, and about thirty-five miles distant from the town of Colusa are a number of quicksilver mines in various stages of development; a few of them are sufficiently developed to prove them to be very valuable, whilst others, though but little prospected, show satisfactory indications of their future value. These mines are situated on Sulphur creek, and in the hills bounding Bear valley on the west. The Buckeye mine ranks first in the amount of quicksilver produced. This mine has been worked by the present owners for about three years. It has yielded during the last twelve months 520 flasks of quicksilver. The mine was worked with ordinary retorts until about two months ago, when the company completed one of Knox & Osborn's patent furnaces at a cost of \$11,000. The furnace is now running on quicksilver at the rate of eighty flasks a month, and the production will soon be increased to at least one hundred flasks a month. The Abbott mine is another well known and valuable mine. It has yielded a good deal of quicksilver during the last five years though until recently it has not been worked with regularity or system. Since the present company took charge of the mine, about eight months ago, it has been thoroughly opened, and a large amount of fine ore taken out. A furnace, similar in all respects to that of the Buckeye, has been erected upon the mine, and has been in successful operation for two or three months. The Abbott had no reduction works upon it before the completion of its furnace, but its furnace has already yielded 125 flasks of quicksilver, and is now producing about like the Buckeye, with equally fair prospects for the future. The Elgin mine, with one small retort upon it, has produced, within the last five months, sixty flasks of quicksilver. The mine is being constantly worked now, and is very promising. The Manzanita mine has no reduction works.

It has, however, been worked for several years, and considerable quantities of very fine ore have been taken from it and reduced elsewhere. During the last twelve months it has produced considerable quicksilver, but we are not informed as to the number of flasks. So with four or five other mines in the immediate vicinity. Good ores have been taken from them in large or small quantities, and they have all produced some quicksilver, but we are not advised as to the quantity. On the Bear Valley range the Turner mine is conspicuous. A furnace has been erected upon this mine and is now about ready to receive ore. A large quantity of good ore has been taken out and is now awaiting reduction. The mine, we are told, is very promising. We thus have for the year's production of quicksilver in Colusa county, 705 flasks as the total amount. We may probably add to this amount 45 flasks as the production of the several other mines above mentioned, which are not credited with the specific quantity of quicksilver taken from each during the year—making, in all, 750 flasks as the total production for the year. This is certainly a showing for a mining district that was unknown outside of the immediate vicinity six months ago, and for a mining district that is as yet almost wholly unprospected. Our quicksilver mines are beginning now to attract considerable attention, and they will probably present a very different appearance twelve months hence. Intelligent gentlemen, well acquainted with cinnabar ores, have lately visited our mines, and have expressed the opinion that we have one of the richest quicksilver regions in the State. It certainly presents a fine field for enterprising men and capitalists.—*Colusa Sun.*

The new 60-stamp mill of the Virginia Consolidated Mining company was started up on Thursday evening for a trial of the machinery. Another mill of the same size will be commenced for the California mine. The Ophir company will also follow suit with a big mill, and next the Sierra Nevada with a 60-stamper.

ENCOURAGING.—It may be an encouraging fact to some one to know that Ezra Corvel, the late philanthropist millionaire, was so poor at one period of his life that the lucky finding of a (New York) shilling in the street once prevented his going dinnerless.

TALL and bulky people require more sleep than thin people. In a state of health, the amount of sleep required to restore nervous energy averages from six to eight hours. Sleep on the right side, and eat nothing heavy before retiring.

JAS. TYLER, of Tyler's ranch, about midway between Lakeport and Cloverdale, has discovered a well-defined ledge of gold-bearing quartz on the ridge that divides the waters of Russian river and Clear lake.

The mining excitement at Varyville continues at fever heat; several new ledges have been discovered and located within the past week, and the hills are full of hardy miners hunting for more.

DURING the month of December 3,143 carloads of ore, aggregating 23,000 tons were shipped over the railroad from the Comstock mines.

THE Helena (Montana) *Independent* claims that the mines of Montana now produce a much larger percentage of precious metals per capita than any other mining region in the world.

[Business Notice.]

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With brief, reliable, well chosen and prepared editorials; varied and condensed correspondence and selections; tables and statistics arranged for ready reference,

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Population of the U. S.—Census of 1870

Alabama.....	996,092	Oregon.....	90,223
Arkansas.....	481,541	Pennsylvania.....	3,221,791
California.....	560,247	Rhode Island.....	217,353
Connecticut.....	537,454	South Carolina.....	705,606
Delaware.....	125,015	Tennessee.....	1,258,520
Florida.....	187,748	Texas.....	818,579
Georgia.....	1,184,109	Vermont.....	340,551
Illinois.....	2,539,891	Virginia.....	1,225,163
Indiana.....	1,880,637	West Virginia.....	442,014
Iowa.....	1,191,792	Wisconsin.....	1,054,670
Kansas.....	364,390		
Kentucky.....	1,321,011	Total.....	38,113,253
Louisiana.....	726,916	Territories.....	
Maine.....	626,915	Arizona.....	9,668
Massachusetts.....	1,457,351	Colorado.....	39,884
Michigan.....	1,184,069	Dakota.....	14,181
Maryland.....	780,894	District Columbia.....	131,700
Minnesota.....	439,706	Idaho.....	14,099
Mississippi.....	327,922	Montana.....	20,595
Missouri.....	1,721,295	New Mexico.....	91,874
Nebraska.....	122,993	Otah.....	86,785
Nevada.....	42,491	Washington.....	23,955
New Hampshire.....	318,300	Wyoming.....	9,118
New Jersey.....	906,096		
New York.....	4,392,959	Total.....	44,789,479
North Carolina.....	1,071,361	Grand Total.....	39,555,983
Ohio.....	2,665,260		

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

—Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grains Grammes, will be sent free upon application.

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Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merit. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the muller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Sellers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

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Grain Elevators.

For shipping grain in bulk on this coast, whereby an immense sum can be saved to our producers, we need elevators to handle the grain from cars and schooners to ocean ships. Consequently, we are happy to notice that Mr. Chase, of Illinois, is now at the Cosmopolitan hotel, in this city, with plans to show what can be done in this line to cheapen our wheat transportation. The *El Paso Journal*, Ill., give the following concerning the success of his elevators elsewhere:

The new system of grain elevation, by Henry I. Chase & Co., of Peoria, to which we have often called attention in these columns, is a great success; so much so that it promises to drive the other elevators out of the market. A new house of 600,000 bushels capacity is now going up in Chicago. The parties in Kansas City, Mo., who have just finished theirs, speak in high terms of it, and wherever it has been introduced it gives the most perfect satisfaction. Its main points are: First—Economy. It costs about half an old-style elevator. Second—Simplicity. It contains little machinery, and can be run with one quarter of the force. Third—Safety. It is built on the ground, so that neither the tornadoes of the prairies nor the earthquakes of the mountains can shake it. We have seen a great many parties who have witnessed its workings, and we never saw any one yet who was not perfectly satisfied with it in every particular. Cheap, strong, simple, durable; it is destined to revolutionize the present system of grain handling in the West.

General News Items.

THE BLACK HILLS.—The avaricious gold-seekers who had defiantly pushed their way into the Black Hills country in spite of the warnings and prohibitions of the Government have been driven out by the cavalry under Capt. Henry. This is a disagreeable climate in the winter—an Iceland compared with the gold and silver fields of California. Let the expelled miners turn their steps to California, and they will find richer mining than will ever be developed east of the Rocky Mountains, in a climate unequalled even in sunny Italy, with abundance of game to satisfy all their sporting desires, together with the more substantial food and necessities of life while mining. We may remark in this connection that recent disclosures at Washington, seem to indicate that the gold reports from the Black Hills have been an artifice in favor of a country through which interested parties desire to build the Northern Pacific Railroad.

THE BREBEY INVESTIGATION.—The committee having this matter in hand have traced \$750,000 to the very doors of Congress, where it disappears in the hands of men who refuse to tell what became of it. Under these circumstances it is impossible to avoid the conclusion that some of it found its way into the pockets of members; and this conclusion brings into suspicion every member who labored or voted for the subsidy. The great mass of members cannot afford to rest under such suspicion. They must insist upon a full disclosure from those into whose hands the money has been traced, whatever the consequences may be. The order of the speaker confining Irwin to the common jail, and indicating the commencement of legal proceedings which will continue his confinement after the expiration of Congress, is a step which does no good to any one either directly or indirectly connected with this disgraceful transaction.

THE NEW CURRENCY BILL.—The bill for the resumption of specie payment which has just passed both Houses of Congress, provides:

First—A redemption of legal tenders, and of resumption of specie payments four years hence, on the 1st of January, 1879.

Second—Free banking, in the widest sense of an unlimited issue of National Bank currency.

Third—A withdrawal of 80 per cent. of the amount issued in new bank currency from the volume of greenbacks, until the amount of \$300,000,000 for United States notes is reached.

Fourth—A substitution of small silver coin for fractional currency.

Fifth—An abolition of the mint charge.

KILLED BY A FIELD ROLLER.—A severe and perhaps fatal accident occurred to Mr. Campea, of Borden, on the 4th inst. He was engaged in rolling his land, and some part of the wood-work of the rolling machine on which he was riding gave way, and he was precipitated to the earth in front of the roller, which passed over his body, crushing and mangle him in a fearful manner. The roller weighed 1,500 pounds.

THE FIRST DETENTION.—The first severe storm and cold weather during the winter occurred on Saturday night along the Union Pacific railroad. The thermometer marked 16 degrees below zero at Omaha, and 26 below at Cheyenne. The westward bound Union Pacific train was eleven hours late at Green River on Saturday evening.

COMING TO AMERICA.—It is said that Emilio Castellar, the eminent statesman and Republican leader of Spain is coming to this country. He will meet with a warm reception here. Spain, under its present regime can have but little attraction for him—even if he could remain there with safety to his person.

RECIPROCITY WITH HAWAII.—Dispatches from Washington say that if the negotiators act promptly in settling up the details of the Hawaiian reciprocity treaty upon such a general character as is understood to be contemplated, there is no doubt of its prompt ratification by the Senate.

SCOTT'S RAILROAD BILL.—Efforts are being made in Congress to have Tom Scott's bill amended so as to connect the Texas Pacific railroad with the Central Pacific railroad at Fort Yums, and thus leave the latter undisputed control of the great route with California.

ACCIDENTS AT THE PALACE HOTEL.—Several accidents occurred to workmen by falling from beams and scaffolding at the Palace hotel during the past week. One of the natural results of building too high.

THE HEALDSBURG FLAG. states that a fire occurred in Point Arena Thursday last, which destroyed Lyman's hotel, McMullen's saloon, Shoemaker's saloon, and a house belonging to Iverson.

RAILROAD FARES IN NEVADA.—A bill has been introduced in the Nevada Legislature for regulating railroad fares and freight tariff in that State. A lively discussion may be expected.

BANK NOTES BURNED.—Nearly \$400,000 in new National bank notes were destroyed by the burning of a postal car on Thursday of last week on the Potomac railroad.

THE BIG BEAR THAT KILLED BERRY near Sierra valley a few weeks since was dispatched last Thursday by a party of hunters. Bruin weighed 800 pounds.

THREE MEN WERE BURNED TO DEATH by the destruction by fire of the Western Hotel at Sacramento on Saturday last.

Agricultural Items.

ANGORA GOATS.—The Watsonville *Pajaronian* learns that E. R. Marsh, of San Francisco, has recently invested \$27,000 in Angora goats; also, Wm. Hall, of San José, lately purchased a lot at \$11,480; and C. S. Abbott, Flint, Bixby & Co., and B. Boswell have bought up all the stock of the Guadalupe Island company, except about 300 shares, and the stock held by Landrum & Rodgers. These men represent several million dollars, and mean business in goat raising. We may note in this connection that Landrum & Rodgers, of Watsonville, will, during the next two months, ship about 3,000 pounds of mohair to Philadelphia.

THE SANTA CLARA VALLEY AGRICULTURAL ASSOCIATION on Thursday elected the following officers for 1875: President, W. C. Wilson; Vice-Presidents, Cyrus Jones and Jessie D. Carr; Secretary, Givens George; Treasurer, C. T. Ryland; Directors, William O'Donnell and S. J. Jamison.

In the foothills of Fresno county grass and volunteer grain is so forward that it would now make good hay. A gentleman informs the *Expositor* that he cut hay on his ranch on the last day of the year, but he couldn't cure it for the want of sun.

THE LAKEPORT BEE is informed that the tobacco crop planted near Guenoc last year by A. A. Ritchie has proved successful. The crop has been cut and saved, and will be cured the coming spring.

In the vicinity of Santa Barbara, a farmer last year raised over 60,000 pounds of Florida tobacco on 30 acres of land. He has sold the same at 40 cents per pound for Eastern shipment.

It is reported that in Yuba county the cherry buds are much swollen, and that the frost has nipped a good portion of the crop.

The next annual fair of the Santa Clara Valley Agricultural Society will be held the week following the close of the State Fair.

The continued dry weather has seriously injured the volunteer potatoes growing near School House station.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., Jan. 12th, 1875.

FOR WEEK ENDING DEC. 29th, 1874.

ALMOND GRATER.—Julius Leroy, S. F., Cal.
FRUIT DRIER.—William S. Plummer, S. F., Cal.

HAY PRESS.—John Wiley, San Andrea, Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses menagerie Seal Ponds, and Skating Rink.

Industrial Items.

MANUFACTORIES AT THE SOUTH.—It is said that the cotton factories recently established at the South are the best paying industrial institutions in the country. They have proved that the fabric could be worked to more pecuniary benefit where it was grown than in those portions of the country generally known as the manufacturing districts. An important point, this, for California capitalists.

BOSTON ENTERPRISE.—Boston is showing much enterprise in further pushing out her iron arms for the trade of the West. A special committee of the Massachusetts Legislature is now examining the terminal facilities of the Baltimore and Ohio Railroad company, for the purpose of legislative action in making South Boston flats the terminus of a through railroad line from the West to that seaboard.

TUNNELING THE NIAGARA.—A plan for tunneling the Niagara river at Buffalo has been prepared by William Wallace, an engineer of that city, who estimates the cost at about \$1,500,000.

SHIP BUILDING at Vallejo is proving a great success. A fine schooner was launched on Saturday last for which \$32,000 has already been offered.

The Palace hotel will formally open about the 1st of September next. A hundred miles of telegraph wire are in use to connect the rooms with the office.

A JOINT stock company has constructed skating rink at Winnemucca. Perhaps, however, this may not be considered an industrial item.

SURVEYORS are at work on the survey of the proposed narrow gauge railroad from Pescadero to Pigeon Point.

The Sacramento angarie has just erected a large two-story building for a distillery and potash factory.

The proprietors of the Marysville Foundry will soon establish a branch establishment at Chico.

The California Chemical Paint company has increased its stock from \$150,000 to \$2,000,000.

A box factory has been started at Nevada City.

TEMPTING DEATH.—Every man or woman afflicted with a cough or cold, which he or she takes no measures to arrest, is tempting death. There is no drug store in the land where *Hale's Honey of Horchound and Tar* may not be procured, and there is no ailment of the lungs or throat tending to consumption or bronchitis, which it is not competent to cure. Do not suffer cold to accumulate on cold, but arrest the first symptoms of pulmonary disease, and tone and invigorate the breathing organs with this wonderful remedy. *Pike's Tooth-Ache Drops*—Cure in one minute.

METALS.

WEDNESDAY M., Jan. 13, 1875.

The only change given is in Quicksilver, for which see table below.

American Pig Iron, 3 ton	46 00
Scotch Pig Iron, 3 ton	42 00
White Pig, 3 ton	46 00
Oregon Pig, 3 ton	46 00
Refined Bar, bad assortment, 3 D.	3 75
Refined Bar, good assortment, 3 D.	4 00
Boiler, No. 1 to 4	5 50
Plate, No. 5 to 8	5 50
Sheet, No. 10 to 13	5 50
Sheet, No. 14 to 20	5 50
Sheet, No. 24 to 27	08 09
Horse Shoes, per pair	7 50
Nail Rod	10 00
Norway Iron	9 00
Roller Iron	6 00
Other Irons for Blacksmiths, Miners, etc.	4 75
COPPER.	
Braziers	31 00
Copper Tie Rods	45 00
O. K. Pat.	50 00
Sheathing, 3 D.	50 00
Sheathing, Yellow	25 00
Shedding, Old Yellow	24 00
Composition Nails	24 00
Composition Bolts	24 00
TIN PLATES.	
Plates, Charcoal, 1X box	13 00
Plates, 1 O Charcoal	12 00
Roofing Plates	12 50
Bacon Tin, 3 D.	32 00
Sheet, 3 D.	25 00
Anderson & Woods' American Cast	16 00
Drill	16 00
Simon, 20 Kil. doz.	60 00
Powder Steel	9 00
Zinc	11 00
Zinc Sheet	11 75
Nails—Aborted steel	4 25
QUICKSILVER, per lb.	1 50

LEATHER.

WEDNESDAY M., Jan. 13, 1875.

This commodity remains steady and the figures are unchanged from those of last week's report.

City Tanned Leather, 3 D.	25 00
Santa Cruz Leather, 3 D.	25 00
Country Leather, 3 D.	24 30
Stockton Leather, 3 D.	25 00
Jodot, 8 Kil. per doz.	50 00
Jodot, 11 to 19 Kil. per doz.	50 00
Jodot, second choice, 11 to 16 Kil. doz.	55 00
Jodot, 3 Kil. per doz.	50 00
Cornellian Females, 12 to 13.	63 00
Cornellian Females, 14 to 15 Kil.	71 00
Cornellian Females, 16 to 17, kil.	73 00
Simon, 15 Kil. doz.	61 00
Simon, 18 Kil. doz.	63 00
Simon, 20 Kil. doz.	65 00
Simon, 24 Kil. doz.	72 00
Simon, 28 Kil. doz.	73 00
Simon, 32 Kil. doz.	75 00
Simon, 36 Kil. doz.	77 00
Simon, 40 Kil. doz.	79 00
Simon, 44 Kil. doz.	81 00
Simon, 48 Kil. doz.	83 00
Simon, 52 Kil. doz.	85 00
Simon, 56 Kil. doz.	87 00
Simon, 60 Kil. doz.	89 00
Simon, 64 Kil. doz.	91 00
Simon, 68 Kil. doz.	93 00
Simon, 72 Kil. doz.	95 00
Simon, 76 Kil. doz.	97 00
Simon, 80 Kil. doz.	99 00
Simon, 84 Kil. doz.	101 00
Simon, 88 Kil. doz.	103 00
Simon, 92 Kil. doz.	105 00
Simon, 96 Kil. doz.	107 00
Simon, 100 Kil. doz.	109 00
Simon, 104 Kil. doz.	111 00
Simon, 108 Kil. doz.	113 00
Simon, 112 Kil. doz.	115 00
Simon, 116 Kil. doz.	117 00
Simon, 120 Kil. doz.	119 00
Simon, 124 Kil. doz.	121 00
Simon, 128 Kil. doz.	123 00
Simon, 132 Kil. doz.	125 00
Simon, 136 Kil. doz.	127 00
Simon, 140 Kil. doz.	129 00
Simon, 144 Kil. doz.	131 00
Simon, 148 Kil. doz.	133 00
Simon, 152 Kil. doz.	135 00
Simon, 156 Kil. doz.	137 00
Simon, 160 Kil. doz.	139 00
Simon, 164 Kil. doz.	141 00
Simon, 168 Kil. doz.	143 00
Simon, 172 Kil. doz.	145 00
Simon, 176 Kil. doz.	147 00
Simon, 180 Kil. doz.	149 00
Simon, 184 Kil. doz.	151 00
Simon, 188 Kil. doz.	153 00
Simon, 192 Kil. doz.	155 00
Simon, 196 Kil. doz.	157 00
Simon, 200 Kil. doz.	159 00
Simon, 204 Kil. doz.	161 00
Simon, 208 Kil. doz.	163 00
Simon, 212 Kil. doz.	165 00
Simon, 216 Kil. doz.	167 00
Simon, 220 Kil. doz.	169 00
Simon, 224 Kil. doz.	171 00
Simon, 228 Kil. doz.	173 00
Simon, 232 Kil. doz.	175 00
Simon, 236 Kil. doz.	177 00
Simon, 240 Kil. doz.	179 00
Simon, 244 Kil. doz.	181 00
Simon, 248 Kil. doz.	183 00
Simon, 252 Kil. doz.	185 00
Simon, 256 Kil. doz.	187 00
Simon, 260 Kil. doz.	189 00
Simon, 264 Kil. doz.	191 00
Simon, 268 Kil. doz.	193 00
Simon, 272 Kil. doz.	195 00
Simon, 276 Kil. doz.	197 00
Simon, 280 Kil. doz.	199 00
Simon, 284 Kil. doz.	201 00
Simon, 288 Kil. doz.	203 00
Simon, 292 Kil. doz.	205 00
Simon, 296 Kil. doz.	207 00
Simon, 300 Kil. doz.	209 00
Simon, 304 Kil. doz.	211 00
Simon, 308 Kil. doz.	213 00
Simon, 312 Kil. doz.	215 00
Simon, 316 Kil. doz.	217 00
Simon, 320 Kil. doz.	219 00
Simon, 324 Kil. doz.	221 00
Simon, 328 Kil. doz.	223 00
Simon, 332 Kil. doz.	225 00
Simon, 336 Kil. doz.	227 00
Simon, 340 Kil. doz.	229 00
Simon, 344 Kil. doz.	231 00
Simon, 348 Kil. doz.	233 00
Simon, 352 Kil. doz.	235 00
Simon, 356 Kil. doz.	237 00
Simon, 360 Kil. doz.	239 00
Simon, 364 Kil. doz.	241 00
Simon, 368 Kil. doz.	243 00
Simon, 372 Kil. doz.	245 00
Simon, 376 Kil. doz.	247 00
Simon, 380 Kil. doz.	249 00
Simon, 384 Kil. doz.	251 00
Simon, 388 Kil. doz.	253 00
Simon, 392 Kil. doz.	255 00
Simon, 396 Kil. doz.	257 00
Simon, 400 Kil. doz.	259 00
Simon, 404 Kil. doz.	261 00
Simon, 408 Kil. doz.	263 00
Simon, 412 Kil. doz.	265 00
Simon, 416 Kil. doz.	267 00
Simon, 420 Kil. doz.	269 00
Simon, 424 Kil. doz.	271 00
Simon, 428 Kil. doz.	273 00
Simon, 432 Kil. doz.	275 00
Simon, 436 Kil. doz.	277 00
Simon, 440 Kil. doz.	279 00
Simon, 444 Kil. doz.	281 00
Simon, 448 Kil. doz.	283 00
Simon, 452 Kil. doz.	285 00
Simon, 456 Kil. doz.	287 00
Simon, 460 Kil. doz.	289 00
Simon, 464 Kil. doz.	291 00
Simon, 468 Kil. doz.	293 00
Simon, 472 Kil. doz.	295 00
Simon, 476 Kil. doz.	297 00
Simon, 480 Kil. doz.	299 00
Simon, 484 Kil. doz.	301 00
Simon, 488 Kil. doz.	303 00
Simon, 492 Kil. doz.	305 00
Simon, 496 Kil. doz.	307 00
Simon, 500 Kil. doz.	309 00
Simon, 504 Kil. doz.	311 00
Simon, 508 Kil. doz.	313 00
Simon, 512 Kil. doz.	315 00
Simon, 516 Kil. doz.	317 00
Simon, 520 Kil. doz.	319 00
Simon, 524 Kil. doz.	321 00
Simon, 528 Kil. doz.	323 00
Simon, 532 Kil. doz.	325 00
Simon, 536 Kil. doz.	327 00
Simon, 540 Kil. doz.	329 00
Simon, 544 Kil. doz.	331 00
Simon, 548 Kil. doz.	333 00
Simon, 552 Kil. doz.	335 00
Simon, 556 Kil. doz.	337 00
Simon, 560 Kil. doz.	339 00
Simon, 564 Kil. doz.	341 00
Simon, 568 Kil. doz.	343 00
Simon, 572 Kil. doz.	345 00
Simon, 576 Kil. doz.	347 00
Simon, 580 Kil. doz.	349 00
Simon, 584 Kil. doz.	351 00
Simon, 588 Kil. doz.	353 00
Simon, 592 Kil. doz.	355 00
Simon, 596 Kil. doz.	357 00
Simon, 600 Kil. doz.	359 00
Simon, 604 Kil. doz.	361 00
Simon, 608 Kil. doz.	363 00
Simon, 612 Kil. doz.	365 00
Simon, 616 Kil. doz.	367 00
Simon, 620 Kil. doz.	369 00
Simon, 624 Kil. doz.	371 00
Simon, 628 Kil. doz.	373 00
Simon, 632 Kil. doz.	375 00
Simon, 636 Kil. doz.	377 00
Simon, 640 Kil. doz.	379 00
Simon, 644 Kil. doz.	381 00
Simon, 648 Kil. doz.	383 00
Simon, 652 Kil. doz.	385 00
Simon, 656 Kil. doz.	387 00
Simon, 660 Kil. doz.	389 00
Simon, 664 Kil. doz.	391 00
Simon, 668 Kil. doz.	393 00
Simon, 672 Kil. doz.	395 00
Simon, 676 Kil. doz.	397 00
Simon, 680 Kil. doz.	399 00
Simon, 684 Kil. doz.	401 00
Simon, 688 Kil. doz.	403 00
Simon, 692 Kil. doz.	405 00
Simon, 696 Kil. doz.	407 00
Simon, 700 Kil. doz.	409 00
Simon, 704 Kil. doz.	411 00
Simon, 708 Kil. doz.	413 00
Simon, 712 Kil. doz.	415 00
Simon, 716 Kil. doz.	417 00
Simon, 720 Kil. doz.	419 00
Simon, 724 Kil. doz.	421 00
Simon, 728 Kil. doz.	423 00
Simon, 732 Kil. doz.	425 00
Simon, 736 Kil. doz.	427 00
Simon, 740 Kil. doz.	429 00
Simon, 744 Kil. doz.	431 00
Simon, 748 Kil. doz.	433 00
Simon, 752 Kil. doz.	435 00
Simon, 756 Kil. doz.	437 00
Simon, 760 Kil. doz.	439 00
Simon, 764 Kil. doz.	441 00
Simon, 768 Kil. doz.	443 00
Simon, 772 Kil. doz.	445 00
Simon, 776 Kil. doz.	447 00
Simon, 780 Kil. doz.	449 00
Simon, 784 Kil. doz.	451 00
Simon, 788 Kil. doz.	453 00
Simon, 792 Kil. doz.	455 00
Simon, 796 Kil. doz.	457 00
Simon, 800 Kil. doz.	459 00
Simon, 804 Kil. doz.	461 00
Simon, 808 Kil. doz.	463 00
Simon, 812 Kil. doz.	465 00
Simon, 816 Kil. doz.	467 00
Simon, 820 Kil. doz.	469 00
Simon, 824 Kil. doz.	471 00
Simon, 828 Kil. doz.	473 00
Simon, 832 Kil. doz.	475 00
Simon, 836 Kil. doz.	477 00
Simon, 840 Kil. doz.	479 00
Simon, 844 Kil. doz.	481 00
Simon, 848 Kil. doz.	483 00
Simon, 852 Kil. doz.	485 00
Simon, 856 Kil. doz.	487 00
Simon, 860 Kil. doz.	489 00
Simon, 864 Kil. doz.	491 00
Simon, 868 Kil. doz.	493 00
Simon, 872 Kil. doz.	495 00
Simon, 876 Kil. doz.	497 00
Simon, 880 Kil. doz.	499 00
Simon, 884 Kil. doz.	501 00
Simon, 888 Kil. doz.	503 00
Simon, 892 Kil. doz.	505 00
Simon, 896 Kil. doz.	507 00
Simon, 900 Kil. doz.	509 00
Simon, 904 Kil. doz.	511 00
Simon, 908 Kil. doz.	513 00
Simon, 912 Kil. doz.	515 00
Simon, 916 Kil. doz.	517 00
Simon, 920 Kil. doz.	519 00
Simon, 924 Kil. doz.	521 00
Simon, 928 Kil. doz.	523 00
Simon, 932 Kil. doz.	525 00
Simon, 936 Kil. doz.	527 00
Simon, 940 Kil. doz.	529 00
Simon, 944 Kil. doz.	531 00
Simon, 948 Kil. doz.	533 00
Simon, 952 Kil. doz.	535 00
Simon, 956 Kil. doz.	537 00
Simon, 960 Kil. doz.	539 00
Simon, 964 Kil. doz.	541 00
Simon, 968 Kil. doz.	543 00
Simon, 972 Kil. doz.	545 00
Simon, 976 Kil. doz.	547 00
Simon, 980 Kil. doz.	549 00
Simon, 984 Kil. doz.	551 00
Simon, 988 Kil. doz.	553 00
Simon, 992 Kil. doz.	555 00
Simon, 996 Kil. doz.	557 00
Simon, 1000 Kil. doz.	559 00
Simon, 1004 Kil. doz.	561 00
Simon, 1008 Kil. doz.	563 00
Simon, 1012 Kil. doz.	565 00
Simon, 1016 Kil. doz.	567 00
Simon, 1020 Kil. doz.	569 00
Simon, 1024 Kil. doz.	571 00
Simon, 1028 Kil. doz.	573 00
Simon, 1032 Kil. doz.	575 00
Simon, 1036 Kil. doz.	577 00
Simon, 1040 Kil. doz.	579 00
Simon, 1044 Kil. doz.	581 00
Simon, 1048 Kil. doz.	583 00
Simon, 1052 Kil. doz.	585 00
Simon, 1056 Kil. doz.	587 00
Simon, 1060 Kil. doz.	589 00
Simon, 1064 Kil. doz.	591 00
Simon, 1068 Kil. doz.	593 00
Simon, 1072 Kil. doz.	595 00
Simon, 1076 Kil. doz.	597 00
Simon, 1080 Kil. doz.	599 00
Simon, 1084 Kil. doz.	601 00
Simon, 1088 Kil. doz.	603 00
Simon, 1092 Kil. doz.	605 00
Simon, 1096 Kil. doz.	607 00
Simon, 1100 Kil. doz.	609 00
Simon, 1104 Kil. doz.	611 00
Simon, 1108 Kil. doz.	613 00
Simon, 1112 Kil. doz.	615 00
Simon, 1116 Kil. doz.	617 00
Simon, 1120 Kil. doz.	619 00
Simon, 1124 Kil. doz.	621 00
Simon, 1128 Kil. doz.	623 00
Simon, 1132 Kil. doz.	625 00
Simon, 1136 Kil. doz.	627 00
Simon, 1140 Kil. doz.	629 00
Simon, 1144 Kil. doz.	631 00
Simon, 1148 Kil. doz.	633 00
Simon, 1152 Kil. doz.	635 00
Simon, 1156 Kil. doz.	637 00
Simon, 1160 Kil. doz.	639 00
Simon, 1164 Kil. doz.	641 00
Simon, 1168 Kil. doz.	643 00
Simon, 1172 Kil. doz.	645 00
Simon, 1176 Kil. doz.	647 00
Simon, 1180 Kil. doz.	649 00
Simon, 1184 Kil. doz.	651 00
Simon, 1188 Kil. doz.	653 00
Simon, 1192 Kil. doz.	655 00
Simon, 1196 Kil. doz.	657 00
Simon, 1200 Kil. doz.	659 00
Simon, 1204 Kil. doz.	661 00
Simon, 1208 Kil. doz.	663 00
Simon, 1212 Kil. doz.	665 00
Simon, 1216 Kil. doz.	667 00
Simon, 1220 Kil. doz.	669 00
Simon, 1224 Kil. doz.	671 00
Simon, 1228 Kil. doz.	673 00
Simon, 1232 Kil. doz.	675 00
Simon, 1236 Kil. doz.	677 00
Simon, 1240 Kil. doz.	679 00
Simon, 1244 Kil. doz.	681 00
Simon, 1248 Kil. doz.	683 00
Simon, 1252 Kil. doz.	685 00
Simon, 1256 Kil. doz.	687 00
Simon, 1260 Kil. doz.	689 00
Simon, 1264 Kil. doz.	691 00
Simon, 1268 Kil. doz.	693 00
Simon, 1272 Kil. doz.	695 00
Simon, 1276 Kil. doz.	697 00
Simon, 1280 Kil. doz.	699 00
Simon, 1284 Kil. doz.	701 00
Simon, 1288 Kil. doz.	703 00
Simon, 1292 Kil. doz.	705 00
Simon, 1296 Kil. doz.	707 00
Simon, 1300 Kil. doz.	709 00
Simon, 1304 Kil. doz.	711 00
Simon, 1308 Kil. doz.	713 00
Simon, 1312 Kil. doz.	715 00
Simon, 1316 Kil. doz.	717 00
Simon, 1320 Kil. doz.	719 00
Simon, 1324 Kil. doz.	721 00
Simon, 1328 Kil. doz.	723 00
Simon, 1332 Kil. doz.	725 00
Simon, 1336 Kil. doz.	727 00
Simon, 1340 Kil. doz.	729 00
Simon, 1344 Kil. doz.	731 00
Simon, 1348 Kil. doz.	733 00
Simon, 1352 Kil. doz.	735 00
Simon, 1356 Kil. doz.	737 00
Simon, 1360 Kil. doz.	739 00
Simon, 1364 Kil. doz.	741 00
Simon, 1368 Kil. doz.	743 00
Simon, 1372 Kil. doz.	745 00
Simon, 1376 Kil. doz.	747 00
Simon, 1380 Kil. doz.	749 00
Simon, 1384 Kil. doz.	751 00
Simon, 1388 Kil. doz.	753 00
Simon, 1392 Kil. doz.	755 00
Simon, 1396 Kil. doz.	757 00
Simon, 1400 Kil. doz.	759 00
Simon, 1404 Kil. doz.	761 00
Simon, 1408 Kil. doz.	763 00
Simon, 1412 Kil. doz.	765 00
Simon, 1416 Kil. doz.	767 00
Simon, 1420 Kil. doz.	769 00
Simon, 1424 Kil. doz.	771 00
Simon, 1428 Kil. doz.	773 00
Simon, 1432 Kil. doz.	775 00
Simon, 1436 Kil. doz.	777 00
Simon, 1440 Kil. doz.	779 00
Simon, 1444 Kil. doz.	781 00
Simon, 1448 Kil. doz.	783 00
Simon, 1452 Kil. doz.	785 00
Simon, 1456 Kil. doz.	787 00
Simon, 1460 Kil. doz.	789 00
Simon, 1464 Kil. doz.	791 00
Simon, 1468 Kil. doz.	793 00
Simon, 1472 Kil. doz.	795 00
Simon, 1476 Kil. doz.	797 00
Simon, 1480 Kil. doz.	799 00
Simon, 1484 Kil. doz.	801 00
Simon, 1488 Kil. doz.	803 00
Simon, 1492 Kil. doz.	805 00
Simon, 1496 Kil. doz.	807 00
Simon, 1500 Kil. doz.	809 00
Simon, 1504 Kil. doz.	811 00
Simon, 1508 Kil. doz.	813 00
Simon, 1512 Kil. doz.	815 00
Simon, 1516 Kil. doz.	817 00
Simon, 1520 Kil. doz.	819 00
Simon, 1524 Kil. doz.	821 00
Simon, 1528 Kil. doz.	823 00
Simon, 1532 Kil. doz.	825 00
Simon, 1536 Kil. doz.	827 00
Simon, 1540 Kil. doz.	829 00
Simon, 1544 Kil. doz.	831 00
Simon, 1548 Kil. doz.	833 00
Simon, 1552 Kil. doz.	835 00
Simon, 1556 Kil. doz.	837 00
Simon, 1560 Kil. doz.	839 00
Simon, 1564 Kil. doz.	841 00
Simon, 1568 Kil. doz.	843 00
Simon, 1572 Kil. doz.	845 00
Simon, 1576 Kil. doz.	847 00
Simon, 1580 Kil. doz.	849 00
Simon, 1584 Kil. doz.	851 00
Simon, 1588 Kil. doz.	853 00
Simon, 1592 Kil. doz.	855 00
Simon, 1596 Kil. doz.	857 00
Simon, 1600 Kil. doz.	859 00
Simon, 1604 Kil. doz.	861 00
Simon, 1608 Kil. doz.	863 00
Simon, 1612 Kil. doz.	865 00
Simon, 1616 Kil. doz.	867 00
Simon, 1620 Kil. doz.	869 00
Simon, 1624 Kil. doz.	871 00
Simon, 1628 Kil. doz.	873 00
Simon, 1632 Kil. doz.	875 00
Simon, 1636 Kil. doz.	877 00
Simon, 1640 Kil. doz.	879 00
Simon, 1644 Kil. doz.	881 00
Simon, 1648 Kil. doz.	883 00
Simon, 1652 Kil. doz.	885 00
Simon, 1656 Kil	

7000 IN USE
BLAKE'S PATENT STEAM PUMP
FIRE PUMPS A SPECIALTY
COMPACT - POSITIVE
ADAPTED TO EVERY SITUATION
SEND FOR ILLUSTRATED CATALOGUE
GEO. F. BLAKE MFG CO.
H. P. GREGORY,
Sole Agent for the Pacific Coast, Empire Warehouse,
Beale street, near Market, San Francisco, Cal.
REMOVAL.
Pacific Lamp Manufactory.
Sole House on the Coast making a specialty of manu-
facturing all kinds of lamps, lanterns and kerosene.
NEW MINING AND MOUNTAIN LAMP.
EMIL BOE-CH,
Patent and Manufacturer,
669 Mission St., San Francisco.

RAWHIDE
BELTING, SLACING, ROPES & CHORDS
Made by **H. ROYER**
437 Brannan St. S.F.
19v27-cow-15p
GOLDEN STATE IRON WORKS.
(CO-OPERATIVE.)
PALMER, KNOX & CO.,
19 to 25
FIRST STREET, SAN FRANCISCO,
MANUFACTURE
Iron Castings and Machinery
OF ALL KINDS.
Stevenson's Patent Mould-Board Pan
THE BEST IN USE.
QUICKSILVER FURNACES, CONDENSERS, &c.
Having much experience in the business of the Re-
duction of Crea, we are prepared to advise, under-
standingly, parties about to erect Reduction Works as to
the better plans, with regard to economy and utility.
BETTER THAN MINING STOCK.
A valuable Patent for sale. No objection to taking
real estate in part payment. Residence, Washington
street on the levee. P.O., Sacramento.
jan2 bp-tf **O. A. DAVIS.**

Banking and Financial.
Gold, Legal Tenders, Exchange, Etc.
[Corrected Weekly by CHARLES SCOTTO & Co.]
SAN FRANCISCO, THURSDAY, JAN. 16, 1875.
LEGAL TENDERS in S. F. 114. W. 50 to 55 per cent.
GOLD BARS, 800. SILVER BARS, 3 per cent. discount.
MEXICAN DOLLARS, 1 1/2 and 2 per cent. discount.
EXCHANGE on N. Y., 6-10 per cent. premium for gold;
Currency, 15 per cent. On London—Banks, 4 1/2%; Com-
mercial, 50. Paris, 5 francs per dollar.
LONDON—Consols, 92 1/2 to 93 1/2; Bonds, 90 1/2; Liverpool
Wares, 7 1/2 to 10. 6 1/2.
QUICKSILVER in S. F., by the flask, per lb., \$1.50

DIVIDEND NOTICE.
Pioneer Land and Loan Association.
Bank of Savings and Deposit, No. 405 California Street,
Opposite Bank of California, Incorporated, 1859.
Guarantee Fund, \$200,000. The Eightieth Dividend
will be paid on the 5th of February. Deposits in Gold,
Silver and U. S. Currency received, and interest paid in
the same. Certificates of Deposit and Pass Books is-
sued, payable at ten days' notice, bearing ten per cent.
per annum. Ordinary Deposits, payable without notice,
nine per cent. per annum. Term Deposits receive
twelve per cent. Reports can be obtained at the Bank.
This incorporation is in its seventh year, and refers
to over two thousand and one hundred depositors for
its economical and successful management, thereby
securing the full amount of interest earned. No charge
for entrance fees or pass books. Bank open from 9
A. M. to 5 P. M. On Saturday evenings until 9.
Money to loan on approved securities.
First-class Fire and Burglar-Proof Vaults for the safe-
keeping of Treasure, Special Deposits and Trust Funds,
Bonds, Silverplate, etc.
THOS. GRAY, President.
J. C. DUNCAN, Secretary. 3-v29-3m

DIVIDEND NOTICE.
California Savings and Loan Society,
512 California Street, San Francisco, have declared a
dividend of nine and six-tenths (9.6-10) per cent. per
annum on Term Deposits and eight (8) per cent. per
annum on Ordinary Deposits, for the half year ending
31st December, 1874, free from Federal Tax, payable on and
after January 15th, 1875. By order,
3-v29-1m **D. B. OHISHOLM, Secretary.**

DIVIDEND NOTICE.
San Francisco Savings Union, 532
California Street, Cor. Wehh, for the half year ending
with December 31st, 1874, a dividend has been declared
at the rate of nine (9) per cent. per annum on Term
Deposits, and seven and one-half (7 1/2) per cent. on Or-
dinary Deposits, free of Federal Tax, payable on and
after January 15th, 1875. By order,
3-v29-1m **LOVELL WHITE, Cashier.**

DIVIDEND NOTICE.
Bank of the Western Savings and
Trust Co., San Francisco, Jan. 4th, 1875. Depositors'
Dividend—The Directors of this Corporation have this
day declared the semi-annual dividend, at the rate of
ten (10) per cent. per annum on Term Deposits and
eight (8) per cent. on Ordinary Deposits, payable on
and after January 15th, 1875, at the office of the Bank,
northeast corner of Post and Kearny streets.
F. CLAY,
Vice-President and Cashier.
H. J. BOOTH, President. 3-v9-1m

DIVIDEND NOTICE.
The Farmers' and Mechanics' Bank of
SAVINGS have declared a Dividend for the half year
ending December 31, 1874, at the rate of ten per cent.
per annum on term, eight per cent. per annum on class
one ordinary, and six per cent. per annum on class two
ordinary deposits, payable on and after January 15th,
1875. By order
3-v9-1m-hp **G. M. CONDER, Cashier.**

\$30 A DAY
Men and Women Wanted
TO SELL OUR
KING IRON.
Four Complete Irons in one. Circulars
and terms sent free. Address **S. M. WOODS,**
No. 205 Sansome Street, S. F.
State, County and Town rights for sale.
NIMROD BAULIER. **ROBERT O. HANSON.**
RICHARD C. HANSON & Co.,
Block and Pump Makers,
IMPORTERS OF ALL KINDS OF
Patent Bushings & Gearing Apparatus,
STEEL FRICTION ROLLERS,
MINING BLOCKS OF ALL DESCRIPTIONS,
PRESSED LEATHER FOR PUMPS,
Lignum Vite for Mill Purposes.
NO. 9 SPEAR STREET.
Near Market, SAN FRANCISCO.

Mining and Other Companies.

Calaveras Hydraulic Mining Company—
Location of principal place of business, San Fran-
cisco, California. Location of works, Central Hill,
Calaveras County, California.
Notice.—There are delinquent upon the following
described stock, on account of assessment, (No. 2.)
levied on the 7th day of December, 1874, the several
amounts set opposite the names of the respective
shareholders, as follows:
Names. No. Certificate. No. Shares. Amount.
W H Knight, trustee..... 3 1875 29 75
W H Knight, trustee..... 61 1875 94 75
C H Stover..... 15 500 25 00
C H Stover..... 10 500 25 00
C H Stover..... 14 500 25 00
C H Stover..... 17 375 18 75
G R Eckley..... 8 750 37 50
And in accordance with law, and an order of the
Board of Directors made on the 7th day of December,
1874, so many shares of each parcel of stock as
may be necessary will be sold at public auction at the
office of the Company, 321 Battery street, San Francisco
Cal., on Monday, the twenty-fifth day of January, 1875,
at 12 o'clock, a. m. to pay the delinquent assessment, together
with costs of advertising and expenses of sale.
Office, 321 Battery street, San Francisco, California.
(office of U. S. Internal Revenue Collector.)
POSTPONEMENT.—The date of payment of assessment
on the above described stock is postponed until Monday,
February 1st, 1875. **ABRAM SHEAR, Secretary.**

California Beet Sugar Company.—Loca-
tion of principal place of business, San Francisco, Cal-
ifornia. Location of works, Sequel, Santa Cruz County,
California.
Notice is hereby given, that at a meeting of the Board of
Directors, held on the 23d day of December, 1874, an as-
sessment of Five Dollars per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold coin, to the Secretary, at the office
of the Company, 214 California street, San Francisco, Cal.
Any stock upon which the assessment shall remain un-
paid on the 31st day of January, 1875, will be delinquent
and advertised for sale at public auction, and unless
payment is made before, will be sold on Saturday,
the 13th day of March, 1875, at 12 o'clock, a. m. to pay
the delinquent assessment, together with costs of adver-
tising and expenses of sale.
LOUIS FRANKONI, Secretary.
Office, No. 314 California street, San Francisco, Cal.

Electric Mining Company—Location of
Principal place of business, San Francisco, Cal.
Notice.—There are delinquent upon the following
described stock, on account of assessment, levied
on the twenty-eighth day of November, 1874, the
several amounts set opposite the names of the respec-
tive shareholders, as follows:
Names. No. Certificate. No. Shares. Amount.
Geo Hasen..... 301 300 15 00
C J Rader..... 302 150 7 50
C J Rader..... 303 160 8 00
C J Rader..... 300 150 7 50
C J Rader..... 330 100 5 00
C J Rader..... 332 1200 60 00
T B Wingard Trustee..... 322 50 2 50
T B Wingard Trustee..... 325 100 5 00
T B Wingard Trustee..... 347 2825 141 25
J B Houghton..... 390 50 2 50
J B Houghton..... 391 25 1 25
J B Houghton..... 392 41 2 05
J B Houghton..... 202 3 25
J B Houghton..... 314 475 23 75
Wm R McCaw..... 348 150 7 50
John Mullen..... 168 750 37 50
G W Malone..... 55 50 2 50
G W Malone..... 56 50 2 50
G W Malone..... 58 50 2 50
G W Malone..... 59 50 2 50
G W Malone..... 60 50 2 50
G W Malone..... 177 1000 50 00
G W Malone..... 205 187 9 35
G W Terrill..... 51 508 25 00
G W Terrill..... 52 50 2 50
G W Muller Trustee..... 104 100 5 00
G W Muller Trustee..... 604 150 7 50
Mrs Annie Woods..... 76 100 5 00
Mrs Annie Woods..... 131 500 25 00
Mrs Annie Woods..... 280 550 27 50
Mrs Annie Woods..... 303 147 7 35
Mrs Annie Woods..... 318 307 15 35
Mrs Annie Woods..... 345 60 3 00
Herbert Eastwood..... 102 50 2 50
Herbert Eastwood..... 224 7 35
E Wolle, Trustee..... 105 25 1 25
E Wolle, Trustee..... 113 100 5 00
E Wolle, Trustee..... 114 100 5 00
E Wolle, Trustee..... 115 100 5 00
E Wolle, Trustee..... 116 100 5 00
E Wolle, Trustee..... 117 100 5 00
E Wolle, Trustee..... 118 100 5 00
E Wolle, Trustee..... 119 100 5 00
E Wolle, Trustee..... 121 50 2 50
E Wolle, Trustee..... 122 100 5 00
E Wolle, Trustee..... 123 100 5 00
E Wolle, Trustee..... 124 50 2 50
E Wolle, Trustee..... 294 138 6 90
C W Claves..... 145 500 25 00
Joseph White..... 154 250 12 50
Joseph White..... 155 250 12 50
Joseph White..... 255 75 3 75
Louisa Thompson..... 239 50 2 50
Hannette Grant..... 240 50 2 50
Wm H Sharp..... 163 100 5 00
Wm H Sharp..... 241 15 75
M G Rader..... 317 1700 85 00
J B Weston..... 183 75 3 75
J B Weston..... 308 25 1 25
J W Wesson..... 257 175 8 75
J W Wesson..... 313 125 6 25
And in accordance with law, and an order of the
Board of Directors, made on the 28th day of November,
1874, so many shares of each parcel of said Stock as
may be necessary, will be sold at public auction at the
salesroom of Maurice Dore & Co., No. 325 Pine street,
San Francisco, on the 26th day of January, 1875, at the
hour of 12 o'clock, M. of said day, to pay said delinquent
assessment thereon, together with costs of advertising
and expenses of sale.
T. B. WINGARD, Secretary.
Office—Room 13, No. 318 California street, S. F.

Geneva Consolidated Silver Mining Com-
pany. Principal place of business, City and County of
San Francisco, State of California. Location of works,
Cherry Creek Mining District, White Pine County, Ne-
vada.
Notice is hereby given that at a meeting of the Board of
Directors, held on the 2d day of January, 1875, an as-
sessment of twenty cents per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold coin, to the Secretary, at the office
of the Company, Room 14, 392 Montgomery street, San
Francisco.
Any stock upon which this assessment shall remain un-
paid on the 8th day of February, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Monday the first
day of March, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.
J. T. MILLIKIN, Secretary.
Office—Room 14, No. 392 Montgomery street, S. F.

Gold Mountain Mining Company—Loca-
tion of works, Lower Rancheria, Amador County, Cal.
Notice is hereby given that at a meeting of the Board of
Trustees of said Company held on the 4th day of January,
1875, an assessment of twenty-five cents per share was
levied upon the capital stock of said Company, payable
immediately in United States gold coin, to the Secretary,
at 115 Leidesdorff street
Any stock upon which this assessment shall remain un-

paid on the 5th day of February, 1875, shall be deemed
delinquent, and will be duly advertised for sale at public
auction, and unless payment shall be made before, will
be sold on Saturday, the 31st day of February, 1875, to
pay the delinquent assessment together with costs of
advertising and expenses of sale. By order of the Board
of Trustees.
W. AUGS. KNAPP, Secretary.
Office.—115 Leidesdorff street, San Francisco.

"Golden Rule" Silver Mining Company—
Location of principal place of business, San Fran-
cisco, Cal.
Notice.—There are delinquent upon the following
described stock, on account of assessment levied
on the 8th day of December, 1874, the several amounts
set opposite the names of the respective shareholders,
as follows:
Names. No. Certificate. No. Shares. Amount.
J Wertheimer, Trustee..... 1 25 1 25
J Wertheimer, Trustee..... 2 25 1 25
J Wertheimer, Trustee..... 3 25 1 25
J Wertheimer, Trustee..... 4 25 1 25
John P Sanders, Trustee..... 8 50 2 50
A Meyer, Trustee..... 16 5 2 50
A Meyer, Trustee..... 17 5 2 50
John P Sanders, Trustee..... 22 100 5 00
John P Sanders, Trustee..... 23 100 5 00
Jacob Sunstatt, Trustee..... 31 20 1 00
Jacob Sunstatt, Trustee..... 41 40 2 00
Wm Small, Trustee..... 42 100 5 00
A Meyer, Trustee..... 58 100 5 00
A Meyer, Trustee..... 59 100 5 00
A Meyer, Trustee..... 60 100 5 00
A Meyer, Trustee..... 61 100 5 00
A Meyer, Trustee..... 62 100 5 00
A Meyer, Trustee..... 63 100 5 00
A Meyer, Trustee..... 64 100 5 00
A Meyer, Trustee..... 65 100 5 00
A Meyer, Trustee..... 66 100 5 00
A Meyer, Trustee..... 67 100 5 00
A Meyer, Trustee..... 68 100 5 00
F Uri, Trustee..... 11925 581 25
And in accordance with law, and an order of the
Board of Directors, made on the 15th day of De-
cember, 1874, so many shares of each parcel of said
stock as may be necessary, will be sold at public auc-
tion in front of the office of said Company, 580 Clay
street, San Francisco, on the 15th day of February, 1875,
at the hour of 2 o'clock, p. m., of said day, to pay
delinquent assessments thereon, together with costs
of advertising and expenses of sale.
K. WERTHEIMER, Secretary.
Office, 580 Clay street, San Francisco, Cal.

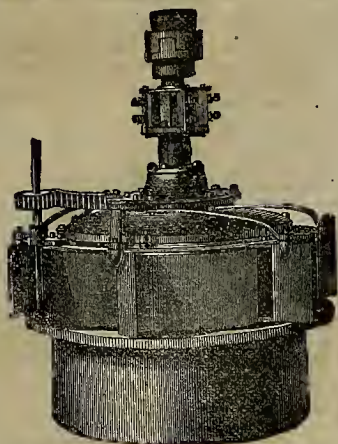
Manhattan Marble Company of California.
Location of principal place of business, San Francisco
California. Location of works, Oakland, Alameda
County, State of California.
Notice is hereby given, that at a meeting of the Direc-
tors, held on the 8th day of January, 1875, an assessment,
(No. 5) of two dollars per share was levied upon the cap-
ital stock of the corporation, payable immediately in
United States gold coin, to the Secretary of the company,
at his office, Nos. 13 and 15 Fremont street, San Francisco,
California.
Any stock upon which this assessment shall remain un-
paid on the 20th day of February, 1875, shall be deemed
delinquent, and advertised for sale at public auction, and
unless payment is made before, will be sold on Saturday,
the 13th day of March, 1875, at 12 o'clock, a. m. to pay the
delinquent assessment, together with costs of advertising
and expenses of sale.
Office, Nos. 13 and 15 Fremont street, San Francisco,
California.

Martin & Walling Mill and Mining Com-
pany. Location of principal place of business, San
Francisco, Cal.
Notice.—There are delinquent upon the following
described stock, on account of assessment levied on
the seventh day of December, 1874, the several amounts
set opposite the names of the respective shareholders
as follows:
Names. No. Certificate. No. Shares. Amount.
Carnell, Richard..... 60 100 50 00
Cox, A. P..... 48 25 12 50
Cox, A. P..... 49 100 50 00
Finck, George..... 53 100 50 00
Finck, George..... 54 75 37 50
Gately, M..... 44 1875 937 50
Gately, M..... 45 50 25 00
Gately, M..... 51 100 50 00
Hudgin, John D..... 11 50 25 00
Hudgin, John D..... 12 100 50 00
Hudgin, John D..... 13 100 50 00
Hudgin, John D..... 14 10 5 00
Hudgin, John D..... 15 100 50 00
Hudgin, John D..... 16 100 50 00
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Hudgin, John D..... 19 100 50 00
Hudgin, John D..... 20 100 50 00
Hud. in, John D..... 21 100 50 00
Rapp, Charles..... 51 25 12 50
Turnock, Joseph..... 55 25 12 50
Tripp, J. W..... 45 100 50 00
Tripp, J. W..... 55 50 25 00
Whalen, John..... 59 800 400 00
Whalen, John..... 59 60 25 00
Williams, Robert F..... 9 1000 500 00
Williams, Robert F..... 22 100 50 00
Williams, Robert F..... 25 100 50 00
And in accordance with law, and an order of the
Board of Directors, made on the 7th day of December,
1874, so many shares of each parcel of said stock as
may be necessary, will be sold at public auction at the
office of the company, 408 California street, room 15,
San Francisco, Cal., on the 23d day of January, 1875, at
the hour of 12 o'clock, M. of said day, to pay said de-
linquent assessment thereon, together with costs of
advertising and expenses of sale.
J. W. TRIPP, Secretary.
Office, 408 California street, room 15, San Francisco,
California.

Orleans Mining Company—Location of
principal place of business, San Francisco, Cal. Loca-
tion of works, Grass Valley Township, Nevada County,
Cal.
Notice is hereby given, that at a meeting of the Trust-
ees held on the 9th day of January, 1875, an assessment
(No. 2) of one dollar (\$1) per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold coin, to the Secretary, at the office
of the company, Room 8, 315 California street, San Fran-
cisco, Cal.
Any stock upon which this assessment shall remain un-
paid on the 9th day of February, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Tuesday, the 2d
day of March, 1875, to pay the delinquent assessment, to-
gether with costs of advertising and expenses of sale.
J. F. NESMITH, Secretary.
Office—Room 8, No. 315 California street, S. F.

Page Tunnel Company.—Location of
principal place of business, San Francisco, California.
Location of works, Big Cottonwood District, Salt Lake
County, Utah.
Notice is hereby given, that at a meeting of the Direc-
tors, held on the 12th day of December, 1874, an assess-
ment of five cents per share was levied upon the capital
stock of the corporation, payable immediately in United
States gold coin, to the Secretary, at the office of the
Company, Room 2, No. 408 California street, San Francisco
California.
Any stock upon which this assessment shall remain un-
paid on the 20th day of January, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on the 20th day of Feb-
ruary, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.
JACOB HARDY, Secretary.
Office, Room 2, No. 408 California street, San Francisco,
California. dec19-4t

Mining Machinery.

THE
AMERICAN TURBINE WATER WHEEL

Recently improved and submitted to thorough scientific tests by James Emerson, showing the following useful effect of the power of the water utilized, being

THE HIGHEST RESULTS EVER KNOWN.

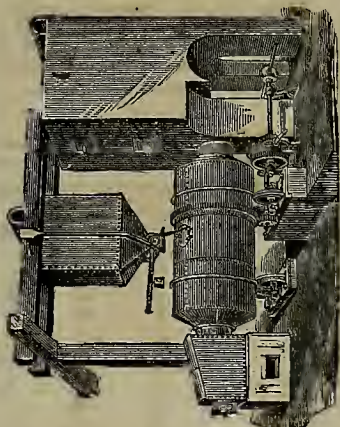
Percentage of part gate, $\frac{1}{2}$ 50.08; $\frac{3}{4}$ 69.64; $\frac{5}{8}$ 78.73
 $\frac{1}{4}$ 82.53; $\frac{1}{2}$ 82.90. Percentage of whole gate, 83.14.

Mr. Emerson says: "These are the best average results ever given by any Turbine Wheel in my experience."

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For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces; controls them with ease; adding heat or air; stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, heating the water for amalgamation and the boilers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln," for drying ore direct from the mine of breaker, saving fuel and labor heretofore necessary in drying ore for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 13, October 31, 1874. For particulars address

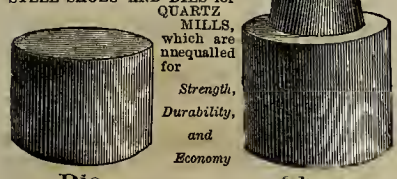
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Economy

Die.

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Will wear three times longer than any iron Shoes

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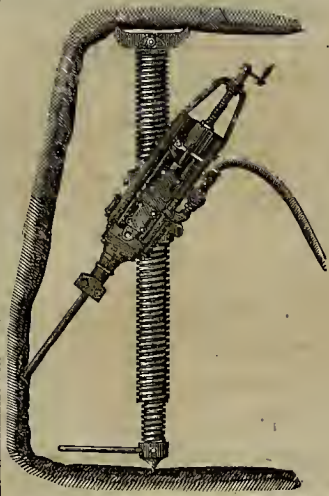
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24v17-qy

FULTON

Foundry and Iron Works.

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Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

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And all kinds of Mining Machinery.

Front Street, between N and O streets, SACRAMENTO CITY.

Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

[PATENTED MAY 26TH, 1874.]

Price Reduced to 16 Cents Per Pound.

SAN FRANCISCO, November 10th, 1874.

To Supts. of Quartz Mills and Mining Men generally:

We take pleasure in stating that owing to the rapid increase in our orders, our Pittsburgh Manufacturers have been compelled to add largely to their works—a new gas furnace and heavier trip hammer—and are thus enabled to reduce the cost of steel and at the same time produce SHOES and DIES superior to any yet manufactured. We have consequently reduced the price to 16 cents per pound and solicit a trial order, guaranteeing that you will find them at least 10 per cent. cheaper than the best iron. There are no STEEL SHOES and DIES made excepting under our patent and sold at this office, or by our authorized agents, though certain Eastern manufacturers advertise STEEL SHOES and DIES which are only cast iron hardened by the addition of a composition. They will not outwear two sets of common iron, though called steel. They are very brittle and are not capable of being tempered, dying from under the hammer like cast iron. Our STEEL SHOES and DIES are in use in many of the largest mills on the Pacific Coast, and all who have tried them pronounce them cheaper and far superior to iron in every respect, even at the old price of 20 cents per pound. Their advantages over iron are cheapness on first cost, increased crushing capacity, time saved in changing and in setting tappets, increased value of amalgam by absence of iron dust and chippings, and a saving of 75 per cent. in freight. It takes 50 days to fill orders from the manufactory East. Price 16 cents per pound shipped at San Francisco. Terms liberal.

Address all orders, with dimensions, to
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CAST STEEL SHOE & DIE CO., Room 1, Academy Building, S. F.

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Established for the Manufacture of

RAILROAD AND OTHER IRON

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Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames

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HAMMERED IRON

Of every description and size

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. box 2032, San Francisco, Cal., will receive prompt attention.

The highest price paid for Scrap Iron.

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Are prepared to make SHEET IRON and ASPHALTUM PIPE of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

24v22-3m JOSEPH MOORE, Superintendent.

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ALL KINDS OF BRASS, Composition Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Bolts and Gears of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch

PRICES MODERATE.

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and Maker of Models for Inventors. All kinds of Dies Stamps and Punches made. Also, all kinds of Small Gears Cut.

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BUCKET-PLUNGER STEAM PUMP.

ALWAYS RELIABLE.

Sole Agents for WRIGHT'S

THE SELDEN

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A. CARR, Manufacturer & Proprietor.

Patented

Aug. 2d. 1870.

Dec. 20th, 1870.



Combining simplicity and durability to a remarkable degree. Its parts are easy of access, and it is adapted to all purposes for which Steam Pumps are used.

As a Mining Pump it is Unsurpassed.

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CARR PATENT STEAM RADIATOR.

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BLACK DIAMOND FILE WORKS.



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G. & H. BARNETT,

Manufacturers of Files of every Description

Nos. 89, 41 and 43 Richmond street, Philadelphia, Pa.

Sold by all the principal hardware stores on the Pacific Coast. 18v26-1y

Brittan, Holbrook & Co., Importers of

Stoves and Metals, Tinners' Goods, Tools and Machines; 111 and 11 California St., 17 and 19 Davis St., San Francisco, and 175 J St., Sacramento.

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TREADWELL & CO.'S
(IMPROVED)
Upright Safety Engines and Boilers.
(MADE BY THE NEW YORK SAFETY STEAM POWER COMPANY.)

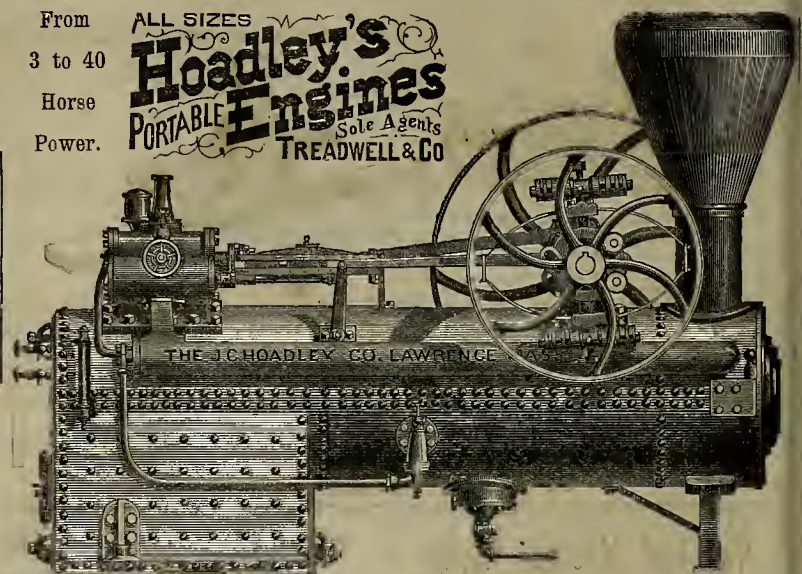
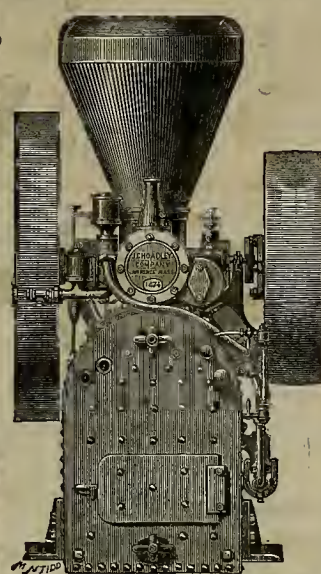
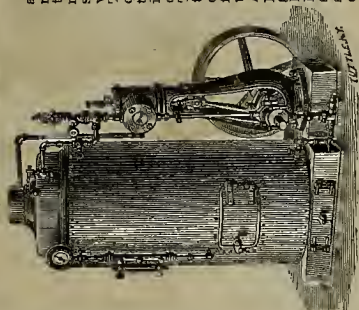
We would call particular attention to the graceful design and simple mechanism of this Engine Boiler, the form in not only pleasing to the eye, but is also, that which secures the greatest efficiency and safety in its operation. The material of the Boilers, which are of the best Tubular style, with internal are box, are of the best material and workmanship, and are all tested to 150 pounds per inch. The heating surface and area of grate are in excess of the quantities usually allowed for the same power, and it is therefore unnecessary to purchase a greater rated power than is actually required, while in cases of emergency these boilers are capable of being increased in power by the addition of the Engine is not fastened to or upon the boiler, and is therefore not affected by expansion, nor are the bearings over heated by conduction, or the heat from the boiler. The fly wheel being at the base secures perfect steadiness under the high speed which is necessary for economy of fuel. All parts are easily accessible—a great advantage. Its complete in itself as a Portable Engine and Boiler, or the Engine can be detached from the boiler, and used as a portable engine, if required. Its main points are simplicity, safety and economy. For printing offices, laundries, tanneries, ranches, small repair or machine shops, or for hoisting, wherever a small and safe power is required, they are peculiarly adapted. Over 500 are already in use.

TREADWELL & CO., Sole Agents, S. F.

THE "HOADLEY" PORTABLE STEAM ENGINE.

From
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Horse
Power.

ALL SIZES
Hoadley's
Engines
Sole Agents
TREADWELL & CO

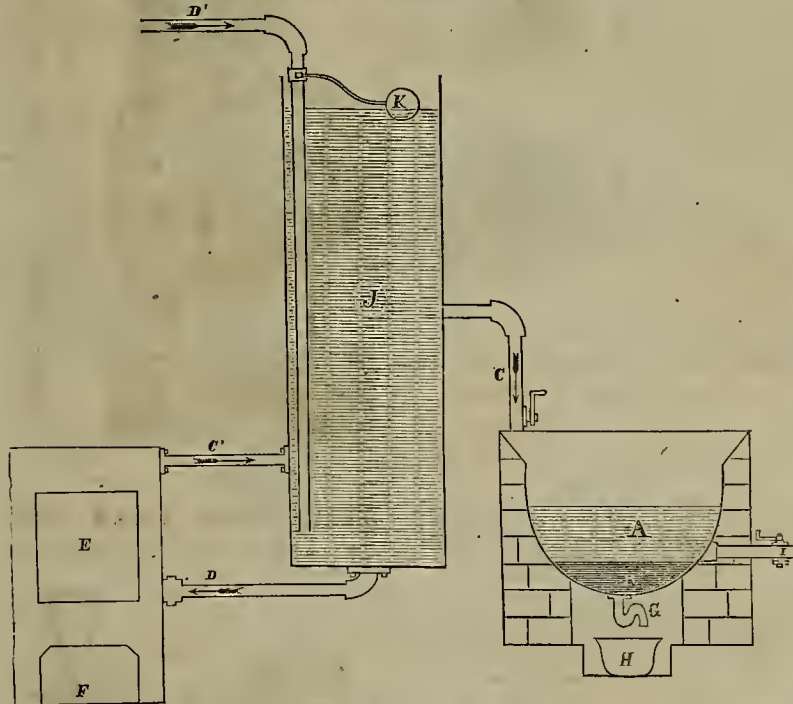


The above cuts represent the new style "HOADLEY" variable cut-off 15 Horse-Power Portable Engine. We have same style and size mounted on wheels as a Threshing Engine for the Russell End-shake Separator. We have all sizes from 3 to 40 horse-power on hand. The HOADLEY ENGINES need no recommendation from us. We have sold them in California for 20 years, and every year has added to their improvements. The last great improvement is the Cut-off Governor, thus giving them all the economy and increased power of the most thorough built stationary engine. Millmen, Mine-owners and Mining Superintendents, and all who intend buying engines, will do well to examine carefully the merits of the "HOADLEY" before purchasing. Circulars and prices sent free on application. Address

TREADWELL & CO., San Francisco.

Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.



PATENTED NOVEMBER 25th, 1873.

RANDOL AND FIEDLER'S QUICKSILVER CONDENSERS,
MADE OF WOOD AND GLASS.

Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

FIEDLER'S QUICKSILVER CONDENSERS,
MADE OF IRON.

Patented February 24th, 1874. See MINING AND SCIENTIFIC PRESS, November 15th, 1873.

For plans and rights to use, address

21v29-16p-8ow-3m

F. FIEDLER, New Almaden, Ca.

GIANT POWDER.

Patented May 26, 1868.

THE ONLY SAFE BLASTING POWDER IN USE.

GIANT POWDER, NO. 1,

For hard and wet Rock, Iron, Copper, etc., and Submarines Blasting.

GIANT POWDER, NO. 2,

For medium and seamy Rock, Lime, Marble, Sulphur, Coal, Pipe Clay and Gravel Bank Blasting, Wood, etc.

Its EXCLUSIVE use saves from 30 to 60 per cent. in expenses, besides doing the work in half the time required for black powder.

The only Blasting Powder used in Europe and the Eastern States.

BANDMANN, NIELSEN & CO.,

General Agents, No. 210 Front Street.

STURTEVANT
BLOWERS &
EXHAUST FANS
PACIFIC MACHINERY DEPOT
H.P. GREGORY
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PACIFIC MACHINERY DEPOT
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SOLE AGENT
FITCHBURG MACHINE CO'S
MACHINISTS'
TOOLS
SAN FRANCISCO

THE PACIFIC

REDUCTION WORKS.

GUIDO KUSTEL, - - - Superintendent.

WILL PURCHASE GOLD AND SILVER BEARING ORES, CUPERIFEROUS SILVER ORES, GOLD SULPHURETS, ETC., AT THE HIGHEST RATES, OR WORK THE SAME, FOR ACCOUNT OF OWNERS.

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1874. A GRAND SILVER MEDAL. 1874.



The highest and only prize of its class given to any Vertical Engine was awarded to the

HASKINS ENGINES AND BOILERS,

BY THE

MASS. CHARITABLE MECHANICS' ASSOCIATION, at their Fair in Boston, in competition with the Baxter, New York Safety Steam Power and the Sharpley Engines.

PACIFIC MACH'Y DEPOT
GUARANTEED PURE OAK TANNED
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Harper's.....	\$4 00
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Saw Smithing and Repairing
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MANUFACTURER OF

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Patent Tooth Circular Saws

They have proved to be the most durable and economical Saws in the World.

Each Saw is Warranted in every respect

Particular attention paid to construction of

Portable & Stationary Saw Mills

MILLS FURNISHED AT SHORT NOTICE
At the lowest Market Prices.

W. T. GARRATT.

CITY

Brass and Bell Founder,

Corner Natoma and Fremont Streets,
MANUFACTURERS OF

Brass, Zinc and Anti-Friction or Babbet Metal
CASTINGS.

Church and Steamboat Bells,
TAVERN AND LAND BELLS, GONGS
FIRE ENGINES, FORCE AND LIFT PUMPS.

Steam, Liquor, Soda, Oil, Water and Flange Cock and Valves of all descriptions, made and repaired. Hose and all other Joints, Spelter, Solder and Copper Rivets, etc. Gauge Cocks, Cylinder Cocks, O. Globes, Steam Whistles. HYDRAULIC PIPES AND NOZZLES for mining purposes. Iron Steam Pipe furnished with Fittings, etc. Coupling Joints of all sizes. Particular attention paid to Distillery Work. Manufacturer of "Garratt's Patent Improved Journal Metal." Highest Market Prices paid for OLD BELLS, COPPER AND BRASS.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 23, 1875.

VOLUME XXX
Number 4.

Improved Pinking Iron.

This is an ingenious and handy substitute for the old-fashioned siaking iron, or one under which the cloth is usually laid and the cutting done by pounding on the end of the tool with a hammer.

The present invention is nothing more than two cutting blades, of any desired form, attached to levers which are jointed like pincers and are operated like scissors. The upper blade does the cutting, and the lower one is made to correspond to it in shape, having its edge made, however, by beveling one side only. Both are so constructed that, when the jaws are closed, the edge of the upper blade sinks slightly below the surface of the lower tool and just back of the same, so that at each stroke the beveled parts of the blades bear against each other, and the cutting edge strikes against nothing but the fabric.

Of course the dice or blades are varied in form for different patterns, but it is considered cheaper to have an entirely separate instrument for every pattern instead of providing detachable blades.

For further particulars regarding sale of State rights, etc., address the inventor, Mrs. Eliza P. Welch, Groton, Caledonia county, Vt.

Some one might make a profitable investment, by purchasing the right to the Pacific Coast, of the above iron which evidently will be a very useful article.

Hydraulic Mining in California. No. 9.

The caved material is washed into the sluice boxes, good care being taken that an even flow is maintained and that the boxes are not over-charged. Pieces of hard gravel, clay, etc., too large to be washed through the sluice boxes, must be reduced to smaller fragments, by either the pick or the blast. For all such material as can be perforated by the churn-drill or angler, the process of blasting with giant powder No. 1 is considered the cheapest and most effective. Rocks and boulders, too large to be sent down by the sluice boxes, must be first broken up. It is to be presumed that as yet room is wanting to stack them in piles on the ground.

When efficient clearance has been made to leave ample space for the deposition of heavy boulders, tree stumps, and other rubbish, either a derrick, or wheelbarrow, or cars can be employed to remove such objects to the place of deposit. Even with abundance of room it will be advisable to go systematically to work and keep certain order in the arrangement. This plan will accustom workmen to dispose at once of any impediments for good and at the right place, and will save a great deal of work in the long run.

In working a hydraulic mine it must be the aim to secure as soon as possible a large open front, so as to occupy two, three, or more hydraulic nozzles, according to the supply of water and general capacity of the works.

These different hydraulic nozzles, being supplied from the same distributor, can open a "cross fire" upon any point within 200 feet from the nozzles and thus do excellent execution.

Should the surface of the gravel deposit be covered by a growth of brush-wood or trees it will be necessary to remove this material by cutting it down and hauling it off the ground, or piling it up and setting fire to it.

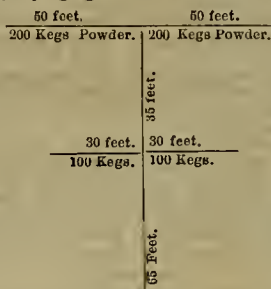
Bank Blasting.

This is resorted to either when the gravel de-

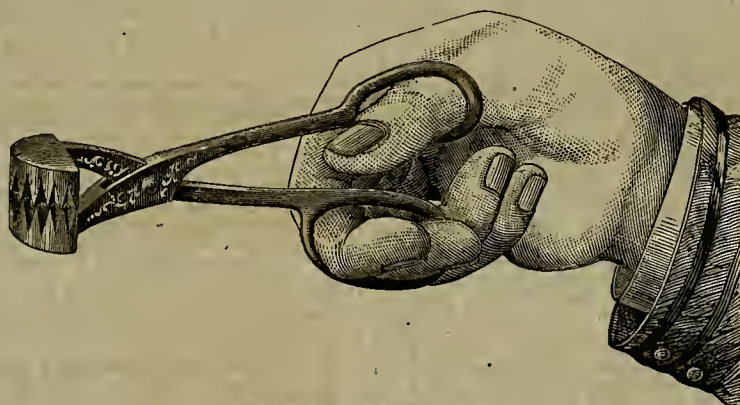
posit is so hard that it will not readily yield to the jet, or when the gravel bank is so high that the hydraulic nozzle cannot with safety, (on account of caving) be brought close enough to do good execution. The blasts may either be placed in drifts with one or more cross drifts, (T,) or in shafts with a cross-drift in the bottom, (L,) or in shafts with a wider bottom (in the shape of a bottle, the shaft forming the neck of the bottle.) The latter are generally used to blow up patches of bottom gravel. The quantity of powder used depends necessarily on the quality and extent of the ground to be blown up, and varies from a few kegs up to two thousand. Even larger blasts have been and will be made, as occasion requires. A keg of powder contains 25 pounds.

When a bank is from 80 to 100 feet high the main drift should be 100 feet long, so that a reasonable proportion may exist between the resistance offered by the top pressure and the lateral or front pressure. Thus a general upheaval results, and neither a blowing out of the front nor a partial blowing up of the top. The

from the mouth of the main drift, each arm being 30 feet long. We shall thus have the accompanying figure.



This blast fired by an electrical apparatus and ignited simultaneously at twelve or sixteen



WELCH'S PINKING IRON.

main drift should be three feet wide and four feet high, or as small as it can be worked. The side-drifts or "Ts" can be made a little larger.



Fig. 1. Nitro-Glycerine Igniter.

To secure a good effect, it is necessary to use about 600 kegs of powder for the blast, placing the contents of 400 kegs on the cross-drifts at the termini of the main drift, each arm being from 45 to 50 feet long, and the contents of 200 kegs in the cross-drifts, located about 65 feet

different points, will in all probability dislodge and crumble an area of ground, representing from fifty to sixty thousand cubic yards.

The powder should be emptied in long boxes placed in the different side-drifts, and electric fuses should be inserted, at proper distances, at least one for every 40 or 50 kegs of powder,

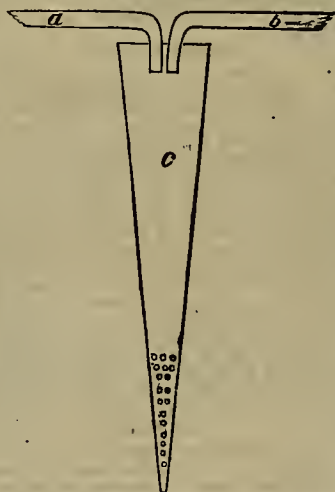


Fig. 2. Mixer for Acids and Glycerine.

which would insure the simultaneous ignition and complete combustion of the gunpowder and develop thus its whole force at once.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner on Mining Statistics.

For the year ending January 1, 1875, the Eureka mill, on the Carcon river, Wm. King, Superintendent, reduced 61,100 tons of ore, producing 80,347 pounds of bullion, worth \$3,435,131.53. The mill contains sixty stamps and the adequate amount of amalgamating machinery.

Nitro-Glycerine Compounds.

The invention of combining nitro-glycerine with other substances to furnishing a substitute for powder in blasting operations has been one of great benefit to the mining interests. The peculiar property which distinguishes this class of substances, is that fire may be applied to them without their exploding. Nitro-glycerine, if ignited in an open space is slowly decomposed with a bluish flame, but the fire goes out when the match is withdrawn. If a drop is placed on an anvil, the blow of a hammer, through the heat developed by compression causes it to explode, but only that part which has received the blow, so that the explosion in this case is only a local one.

A chief point in Noble's inventions consists in overcoming this difficulty, and he adopts two different methods of promoting its explosion. The method to be used in blasting, where evidence of explosion is of great importance, is that by which it is submitted to pressure, the most rapid source of developing heat. There are many means of attaining this impulse of explosion.

Some of these are as follows: when nitro-glycerine in tubes is surrounded by gunpowder and vice versa; by an electric current when the nitro-glycerine is enclosed on all sides, so as not to afford an escape to the gas developed by a capsule; by many chemical agents developing a gradual heat; simply by a fire; by igniters.

These igniters are shown in figure 1 of the cuts. They may be equally varied, but in their simplest form they consist of a wooden cylinder, hollow inside and filled with gunpowder, being corked at one end and connected with a fuse at the other. When the nitro-glycerine has been poured into the bore, this cylinder is let down with its fuse until the former swims in the blasting oil; then the upper part of the bore is filled with loose sand, and nothing remains but to ignite the fuse. The fuse in its turn fires the gunpowder contained in the wooden cylinder, the hot gases of the gunpowder make their escape and rush in streams into the blasting oil, of which they heat a minute part; a local detonation takes place, which as the oil cannot escape, heats it by pressure to about 360 degs., F. when it explodes through the whole blast. In the figure referred to, a, a, shows the work, b, b, the bore, c, c, the nitro-glycerine, d, d, the wooden cylinder (igniter), e, the charge of gunpowder, f, the cork, g, g, the fuse, and h, h, the shaft of loose sand.

Among other improvements of modes in the manufacture of this compound consists in rapidly mixing the whole relative quantities of acids and glycerine, which being led immediately into cold water the nitro-glycerine separates, being insoluble. The old way was by adding glycerine drop by drop to a mixture of sulphuric and nitric acid, and taking care not to raise the temperature above 32 degrees Fahr. In the method of making referred to above, where it is mixed in once, is shown in Fig. 2 of the engraving. In this a is a tube conducting the mixture of nitric and sulphuric acids into the mixing tube, c; b is a tube conducting glycerine into the mixing tube, c; c is a mixing tube wherein the re-action takes place, and is provided with small holes at the bottom, whence the mixture of acid and nitro-glycerine escapes into cold water.

THE MECHANICS' ART LECTURES.—We had prepared a summary of the lecture on the "Production of Silver Ore," delivered on Saturday evening by Prof. Becker, of the University of California, but are compelled to leave it over until next week for want of space.

New discoveries continue to be made in Peavine district, and some of the specimens sent to Virginia City give high assays. It is thought there will be considerable excitement in that vicinity next season.

THE Helena (Montana) Independent, says the miners up at Ten-mile quartz mines, in going to work, slide down that shaft on icicles. A nice slide.

CORRESPONDENCE.

Notings from Tybo, Nevada.

From the Old to the New.

EDITORS PRESS:—Old Fether Time has been instrumental in effecting a chronological change since my last letter reached the editorial seat of the Press. 1874, feeble and decrepit with age, has been borne to thosilent chambers where calmly repose the remains of its more notable and illustrious predecessors. Its course was unmarked by aught of a nature to effect the common current of our thoughts, or desert them from their everyday ploddings. If there have been no great national or physical revolutions to chronicle during its career, we have had that given to us which is infinitely better and worthier of our attention than either sanguinary wars or chaotic revolutions. A measure of prosperity has been vouchsafed to the people of this coast during its passage greater than they have ever before enjoyed.

Mining and agriculture have both flourished in a manner unprecedented in the annals of statistical production; nor have manufacturing and other interests been a whit less prosperous. The production of bullion has, as we know, largely exceeded that of any preceding year, and it is certain that the product of 1875 will be still larger. The great bonanza will soon begin to pour forth its long dormant treasures, to enrich and stimulate the commerce whose broad sails whiten the waters of the Occident, while heaving to its masts the rich products of the orient. These riches will effectually eclipse by their vastness the amounts which have been at various periods drawn from the most famous mines of either ancient or modern times. The fame heretofore so freely accorded to the Veta Madre of Central Mexico, and the San Luis Potasi, of Buenos Ayres, will not any longer be entitled to receive the homage of either our admiration or remembrance, when we come to recall the figures of Mr. Deidesheimer, which are almost beyond the capacity of ordinary arithmeticians, \$1,500,000,000 in bullion! No wonder that he thought people who saw these figures would be inclined to set him down as a crazy man, and a fit candidate for Stockton. So much for what the old year has done for the Great West; and it faded from sight, down the horizon of time. We will now turn to the affairs of the Great East.

And inquire what are its prospects for the year which has so auspiciously dawned upon it. From every camp within its borders comes the most cheering accounts. New mines are every day being developed, and old ones long idle, are being opened and worked anew, with a confidence which shows the abiding faith and enterprise of their owners. From

Eureka

There is waited to us news of a very inspiring character, and from its tenor there is every reason to believe that the great bonanza will not be allowed to quietly beer off with it all the honors to which it now aspires. The vast mineral resources of Ruby Hill are not yet exhausted. Nature has lavished her treasures with no sparing hand upon that favored locality, and the bullion returns of the three companies whose properties cover its surface area leaves ample evidence to this fact. Not one of these three companies have since their incorporation levied an assessment, and two of them, the Eureka Consolidated and the K K, have paid in hard cash to their stockholders dividends aggregating \$750,000—the former, \$700,000, the latter, \$50,000. The affairs of the last named are, however, but indifferently managed in San Francisco, otherwise its shareholders would have been able to pocket more substantial rewards. Such will continue to be the case, too, so long as self-interests and the narrow policy which they invariably produce are considered paramount to the public good. Messrs. Heggins & Tevis have never been accused of much liberality toward parties with whom they have been associated in mining. These two gentlemen at one time in its early history controlled and directed the destinies of the first named company, and the result of their administrations are well known. They also control the financial affairs of the K K to such an extent that those who know and appreciate the mine best, even though seeking cheap and profitable investments, will not touch its stock so long as they have anything to do with it. This apathy of the public is evidenced by the fact of its being hardly ever called on change nowadays. The third of these companies,

The Richmond,

Which, though stocked in London, where such things are differently managed still maintains its prestige in that great mart, being by last advices, quoted at \$36, and paying the regular dividend of 27 and 30 per cent. to its lucky share-

holders. These dates, too, could have been mysteriously increased were its concerns here only skillfully managed. But they are not, as the sequel would show, were I, at present, at all desirous of undertaking the task of pointing out wherein things are, and have been of late, mismanaged. The Richmond is, however, a great mine, and worthy of the high encomiums that are lavished upon it. The amount a bullion it produced from the 1st of September, 1873, to the ending of the financial year, 31st August, 1874, has been \$1,775,000. Out of this large sum, there were \$375,000 paid for charcoal alone, to the people of the Base Range; this, and the other expenses leaving a net revenue of \$455,000. A large proportion of these expenses have, however, been debited to construction account, for the extensive refining works which are in process of erection and nearly finished, will absorb no inconsiderable sum. The entire cost will be about \$80,000. But whether they will ever be of any greater benefit to the company than the amount of oxide of lead which they will give, for smelting purposes, is a question which has yet to be solved. Experience is a stern teacher, and experience will, without I am mistaken, prove how fallacious have been the hopes of its projector, whose pet scheme it has been all along. No matter, it gives evidence of enterprise and enlarged views, and will prove ornamental if not either useful or profitable.

The mine is in a very prosperous condition, the late strike being the richest and most important, as regards size, which has ever been made in eastern Nevada. The Richmond is in the full zenith of its glory and productiveness, and there is every probability that it will long continue so, too.

The other mines of Eureka are also doing well, and give much future promise, and I would gladly particularize them had I time and space in which to do it. It is, however, enough to say that the prospects are as good, if not better, than they have been within the memory of the writer. From

White Pine

District, distant 45 miles from Eureka, and 80 miles from Tybo, in a northeasterly course, there comes many flattering reports. This place was, at one time, the Mecca of the hopes and aspirations of the thousands, who, like the writer, bent their steps toward it in 1868 and in 1869. But, however ardent we were at the outset, neither the pilgrimage thither, nor the experience gained there, proved to be quite as consoling in their effects as those which the devout Mussulman desires from a visit to the resting place of the prophet. It is not, however, at present, devoid of interest; nor will it be, provided Capt. Drake is but as successful in the future as he has been in the past. His management of the Eberhardt and Aurora company's property during the past four years has been marked by sense, judgment, and ability of no mean order. These mines have produced in that period, a sum equal to \$1,835,000, yet the company was at one time brought to the verge of bankruptcy, by the neglect and inefficiency of its then manager, whom it is needless to name. Mr. Edward Applegarth was the vendor of this now magnificent property to an English company, and he is now one of its directors. The company is now out of debt, and extracting 50 tons of ore a day, valued at sixty dollars (\$60) per ton, and at a recent meeting debentures to the amount of fifty thousand dollars (\$50,000) were subscribed for by its members, in order to inaugurate the new year's start with full coffers. The news from Cherry Creek, Pioche, Patterson, Robinson, Pharamagot, and other places to the east and south of here, is of the most cheerful character, thus showing that the prospects for 1875 are bright and encouraging.

To come to localities nearer home, I will mention

Rattlesnake Canon,

Hot Creek district, as the first of them which I will notice, because of its greatest proximity to Tybo, being only seven miles to the northward. Some of the leading mines of this camp are owned by a New York company, whose supineness of late has been a matter of comment. It has, however, not long since again commenced active operations, with a view to push developments ahead. Much headway cannot, however, be made until hoisting and pumping machinery are supplied, and I am informed that these have been already ordered from New York. Several of the claims, which were for a length of time lying idle, were re-located on the 1st instant, by parties who mean business. I have myself received from there within the past week three samples of milling ore for assay, which I am confident, as are those who have seen them, will go away up into the hundreds, and possibly into the thousands. The

Hot Creek

District contains many distinctive features of curiosity and interest. It receives its name from a rather singular stream of hot water which flows from several boiling springs in the neighborhood, which forms a stream of considerable proportions. It takes its course through a chasm in the mountains the walls of which rise vertically several hundred feet on each side, and flows a distance of a couple of miles and disappears suddenly through the sands and alkali beds, the same as does all other streams of Nevada. The old.

Milk Spring

District is situated in the Hot Creek range 45 miles east of Belmont and twelve miles south of this camp, close to the line of the projected Palisade and Colorado railroad. Its geologi-

cal formation is of limestone, in which occurs the silver-bearing veins, whose course is north-west and southeast, and dipping, like here, to the east at an angle of 60 deg.

Comparatively little has been done toward the development of its mines, yet they have been sufficiently opened to prove them true fissure veins. The district is, however, about to be re-baptized in consequence of some new and important discoveries which lately have been made there. Whenever this interesting ceremony shall occur, I shall communicate the facts to the Press, together with the mining laws and such other data as will prove of interest to its readers. From

Belmont

We have the intelligence that work is being pushed ahead on the 300-foot level of the Belmont mine as rapidly as possible. The connection with the winze in which the new body of ore is known to have been out, will be effected early this month. When once made stoping will be commenced and the mill once more started upon this ore. Orders have been received from San Francisco to put a force of men to work on the Central Belmont mine at once. The El Dorado South Consolidated company is out with notices for bids for sinking a perpendicular shaft 100 feet—6x16 on its ledge. The Josephine and other mines are about to be started up immediately, so that the folks of our sister town may soon look for lively times.

Jefferson Canon,

Too, forty-seven miles from here, is turning out to be a place of considerable importance. The Prussian North and South mines are yielding very rich ores, and in quantities to keep the two ten-stamp mills in full blast. Their product is about \$3,000 per diem in bullion, which is shipped to the Belmont bank, and, there is in addition, a great deal of prospecting going on in every quarter of the district. The population is about 400, and the above two mines and mills employ about 150 men. The mines are rich and the future radiant, and what more does Jefferson need?

Springfield District.

This is a new district, situated on the west side of Monitor valley in this county, and about 30 miles from its seat—Belmont. The Sheba ledge is among its most important discoveries. It is from 10 to 12 feet thick, and its outcrop has been traced a distance of 5,000 feet. It is opened by shaft and tunnel, the former 80 and the latter 100 feet, along the course of the foot-wall. The ore is base, and contains in itself sufficient flux for its treatment in a cupola furnace. Experts (?) who have examined this mine, claim for it in thickness and general average, a superiority over the famous Two G mine of this place, the property of the Tybo Consolidated company. These things may be so, but whether they are or not, matters but little. Our mental equilibrium is not disturbed by the thought; nor is the importance of the Two G any the less diminished if such is the case. We are not at all envious of the Sheba, but on the contrary are delighted to have it in our power to be able to give it this gratuitous notice, and to pronounce it a worthy property into the bargain.

Having in the foregoing paragraphs given a general glance at the prospects of the west and east sections of the State for 1875, and pointed out some of the distinctive features of interest in connection with the circumjacent camps, we will now see what progress has been made in the development of the mines of Tybo, since the 4th ultimo, the date of our last article to the Press.

The Tybo Consolidated

Company's property—particularly the Two G—has been steadily and successfully worked since last writing. The vein was at that time opened to a depth of 298 feet; it is now penetrated to a depth of 323 feet, and exhibits at this point ore of a remarkably fine grade. The assay value of the two classes of ore found at this depth, is—galena, \$331—and quartz, \$56—or an average of \$198.50 per ton, thus proving the increased richness of the vein as depth is attained. The lode is now developed longitudinally 560 feet, by tunnels or adit levels one and two, which are still being driven ahead. It has, however, increased in thickness toward the deep, being now five feet in the clear between walls, and preserves with the utmost exactitude its angle of inclination. The milling and smelting ores, also, continue their course, side by side, but have reversed situations, the former now showing its affinity for the silicious lime hanging-wall, and the latter for the foot or porphyry wall. This is proper, and in accordance with the laws of gravitation.

The outlook is all that could be desired, there being now exposed in this mine alone, in the neighborhood of 60,000 tons of ore, ready for extraction and reduction. This amount would more than suffice to keep a 20-stamp mill and a 50 ton furnace in full blast for a space of two years. Explorations will, however, be pushed ahead vigorously, in order to still further test the value and productiveness of the mine.

The Lafayette

Has also been worked with success, since last notice of it, a large quantity of \$150 ore having been mined and worked. This mine, an offshoot from the mother, or Two G vein, exhibits all of its mineral and structural attributes. Active operations have also been commenced on the

Crosby

Mine, located on the extreme northwest of the lode. A new shaft is being sunk on it, through

ore of the same quality as found in the two former.

The Casket

Is at present idle, and will be until hoisting works are supplied sometime during the coming summer. This mine is opened by two shafts, which cut the vein at a depth of 65 feet each. A new shaft will, however, have to be sunk at the point of divergence of the Lsytayette from the main lode, over which the hoisting machinery is to be permanently placed, for the working of both. A new shaft through which to work the Two Grand Casket mines, has been sunk a distance of 60 feet, but had to be abandoned for the want of suitable lumber with which to line its compartments, when this is to be had, work will again be resumed upon it.

The Furnace

Shut down for much needed repairs on the 29th ultimo, having made a run of exactly 30 days, which, added to the 59 days formerly mentioned, makes 89 days altogether that it has been engaged in the production of bullion. It reduced in the last 30 days of its run 700 tons of ore which produced in the aggregate 80 tons of base bullion, valued at \$36,000, or \$4.50 per ton in gold, silver and lead. This showing is a good one and is far ahead of the last one given in the Press. Up to that time the furnace ran on the whole 59 days, reducing 1,260 tons of ore, which produced 153 tons of bullion, valued at \$62,000. Adding these two together we have a total of 89 days run, in which there were reduced 1,960 tons of ore, which yielded 233 tons of crude bullion valued at \$98,000. This is not an unfavorable showing, all things considered. With increased working facilities, this exhibit will be largely increased. With a 20-stamp mill and a couple of furnaces in full blast, as there will be next summer, we may look for prosperous times in Tybo. There are already 90 tons of the mill material to haul, and the balance is expected at an early day, so that this structure will soon add to our prosperity. J. D. P.

Tybo, Nevada, Jan. 12, 1875.

Esmeralda.

EDITORS PRESS:—It has been many years since I have seen anything in your columns relating to the once important Esmeralda mining district; and in truth there has not very much transpired in the district worth recording, although that it still possesses much importance as a "mining camp," I, in common with many others, still firmly believe.

During the great stock fever of 1862, '63 and '64, the credulous and then comparatively inexperienced people of California were most wretchedly humbugged and swindled by having wild cats of all kinds, sizes and colors palmed off upon them as genuine mines by unscrupulous stock sharps and swindlers. The result was that the reputation of "the camp" suffered by having odium cast upon the good mines as well as poor ones—or none at all. Stockholders refused to pay assessments for the purpose of prospecting the mines to any depth, and when the rich boulders, found on the surface, and the richer "bonanzas" which were found in the veins near the surface were worked out, the work stopped, and mills which cost from \$125,000 to \$250,000 have been idle from that day to this. And the fact is, the lowest depth attained in any of the works is, I think, not over 200 feet vertically.

In 1867, John D. Winters, who had a mill here, made an effort to sink deeper and prospect thoroughly the Juniata mine, located one mile easterly from this town, but he having become bankrupt by business complications elsewhere the work was stopped, while everything in and about the mine looked extremely encouraging.

Matters have remained substantially in statu quo until about three months since, when the Juniata Consolidated mining company, which owns the Juniata proper and also the once famous real Del Monte, Wide West, Pond, Ural and other lodes, started in the old works with vim and energy, under the skillful superintendence of Mr. Warren Rose. Much time has necessarily been lost in cleaning out the old shaft and drifts, as a new steam pump had to be procured, roads made, etc. But now they have arrived at a point when their work will soon tell, and all the citizens—many of whom have stood by the place through prosperity and adversity since 1860 and '61—confidently predict that in due course of time developments and discoveries will be made, which will not only richly remunerate those immediately connected with the enterprise, but will also lead to many like operations in the district. Many being of the opinion that much better locations can be found for deep prospecting than the one now under operation.

These operations will be assisted by the settlement of titles under the United States mining laws, many of the mine owners having already obtained their patents or taken steps toward that end.

The Juniata Consolidated mining company also own the large mills alluded to above. They were built by the Real del Monte and Antelope mining companies in 1863 or 1864. There is one small mill of five stamps belonging to Horace Marden & Co., which is started up and kept running semi-occasionally on small lots of ore (generally quite rich) taken out by "coasters," mostly from the old abandoned mines. More anon.

SANDFORD.

Aurora, Esmeralda Co., Nev., Jan. 6th, 1875.

SCIENTIFIC PROGRESS.

Is The Ether Matter.

Hydrogen passes through cast iron as water does through loose sand. The resistance which a cast iron ball would meet in its flight through an atmosphere of hydrogen would be scarcely appreciable. The difference in density between cast iron and hydrogen, though very great, is far from infinite; were it infinite, the resistance which either would offer to the passage of the other would be infinitely slight; to us nil. So with every other sort of matter in a medium infinitely more dense or infinitely more rare than itself. It is possible, therefore, to conceive, as Dr. Young suggests, of series of worlds of different orders, pervading each other, mutually unknown and unknowable, in the same space.

There is in this line of thought something more than purposeless speculation; and if there were not, one could hardly escape it in contemplating the theory of light now generally accepted by the scientific world, a theory involving conditions so astounding that nothing short of a new order of matter seems adequate to meet its requirements. Practically there could not be an hypothesis which would answer the requirements of a perfect hypothesis more completely than that which attributes the phenomena of light to undulations of a highly elastic medium pervading all space. It affords a reasonable explanation of every phenomenon in optics. More than that, it enables the investigator to anticipate effects which no eye has seen. Yet this most satisfying theory is based on the assumption that interstellar space which we have knowledge of, whether occupied by ordinary matter or not, is pervaded by something inconceivably more solid and elastic than steel.

Attempts have been made to dispense with the assumed ethereal basis of light by substituting therefor some excessively rare form of ordinary matter. To meet the requirements of the case, such a gas would have to be very rare indeed; at the same time it would have to possess an elastic force of at least a million million (1,000,000,000,000) times as great as the atmosphere at the earth's surface, conditions quite inconsistent with the main body of our knowledge concerning gases. If material, the physical basis of luminous undulations must be matter of an entirely different grade from anything else we know.

Any comparison between ordinary matter and anything so unlike it as the hypothetical ether must obviously be taken as suggestive rather than demonstrative; nevertheless the results of such comparisons give us, perhaps, as correct a notion of the physical basis of light as we are able to entertain. Our only clue to its possible qualities lies in the extreme rapidity with which light rays traverse it. It is understood that the velocity of wave motion depends, other things being equal, on the elasticity of the medium. Knowing the relative velocities of light and sound, Sir John Herschel calculated the necessary elasticity of the ether (in other words, the amount of force which the wave theory of light requires to be exerted at each point of space) as 1,148,000,000,000 times the elastic force of ordinary air at the surface of the earth. The atmospheric pressure is 15 pounds to the square inch; the corresponding ethereal pressure must therefore be about 17,000,000,000,000 pounds. The atmosphere counterbalances a column of mercury 30 inches high. Could it be demonstrated in a similar manner, the pressure of the ether would sustain a column of mercury six times as high as the sun!

These members give but an approximate idea of the enormous solidity of the adamantene something which the earth sweeps through at the rate of 1100 miles a minute without resistance. It pervades our bodies and we move about in it with perfect indifference. As Prof. Levens justly observes, all our ordinary notions of matter must be laid aside in contemplating conclusions like these; yet, "they are not more than the observed phenomena of light and heat force us to accept."

Regarded in the light of ordinary matter, the ether is impossible and incredible; as an extraordinary matter, or, as we have imagined, matter of a higher grade, it is consistent and reasonable. If we admit one such higher or lower grade of matter, the door is opened for the possible existence of an infinite series of them.

The contemplation of such possibilities may at least teach us not to be hasty in limiting the scope of the universe to elements such as we know.—*Scientific American*.

DANGERS OF BENZINE SCOURING.—M. Dumas, at a recent meeting of the French Academy of Science, stated that, in examining the process of scouring fabrics as usually practiced by cleaners of old clothes (washing in benzine), he had discovered a novel and dangerous cause of fire. Workmen engaged in this industry had frequently complained of the benzine becoming inflamed during the scrubbing; and in order to test the question, M. Dumas caused a piece of cashmere to be dipped in for a length of 18 feet. Every time the stuff partially emerged from the bath, while being rubbed between the hands, a sharp pricking sensation upon those members and on the face was felt; and finally sparks were emitted from the fabric, sufficient, if the scouring had been briskly continued, to have ignited the inflammable fluid.

Personal Equation.

It has been found by observation that there is a great variation in the power of different individuals to determine small intervals of time, or in the time occupied by them to become conscious of a fact passing before them. This is a matter of much importance in making astronomical observations—for instance the determination of the time of the exact contact or observation of heavenly bodies. The correction or averaging of this difference is called "Personal equation." Some years ago, at a meeting of the Albany Institute, Prof. Hough, the astronomer in charge of the Albany Observatory, read an interesting paper upon this subject, illustrating it by means of an instrument called a chronograph, which term, literally interpreted is a time-writer or an instrument for recording intervals of time. It consisted of a disk covered with white paper, and revolved by clock-work. From the center of the disk radii were drawn to the circumference, dividing the disk into equal parts, representing minute divisions of time. Over this revolving disk was placed a stylus, actuated by an electromagnet. A circuit-breaker was connected with this electro-magnet and held in the hand of the observer, whose personal equation it was desired to determine. Another disk, upon which a circular black spot was painted, was also caused to revolve by clock-work. Before it was placed in an opaque bar, which eclipsed the black spot at each revolution of the disk. The exact time at which the edge of the black spot reached the obscuration of the bar was automatically registered. The observer holding the circuit-breaker in his hand stood in front of the revolving disk, and was directed to operate the circuit-breaker in order to make the mark upon the disk the moment the black spot reached the bar. The difference in the time of registering by the observer and the automatic registering of the instrument constituted the personal equation. It varied considerably with different persons. We do not now remember what the maximum variation was, but we recollect distinctly that with some it was nearly double that of others. This difference in the power of determining precisely when an event happens, as seen by the eye, depends primarily upon peculiarities in nervous structure. It may, however, vary in the same observer from time to time. Professor Hough remarked, in his interesting paper, that he found his personal equation increased always when he felt ill.

THERMO-ELECTRICITY IN IRON SHIPS.—There is a curious point, says *Broad Arrow*, in connection with the deviation of the compass on board iron ships, which is now beginning to attract the attention of scientific men, and may therefore, perhaps, be new to some of our readers. It is now believed that some of the sudden and hitherto unaccountable changes in the deviation of the compasses of iron ships—which are often unsuspected until alleged as the only conceivable cause of the vessel running ashore—are the effects of an unequal and varying distribution of heat over the iron hull; for it is well known that electricity is generated in a metallic substance by heat applied in a certain way, and, in fact, there is a branch of electrical science called thermo-electricity, devoted to the investigation of phenomena of this kind. Sudden slight changes of compass deviation, not exceeding five degrees, have been noticed on board iron ships on the North American coast, and these are now attributed to changes in the hull, occasioned by the vessel passing from warm to cold water, and vice versa. The warm temperature of the gulf stream, taken in connection with the cold counter-current, is considered to be quite sufficient to account for many of the suspected compass errors on board iron ships.

THE ARTIFICIAL VANILLA.—We alluded a few weeks since to the fact of the discovery that the odorous principle of the vanilla beans could be obtained. We are now enabled to give the substance of the English patent that has been issued for this to Wilhelm Haarman, Ph.D., analytical chemist, Georgenstrasse, Berlin, Germany. Take, first, coniferine; or, secondly, the sap of plants mentioned above which has been purified or liberated from alumina or other impurities; or, thirdly, an extract of all those parts of the just-mentioned plants containing coniferine; or, fourthly, the products obtained from coniferine by means of fermentation, putrefaction, or similar action; and treat one another with oxidizing agents or such agents of similar action, such as bi-chromate of potassium and sulphuric acid, or any other peroxide, oxide, acid or salt, which produce the same effect. The product of the reaction in all these cases is artificial vanilla, which has been proved to be identical in all physical and chemical properties with the aromatic principle obtained by the extraction, etc., of the natural vanilla beans.

ASTRONOMICAL.—The astronomical discoveries of 1874, apart from those which may have been made by observers of the transit of Venus, were few and comparatively unimportant. Six asteroids were discovered, two by American astronomers, and three by Palisa, at Pola, near Berlin. Of the four comets discovered in 1874, that of Coggia only, was especially interesting. The meteoric shower of November 14th entirely failed for 1874. According to the calculations of some astronomers, no further return of this meteoric display in any considerable numbers can be expected till near the close of the century.

THE PHYSICAL FORCES ARE MODES OF ETHER PRESSURE.—Professor Challis, of Cambridge University, after long and exhaustive researches upon galvanic and magnetic action, concludes that the hydro-dynamical theory of action is almost correct. The theoretical explanation of galvanic and magnetic phenomena is to be sought by means of mathematical deductions. The author believes that the science of theoretical physics, laid down in Newton's "Principia," is by no means confined to physical astronomy, but comprehends the principles of all departments of natural philosophy which have relation to physical force. His conclusions on galvanic and magnetic action have been reached in conformity with Newton's rules and principles. The author's main conclusions, relative to the *modus operandi* of the physical forces, to which this system of philosophy seems to point, are: That they are all modes of pressure of the ether; that the forces concerned in light, heat, molecular attraction and repulsion, and gravity are dynamical results of vibrations of the ether; and that electricity and galvanic, and magnetic forces are due to its pressure in steady motions.

MECHANICAL PROGRESS.

Interesting Steam Boiler Experiment.

A correspondent of the *Scientific American* furnishes that journal with the following account of a late experiment made by him:

"With the intention of increasing the capacity of a steam boiler (horizontal, 42 inches in diameter and 18 feet long, with 32 tubes), I introduced some four inch tubes under the boiler, commencing just behind the bridge wall and running back the length of the boiler. These pipes had cast iron connections at the bends. I placed them eight inches below the bottom of the boiler, connected them at the back end of the boiler near the bottom, and attached the feed pump near the front, and fed with hot water. The first day they worked well and improved the boiler greatly in steaming capacity; but on the third day, just after starting up, with the first stroke of the pump, the cast iron end on the pipe where the feed pipe was connected burst with a loud report, and for a few seconds nothing but blue steam escaped, and finally water and steam. Thinking the trouble was in pumping in water so near the fire and bridge wall, I changed the connection, putting the feed pipe into the mud drum, and then letting the back connection stay as it was, making a series of circulating tubes. On firing up this time, I was alarmed by a succession of concussions or jars in the boiler that shook the walls; but by firing slowly, we got up steam without any accident. In an hour or two we noticed that the tubes nearest the fire and bridge wall were red hot, and blue steam was escaping from the joints of the connections on the ends of the tubes. We drew the fire and removed the tubes. We found a great improvement by the use of these tubes, and did not like to abandon the use of them. We are at a loss to account for the phenomenon of live steam being where we expected nothing but water. What is our remedy?"

In answer to this query, the *Scientific American* says: "The trouble seems to have been that the pipes got so hot that they made steam faster than it could be carried off, the circulation being imperfect. It will probably be necessary to use larger pipes, or to discard the return bends, to make the present arrangement successful. The same trouble has occurred with some forms of sectional boilers, whose use has been abandoned on account of the poor circulation."

Assembling in Machine Making.

The system of making the component parts of a machine or implement in distinct pieces of fixed shape and dimensions, so that corresponding parts are interchangeable, is known as "assembling." The term is, however, more strictly applicable to their fitting together, after being separately and accurately made, according to fixed patterns, and constantly compared by gages and templates which test the dimensions.

This system of interchangeability of parts was first introduced into the French artillery service by General Gribeauval about 1765. He reduced the gun carriages to classes, and so arranged many of the parts that they could be applied indiscriminately to any carriage of the class for which they were made. The system was afterward extended into several European services, and into that of the United States.

The first firearm attempted to be made on this system was the breech-loader of John H. Hall, of North Yarmouth, Massachusetts, 1811; of which 10,000 were made for the United States, \$10,000 being voted the inventor in 1836, being at the rate of one dollar per gun. Some of them were captured in Fort Donelson, February 16, 1862. They were probably the first breech-loading military arms ever issued to troops.

The extent to which the system of gages was carried with the Hall arm is not accurately known, but it is doubtless true that the principle was brought to a high state of system and accuracy by Col. Colt, of Connecticut, in the manufacture of his pistols. Among the most important of extensions of this principle has

been the making of special machines to fashion particular parts, or even special portions of individual pieces, so that each separate part may be shaped by successive machines, and hored by others, issuing in the exact form required.

This plan requires large capital, and will not pay unless a great number of like articles be required, but has been extensively introduced into this country, and from hence into England, and to some extent on the continent of Europe. All the Government breech-loading fire-arms are thus made. The greater number of the military arms of Europe and Egypt are thus made in the United States for the various countries. The Snider gun, a modification of an American model, is made at the Enfield Arsenal, England, on special machines made for that purpose in duplicate at the Colt works, Hartford, Connecticut. Pratt & Whitney, of Hartford, are just completing for Germany a full set of special machines and gages for the manufacture of the Minsler rifle, adopted by Prussia for the confederate German States.

The first watch made on this plan was the "American" watch, of Waltham, Massachusetts, the system extending down to the almost microscopic screws and other small parts. All the prominent sewing machines are so made; the same with Luth's knitting machine; and probably others. Many kinds of agricultural implements, including plows, harrowers, threshers and wagons, are made of interchangeable parts. The system has been carried into locomotive building; about seven grades of engines, it is understood, are employed on the Pennsylvania Central railroad, corresponding parts of a given grade being precisely similar, so as to fit any engine of the class. This is the American system of "assembling."—*Harper's Magazine*.

A Promising Invention—Re-rolling Steel Rails.

One of the objections which many railroad men urge against steel rails has been the difficulty of profitably utilizing them when worn out. This, though not a very formidable argument against them, when their great endurance is considered, constitutes, perhaps, a slight objection. Hitherto they have never been rolled when cut up and treated as an iron rail pile, as they do not weld. We speak now of Bessemer cast-steel rails; puddled steel headed rails are successfully produced, and certainly outwear the iron article; the so called silicon steel is but a variety of puddled steel. In a few years the large and increasing amount of Bessemer rails laid will be worn out, and must be replaced, thus rendering their proper utilization, in a secondary degree, a question of national importance. As scrap steel in the regular Bessemer manufacture they could not be disposed of; they cannot be melted alone in a furnace, as they burn; and their use in the Siemens-Martin process, in which a bath of cast iron is decarburized by the addition of wrought iron scrap, sponge, or steel scrap, would also prove a slow method of consumption. Re-rolling into a solid steel rail is the most rational and economical method, if it can be effected. It is barely possible that it is practicable with the aid of some flux, and one certainly worthy of trial has been invented by M. G. C. Henry, an analytical chemist of Burlington, Iowa. Its use has been very favorably considered by the Springfield Rolling Mill Superintendent, and it is giving good results in steel wire manufactured in St. Louis. At the Joliet Iron and Steel Works standard Bessemer steel, containing 0.35 of carbon, was welded perfectly, at a smith forge, no joint being afterward visible.

The function of a flux, in the welding process, is to form a fusible slag, by its union with the scale, or oxide, which forms upon the surfaces of heated iron. Borax, which is an acid salt of soda, has this property, and is commonly used by smiths; but its cost, about forty-five (45) cents per pound, precludes its use on a large scale. Mr. Henry thinks he can furnish the flux for \$15.00 per ton. It is a dark looking substance, and fuses at a light red heat. The low degree of heat, comparatively, at which steel burns, may alone account for the difficulty in welding it, and if a substance can be kept at the welding surfaces which shall remove this scale as rapidly as it forms, it would seem that at least the chemical difficulties were overcome. It is Mr. Henry's hope to enlist the attention of some rolling mill sufficiently to try the invention upon a steel rail pile, rolling the rails into B forms, regularly piling as in re-rolling iron, and by placing the flux on the top of the pile in the furnace, it is possible that in passing, as a certain quantity flows down the sides, and into the joints, it will make the pieces cohere sufficiently to turn over the pile. As the flux is not injured by heat, increasing the whole pile in a bath of it has been suggested. If this succeeds, mills could advantageously re-roll their second quality rails. It is to be hoped that some one may try the experiment.—*Western Manufacturer*.

HARDENING THE SURFACE OF STEEL.—Mr. G. Arnes, of Rochester, has proved that the surface of steel may be hardened, without hardening the mass of the metal, by placing the steel in a cylinder for example—upon an engine-lathe, and, while it is in motion, bringing into contact with it an emery wheel, rotating at a velocity of about one thousand eight hundred revolutions per minute.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, JANUARY 14.	THURSDAY, JANUARY 21.
MORNING SESSION.	MORNING SESSION.
1140 Ophir.....165@183	590 Alpha.....32@35
200 "b 30.....192	15 "b 5.....30@32
800 Mexican.....22@25	230 Belcher.....30@32
200 "b 5.....54@55	70 "b 5.....50@52
650 Gold & Curry.....55@57	2460 Best & Belcher.....30@38
230 Best & Belcher.....55@57	230 "b 5.....50@52
400 Savage.....14@15	1700 Mexican.....22@25
50 "b 30.....155	200 "b 5.....54@55
420 Chollar.....86@75	200 "b 30.....192
170 Halo & Norcross.....44@45	170 Halo & Norcross.....44@45
100 Crown Point.....44@45	200 "b 5.....54@55
20 "b 5.....54@55	1715 Imperial.....17@17 1/2
70 "b 30.....155	30 Justice.....165@172 1/2
220 Yellow Jacket.....13@14	1000 Kern.....22@25
30 "b 5.....54@55	10 "b 30.....192
1740 Imperial.....18@19	1755 Mexican.....22@25
50 "b 5.....54@55	1340 Ophir.....32@35
150 Empire.....18@19	165 Overman.....30@32
155 Kentuck.....18@19	110 "b 30.....192
955 Alpha.....22@23	160 Succor.....25@26
85 Bellows.....11@12	100 Savage.....17@18
505 Belcher.....14@15	370 S. Nevada.....35@38
50 "b 5.....54@55	270 Y. Jacket.....14@15
330 Confidence.....40@42	
400 Van Virginia.....19@20	
30 Sierra Nevada.....19@20	
300 Daney.....24@25	
187 California.....56@59	
150 "b 30.....192	
260 Overman.....30@32	
155 Justice.....13@13 1/2	
100 Succor.....25@26	
200 California.....15@16	
200 Julia.....8@9	
240 Globe.....15@16	
200 California.....15@16	
90 Bullion.....35@38	
155 Utah.....60@62	
150 Silver Hill.....10@11	
20 Challenge.....10@11	
570 Dayton.....44@45	
AFTERNOON SESSION.	AFTERNOON SESSION.
1900 Meadow Valley.....7@7 1/2	530 Meadow Valley.....7@7 1/2
1045 Raymond & Ely.....33@35	420 Raymond & Ely.....33@35
70 Eureka Consolidated.....18	230 Belmont.....23@25
50 Picoche.....43@44	430 Ely South.....14@15
220 Wash & Creole.....12@13	1200 Wash & Creole.....12@13
520 American Flag.....24@25	50 Empls.....10@11
3005 Belmont.....10@11	1775 Lady Bryan.....9@10
465 Newark.....12@13	160 Julia.....9@10
90 Rye Patch.....12@13	160 Julia.....9@10
170 Eldorado South.....27@28	275 Knickerbocker.....43@45
200 Globe.....28@30	230 Globe.....28@30
1000 Chollar.....18@19	230 Globe.....28@30
100 Ida Elmore.....15@16	625 Bullion.....35@38
55 Mahogany.....4@5	425 Utah.....8@9
100 Empire.....35@38	325 Emps.....10@11
400 Picoche.....43@44	325 Emps.....10@11
170 New York.....5@6	35 Trench.....12@13
175 Occidental.....5@6	160 Challenge.....10@11
110 American.....10@11	1000 American.....10@11
750 Renator.....12@13	615 Rhode Island.....6@7
2435 Phil Sheridan.....24@25	320 Picoche.....43@44
325 Woodville.....12@13	855 New York.....5@6
20 Mint.....4@5	1000 Occidental.....10@11
420 Lady Washington.....24@25	75 Senator.....14@15
385 Kosuth.....44@45	1600 Phil Sheridan.....24@25
900 Sea Rock Island.....12@13	1000 American.....10@11
175 Andes.....10@11	1000 American.....10@11
300 Pacific.....12@13	275 Alta.....12@13
50 Ward.....4@5	1200 Woodville.....12@13
550 Scorpion.....14@15	1450 Sinto.....14@15
750 Cosmopolitan.....12@13	150 Lady Washington.....24@25
2250 Leviathan.....24@25	600 Gresson.....44@45
1500 Georgia.....44@45	755 Kosuth.....44@45

Mining Stocks.

The stock market during the past week has not been in as firm a condition as for some time past. Prices have been comparatively low, and the dull weather has brought rather dull times for the brokers compared with the recent busy season. Whether the big break which was expected has come or not we do not know, but there has been a pretty heavy fall. There is no special change in the Comstocks and the *Enterprise* says of the mines. There is no change in the honanza mines or any other mines along the Comstock range except for the better, therefore the decline in stocks is charged by our people to the manipulations of big operators in San Francisco, who, it is supposed, have locked up all the money they could lay their hands upon and who have in this way and other ways cinched the market. Such of our people as own in the bonanza mines and have their stocks paid for are but little disturbed, as they feel perfectly safe so long as an earthquake does not come and swallow up the entire north end of the lead. As hundreds of persons—not only among our own citizens, but also from San Francisco and many other places—have visited and critically examined the great ore body, there can be no mistake about that. In regard to the richness of the ore, it is being ascertained by actual working in the new mill that it is even richer than was supposed by those who had examined it while it was standing in the mine. The drifts in the California, in the 1400 and 1500-ft levels are already in good ore and are fast advancing toward the very rich ore of the great bonanza, while the drift from the Gould & Curry, on the 1550-ft level, is 30 feet into California ground, and is being pushed ahead in the same rich ore as is found above on the 1500 ft level. At the Ophir end there is a constant and marked improvement, notwithstanding the many falsehoods that have been industriously circulated in regard to it in San Francisco.

LYTLE & HAWKES have been offered \$100,000 for their quicksilver claim in Cinnabar district, Trinity county. They have three large retorts in position at the foot of the mountain, with which they expect to produce 100,000 pounds of quicksilver daily. Dr. E. H. Pardee, of Oakland, has offered J. F. Doliffe \$10,000 for his mine, and negotiations are now pending. The Trinity company are in 85 feet with their tunnel, and have favorable indications. 11 men are wintering at Cinnabar. A great rush is expected as soon as spring opens.

A MAN named Mattock, from Carson, Nevada, has discovered an extensive cinnabar ledge in Pinto district, Inyo county. There have recently been several important gold and silver discoveries near this locality.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
American Flat M Co	Washoe	4 100	Dec 7	Jan 9	O A Sankey	331 Montgomery at
Andes S M Co	Washoe	11 75	Dec 10	Jan 14	Feb 2	J Maguire
Arizona S M Co	Unionville Nevada	1 100	Nov 30	Jan 8	Jan 29	Wm Willis
Baltimore Oms M Co	Washoe	7 100	Dec 5	Jan 8	Jan 29	D F Verdonal
Bellevue M Co	Placer Co Cal	12 50	Dec 10	Jan 14	Feb 4	O E Elliott
Bovary Cons M Co	Ely District	3 200	Dec 15	Jan 25	Feb 28	R Wagner
California S M Co	Washoe	10 300	Jan 8	Feb 12	Mar 5	J E Swift
Chariot Mill & M Co	San Diego Co	1 50	Dec 24	Jan 23	Feb 13	G W Anderson
Com Reform M Co	Cal	30 100	Jan 16	Feb 22	Mar 1	G B Spinney
Danay M Co	Washoe	12 75	Jan 12	Feb 16	Mar 9	W E Dean
Empire Mill & M Co	Washoe	17 50	Dec 28	Jan 29	Feb 18	L Hermann
Florida S M Co	Washoe	1 100	Jan 8	Feb 10	Feb 2	J Maguire
Globe Cons M Co	Washoe	1 75	Dec 10	Jan 14	Feb 2	L Kaplan
Globe M Co	Washoe	9 75	Dec 10	Jan 14	Feb 2	J E Swift
Golden Chariot M Co	Idaho	12 150	Jan 4	Feb 8	Feb 23	D Wilder
Hale & Norcross S M Co	Washoe	45 500	Dec 5	Jan 11	Feb 18	A D Carpenter
Iowa M Co	Washoe	2 25	Jan 13	Feb 15	Mar 10	J S Kennedy
Justice M Co	Washoe	13 50	Jan 12	Feb 12	Mar 2	J S Kennedy
Knickerbocker M Co	Washoe	12 100	Dec 3	Jan 5	Jan 25	H Boyle
Lady Washington M Co	Washoe	2 200	Dec 17	Jan 21	Feb 8	H C Kibbe
Mahogany G & S M Co	Idaho	15 200	Jan 5	Feb 11	Feb 11	C B Higgins
New York Cons M Co	Washoe	11 100	Jan 8	Feb 12	Feb 12	O E Elliott
Original Gold Hill G & S M Co	Washoe	2 50	Dec 12	Jan 14	Feb 1	W M Helman
Overman S M Co	Washoe	30 300	Dec 1	Jan 5	Jan 26	G D Edwards
Page Tunnel Co	Utah	5 50	Dec 12	Jan 20	Feb 16	O E Elliott
Picoche S M Co	Ely District	6 30	Dec 23	Feb 3	Feb 25	T L Kimball
Picoche West Ex M Co	Ely District	8 100	Jan 18	Feb 24	Mar 2	W Willis
Poorman G & S M Co	Idaho	2 100	Jan 19	Feb 24	Mar 2	T W Culbarn
Raymond & Ely S M Co	Picoche	5 50	Nov 23	Jan 26	Jan 26	Wm Willis
Red Jacket M Co	Idaho	6 100	Jan 13	Feb 17	Mar 9	J W Clark
Reid Island G & S M Co	Washoe	16 500	Dec 5	Jan 1	Jan 27	E B Holmes
Sage M Co	Washoe	30 100	Dec 1	Jan 5	Jan 25	G D Edwards
Sierra Nevada S M Co	Idaho	7 100	Jan 2	Feb 5	Feb 26	Frank Swift
South Chariot M Co	Idaho	12 100	Jan 9	Feb 16	Mar 9	O H Bogart
Tyler M Co	Washoe	7 50	Nov 19	Jan 21	Feb 12	O D Squire
Utah S M Co	Washoe	1 100	Dec 25	Jan 26	Feb 12	W E Dean
Washington & Creole M Co	Ely District	13 50	Dec 8	Jan 11	Feb 4	F D Cleary
Yellow Jacket S M Co	Washoe	19 500	Dec 10	Jan 13	Feb 13	G W Hopkins

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Baltic Cons M Co	Cal	1 15	Nov 18	Dec 23	Feb 1	B Burris	501 Montgomery at
California Hydraulic M Co	Cal	5 50	Dec 7	Jan 9	Jan 25	A Shear	321 Battery at
California and Arizona M Co	Arizona	10 100	Jan 8	Feb 12	Mar 2	T E Jewell	567 Montgomery at
California Cons M Co	Cal	1 100	Jan 14	Feb 16	Mar 5	J W Tripp	408 California at
Combination G & S M Co	Panama	2 50	Dec 24	Jan 30	Feb 20	A D Carpenter	305 Clay at
Edith Quicksilver M Co	Cal	2 200	Dec 23	Feb 3	Feb 23	W Stuart	113 Liedesdrift at
Enterprise Cons M Co	Cal	1 125	Dec 26	Feb 6	Mar 3	F J Hermann	48 Kearny at
Equitable Tunnel M Co	Humboldt Co Cal	1 100	Dec 5	Jan 8	Feb 3	S Healy	220 Montgomery at
Enterprise Cons M Co	Cal	9 100	Dec 29	Feb 2	Feb 20	E E Delavan	419 California at
Gold M & M Co	Holcomb Valley Cal	3 300	Nov 19	Dec 29	Jan 23	J P Cavalier	513 California at
Gold Run M Co	Nevada Co	3 200	Dec 7	Jan 10	Feb 3	J P Cavalier	41 Market at
Golden Rule S M Co	Utah	5 50	Dec 8	Jan 15	Feb 15	K Wertheimer	530 Clay at
Hale M & M Co	Mariposa Co Cal	3 125	Jan 13	Feb 16	Mar 16	W A M Van Bokkelen	419 Cal at
Hayes G & S M Co	Robinson Dist	6 200	Jan 4	Feb 12	Mar 8	E S Spinney	320 California at
Idaho Cons M Co	Idaho	1 100	Dec 24	Jan 26	Feb 20	R H Brown	402 Montgomery at
Idaho Cons M Co	Idaho	1 100	Jan 9	Feb 17	Mar 10	F J Hermann	418 Kearny at
Junata Cons S M Co	Aurora Nev	2 100	Dec 16	Jan 21	Feb 10	O S Neal	408 California at
Kearse Cons Quicksilver M Co	Cal	1 100	Dec 5	Jan 8	Feb 3	J McAffee	201 California at
Kennedy M Co	Amador Co	4 100	Dec 12	Jan 12	Feb 1	W R Townsend	330 Pina at
Keystone No 1 & 2 M Co	Arizona	1 100	Dec 12	Jan 12	Feb 1	J W Tripp	408 California at
Martin & Walling M & M Co	Cal	1 50	Dec 7	Jan 8	Jan 23	J W Tripp	419 California at
New York M Co	Washoe	11 50	Dec 5	Jan 8	Jan 25	I Derby	320 California at
North Blonfield Gravel M Co	Cal	35 100	Dec 1	Jan 4	Jan 25	I Derby	320 California at
Oleida M Co	Amador Co Cal	10 100	Dec 11	Jan 15	Feb 3	L Kaplan	438 California at
Pinto M Co	White Pine	10 100	Jan 9	Feb 15	Mar 8	A K Durbrown	438 California at
Prusslan G & S M Co	Nye Co Nevada	3 100	Dec 23	Jan 28	Feb 19	R H Brown	402 Montgomery at
Rattlesnake Quicksilver M Co	Cal	2 125	Dec 24	Jan 28	Feb 19	A Baird	316 California at
South Fork M & Canal Co	Cal	5 50	Dec 7	Jan 10	Feb 1	H Knapp	306 Montgomery at
Star King S M Co	Elko Co Nevada	9 25	Dec 4	Jan 8	Jan 28	L Kaplan	438 California at
Wells Fargo & Co M Co	Washoe	5 50	Jan 13	Feb 13	Mar 1	V J Gunn	331 Montgomery at
Yarrowburgh S M Co	Kern Co Cal	6 30	Dec 23	Jan 30	Feb 23	E Barry	415 Montgomery at

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
American Nevada M Co		L Hermann	320 Pine st	Annual	Feb 4
Balhar M Co	Washoe	H C Kibbe	419 California at	Annual	Jan 26
California M Co	Washoe	H C Kibbe	419 California at	Annual	Jan 26
Consolidated Amador	Cal	F B Latham	402 California at	Annual	Feb 1
Consolidated Virginia	Washoe	Called by Trustees	401 California at	Special	Jan 26
Crown Point Ex M Co	Washoe	G R Spinney	320 California at	Annual	Jan 27
Florida S M Co	Washoe	J W Tripp	408 California at	Annual	Feb 1
Gleanna M Co	Washoe	J Maguire	419 California at	Annual	Jan 30
Globe Cons M Co	Washoe	Called by Trustees	438 California at	Special	Feb 16
Gould & Curry S M Co	Washoe	Called by Trustees	438 California at	Special	Feb 16
Iowa M Co	Washoe	J S Kennedy	Merchants' Ex	Annual	Feb 15
Justice M Co	Washoe	Called by Trustees	438 California at	Special	Feb 16
Keystone Cons M Co	Washoe	Frank Swift	419 California at	Annual	Jan 26
Lady Bryan M Co	Washoe	Called by Trustees	418 California at	Special	Jan 26
Pacific M Co	Idaho	J W Clark	330 Pina at	Annual	Jan 26
Patterson M Co	Ely District	L Hermann	418 California at	Annual	Jan 26
Raymond & Ely M Co	Idaho	Wm Culbarn	418 California at	Annual	Jan 26
Red Jacket M Co	Idaho	J W Clark	418 California at	Annual	Feb 10
Sage Fire Plat Cons M Co	Washoe	Called by Trustees	302 Montgomery at	Special	Jan 30
Succor M & M Co	Washoe	G R Spinney	320 California at	Annual	Jan 28
Surprise G & S M Co	Washoe	Called by Trustees	331 Montgomery at	Special	Jan 26
Union Cons M Co	Washoe	Called by Trustees	331 Montgomery at	Special	Jan 26
Wells Fargo & S M Co	Washoe	Called by Trustees	331 Montgomery at	Special	Jan 26

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co	Washoe	H. O. Kibbe	419 California at	3 00	Jan 11
Chariot M & M Co	Cal	Frank Swift	418 California at	40	Nov 16
Consolidated Virginia M Co	Washoe	J T Barclay	401 California at	3 00	Jan 11
Crown Point M Co	Washoe	O E Elliott	414 California at	1 00	Jan 12
Diana M Co	Nev	N. C. Kaset	220 Clay st	2 00	Jan 25
Eureka Consolidated M Co	Nev	W F Taylor	419 California at	50	Jan 25
Rye Patch M Co	Nevada	D F Verdonal	408 California at	25	Jan 9

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office, San Francisco.

WOODVILLE CONS. M. Co. Gold Hill, Nev. Jan. 14. Capital stock, \$12,000,000. Directors—W. Sherman, R. H. Sherwood, J. R. Lee, J. S. Wall and H. G. Maynard.

SPANISH S. M. Co., Jan. 14. Location: Flowery District, Nevada. Capital stock, \$5,000,000. Directors—George M. Pinne, D. L. McDonald, Jas. H. Crossman, James A. Pritchard and Michael Skelly.

MUTUAL INDEMNITY ASSOCIATION OF GRANGERS OF CAL., Jan. 14. Object: To secure to the families or friends of deceased members such pecuniary aid as shall shield them against want, by paying to the nominee of such member the sum of \$1,000, the same to be paid by assessment on surviving members. The Directors are: Josiah Earl, J. D. Blanchard, A. W. Thompson, E. Hallet, W. L. Ovarliser, J. A. Wilcox and C. J. Morley.

CALIFORNIA BANK G. S. & M. Co., Jan. 15. Location: Storey county, Nevada. Directors—John R. Spring, E. P. Brown, A. B. Perkins, Arthur C. Taylor and Sydney H. Horbert. Capital stock, \$10,000,000, divided into 100,000 shares.

BONANZA M. Co., Jan. 15. Location: Virginia City, Nevada. Object: To acquire water rights, ditches and flumes, and to develop certain mines. Directors—J. R. Grannis, H. W. Berryman, David Conkling, Richard W. Heath, Jr. and John Landers. Capital stock, \$10,000,000, divided into 100,000 shares.

ROCK BAR M. Co., Jan. 15. Location: Storey county, Nevada. Directors—E. J. Baldwin, R. H. Lloyd, Alex. MacAhee, A. Ross and M. Strass. Capital stock, \$60,000,000, divided into 60,000 shares.

POMTOSA QUICKSILVER M. Co., Jan. 15. Location: Santa Barbara county. Directors—Joseph G. B. Isham, S. Heynfield, Jr., Christian Rees, H. Bogart and S. Heynfield. Capital stock, \$10,000,000 divided into 100,000 shares.

NEVADA SILVER M. Co., Jan. 15. Location:

Monterey county. Directors—L. Goodwin, J. B. Winter, Thos. Eagle, M. Little and H. F. Pitts. Capital stock, \$6,000,000, in 100,000 shares.

NORTH LANEY BRYAN. M. Co., Jan. 15. Location: Storey county, Nevada. Capital stock, \$6,000,000. Directors—C. D. O'Sullivan, P. J. White, Robt. Sherwood, P. J. Cassin and Wm. Burley.

CONSOLIDATED BONANZA G. & S. Co., Jan. 19. Location: Ormsby county, Nevada. Directors—Calah S. Hobbs, John K. Hobbs, Wales L. Palmer, Israel W. Knox and Dyer A. Carpenter. Capital stock, \$5,000,000, divided into 100,000 shares.

ECREKA LAMP Co., Jan. 19. The object is to carry on a general mercantile business of buying and selling and manufacturing the self-lighting lamp and gas attachments. Directors—A. L. Day, C. P. Rank, J. T. Doyle, C. Mason and John Ben. Tungata. Capital stock, \$50,000, divided into 5,000 shares.

CAO S. M. Co., Jan. 16. Location: Virginia City, Nevada. Capital stock, \$10,000,000. Directors—S. H. Chamberlin, J. P. Moore, L. P. F. Waller, O. K. Britell and J. Weightman.

FRANKLIN GRAVEL M. Co., Jan. 19. Location: Placer county, Cal. Capital stock, \$2

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR COUNTY.

RUSH GRAVEL MINES.—Jackson, (Amador) Dispatch, Jan. 16: Messrs. Batterfield, Ryan, Pawling, and some four or five others of our citizens have been prospecting a gravel claim of about forty acres, about three miles below this place, which has every indication of enriching its owners. The paying gravel is from ten to forty feet thick, and extends over the entire 40 acres; and in prospecting, good colors were found in every pan. The owners are now making preparations for conducting water from the Amador Canal to the claim, in order to successfully and thoroughly develop the same. There is also another claim of forty acres, just below and adjoining the claim above mentioned, belonging to the Messrs. Morrow, which is said to be equally rich and valuable. We hope the owners of these mines will not delay the noble work of operating them on an extensive scale, as there can be but little doubt as to their extent and richness.

ALPINE COUNTY.

A QUESTION.—Alpine Chronicle, Jan. 9: The Leviathan mine having been relocated, the manager has submitted the case to the Commissioner of the General Land Office. The point raised is this: That the party in charge of the mine had orders to work it, and the manager supposed the work was going on, but it was not, and during the temporary absence of the person having charge, it was relocated. The question at issue is: Can employees thus sacrifice the interests of innocent parties?

MILL SITE.—On Saturday last a mill site was located on Silver Creek for the Occident, late Rippon mine.

RELOCATED.—On the 1st instant the Morning Star mine was relocated, and on the 2d, the Leviathan mine was also jumped.

COLUSA COUNTY.

ROADS.—Colusa Sun, Jan. 16: As soon as the weather will permit in the Spring, the Abbott and Buckeye Mining companies intend to build a good road from Sulphur Creek to Lower Lake. These mines will then be within fifty or fifty-five miles of Calistoga, and there will be a magnificent road all the way. The distance from Colusa to Sulphur Creek is about thirty-three miles, and thirty-five to the Abbott, and a miserable road to travel over. These mines will have to build a road to the Lake to get timber, and they will not build it on to the Sacramento Valley. At present Grizzly Cañon pretty much stops all travel beyond the Abbott, but once a good road made through that and away goes the trade of all that region, unless Colusa and those interested along the way build a good road to Sulphur Creek.

CALAVERAS COUNTY.

SAN BRUNO.—Calaveras Chronicle, Jan. 16: The work of putting an engine and hoisting works underground, in the San Bruno mine at Mosquito, is completed and sinking commenced. The engine is placed in the lower tunnel of the mine, about 500 feet in from the mouth, a large room having been hollowed out of the solid rock for its reception. The smoke-stack of the engine extends to the upper tunnel, a hundred feet or more above, and as there is a powerful draft between the two tunnels it is thought there will be no inconvenience from heat or smoke. The object is to work the mine by means of a shaft sunk from the lower tunnel, the engine being necessary to keep the works free of water and hoist the rock. The ore in the bottom of the tunnel is very rich, and the owners of the mine think it can be got out cheaper in the manner adopted than by driving a level to tap the lode lower. The machinery has not been started yet, its assistance not being required until the shaft reaches a considerable depth. The result of this novel mode of working the mine is awaited with interest.

WEST POINT DISTRICT.—The Mina Rica shaft has attained the depth of 165 feet, carrying a large, handsome vein. The vein inclines now in excess of the shaft and rich developments are looked for. A large force is employed at sinking, running levels, and stoping. The mill started last Monday. The Good Faith tunnel is being driven now at the rate of 7 feet every 24 hours. It is in 150 feet and the first of the five veins belonging to the property will be cut in about 40 feet farther. The Superintendent of the Josephine who was unfavorably predisposed in regard to the resources of this district, has been somewhat disappointed. The main shaft is now a few feet below water level, showing ore fully five feet in width. The ore looks splendid, showing handsome sulphurets of lead and iron, and plenty of free gold. A streak nearest the hanging wall and a streak nearest the foot wall, each one a foot thick, are estimated to yield not less than \$100 per ton; the balance, 3 feet, will mill in the neighborhood of \$20 per ton. Henry & Son have started their mill and are now steadily running on ore from their mines on Valentine Hill. The Zoatero has struck better ore than ever and the working force has been increased. The Haskins mine at Big Flat yields as rich ore as previous.

INYO COUNTY.

CINNABAR DISCOVERIES.—Inyo Independent Jan. 9: If Inyo county don't amount to some-

thing it won't be because it don't possess a sufficient quantity and variety of minerals. Now comes one Matlock, a mining man of Carson, Nevada, with the discovery of an extensive cinnabar mine in Pinte district, just east of Bishop creek. We have no particulars of the discovery, but as it is an established fact that that section has a number of very fine gold and silver mines, and now the quicksilver to work them right at hand, that end of the county ought to maintain its balance of power very easily.

PINE MOUNTAIN.—We have some very flattering reports of late developments and discoveries at Pine Mountain. Ebb Harrington, whose general knowledge of the mines of this region is very complete, and whose judgment is second to none, is confident this going to prove itself the "king district" of this entire country. Broder & Moffat fully intend to have a furnace in operation there in a short time. There is enough ore now on the several dumps to keep a furnace running a long time.

WIDENING.—Superintendent Todd informs us that the vein of rich black sulphurets in the lower levels of the Kearsage continues to widen as work progresses. We also hear that a heavy force will be put to work on this mine early in the spring.

ABOBS THE RIVER.—Mr. Messenger, of San Francisco, has been examining and reporting upon some of the old original mining locations in the foothills of the Inyo ranges across the river. May of these were of the case knife, atrata order, bearing exceedingly limited amounts of intractible ore, the location and attempted workings of which date back to the days of '63, when they built costly mills before obtaining the somewhat necessary mine. But all accounts agree that a mile or so back from the seams in the main mountains there is an extensive and rich mineral belt—so that by a little energy and perseverance there would have been no occasion for the fiscal downfall Owensville, Crispopolis, Bend City, San Carlos, etc.—all of which once lively places, before and during the Indian war are now numbered among the things that were.

MEDOCINO COUNTY.

Ukiah. Mendocino Democrat: About a ton of ore has just been shipped from the Wurfenburg & Burger mine, about a mile and a half from town, to San Francisco, for a thorough testing, so we may soon know fully how it is going to yield.

MARIPOSA COUNTY.

WASHINGTON MINE.—Mariposa Gazette, Jan. 16: We understand that the managers of this successful and valuable mine are about contracting for six thousand cords of wood, to be delivered at the mill during the coming spring and summer, this is an inducement to wood choppers and teamsters, and indicates business and prosperity for that locality.

NAPA COUNTY.

CALISTOGA.—Napa Gazette, Jan. 16: Work has been resumed in three tunnels of the Calistoga mine, but the mill is still closed. No ores are being hauled.

GOLD FROM FOSS VALLEY.—Gold bearing rock has been brought in from Foss valley that assays \$800 to the ton. If subsequent assays confirm this some little excitement will doubtless be raised.

NEVADA COUNTY.

PROVIDENCE.—Nevada Transcript, Jan. 16: The Providence mine has been for a year or more, trying to work out a bonanza in their mine, and have not found the end of it yet. The rock is not quite as rich as that in the California and Virginia Consolidated, but investors in the stock of the Providence are not in danger of having values fall several millions in a day; on the contrary the value is continually on the increase.

CONVENIENT.—The ditches which conduct water from the mountains to the towns and mines on their lines, over on the San Juan Ridge, are being utilized in floating flume blocks from the saw-mills above, to the mines below. These blocks are sawed above Columbia hill, and floated down the ditch to the points above, and near San Juan, thereby saving several miles of hauling with teams. We presume wood can also be shipped in the same manner. It saves an enormous bill of expense, and guarantees an inexhaustible supply of mining timber.

BEAUTIFUL BAR.—We saw a beautiful bar of gold, the result of a few days' clean up of one of our quartz mines. The bar was valued at \$9,000.

DEADMAN'S FLAT.—Foothill Tidings, Jan. 10: Deadman's Flat, two or three miles south westerly from this town is getting to be a lively flat for prospectors. McCook Brothers and Sanford have been getting good pay out of the Pittsburg mine out there for some time, but on Monday last they struck it richer than ever—\$80 to the pan. Mr. Wm. K. Spencer, the worthy telegraph agent here has a quartz claim near the Pittsburg, which it is said to resemble closely and which we hope to see panning out soon. A prospecting company started work on a new ledge near there a few days since and already have a good paying claim. Deadman's Flat may yet prove many a live man's raise.

That gold trap is in daily operation at the Empire mill and the inventor is sanguine of great success. No clean up has yet been made. [This item refers to the amalgamator which Mr. Lunbridge took up to Grass Valley to test at one of the mills. We will give the results of his work as soon as the new mine is cleaned up.—Ens. Press.]

PLACER COUNTY.

BOOTH.—Placer Herald, Jan. 16: The Eclipse mill has been pounding for some time on rock from the Booth mine, but a crack discovered in the bottom of one of the batteries, by which the amalgam was being wasted, caused the mill to be stopped for a short time, and necessitated a clean-up sooner than was calculated on. At the time of this clean-up there had been about 100 tons of rock crushed, from which was obtained 137½ ounces of gold. From the damaged battery, which is ½ heavier than the other, and must have crushed ½ more rock, there was obtained ¼ less gold, proving that enough was wasted to have raised the yield of the rock to nearly or quite \$30 a ton, which is decidedly an encouraging figure, especially when we consider the size of the ledge from which it is obtained.

BUSINESS.—The Greene mining company is rushing things in a business like way, which would lead us to infer that they have struck a bonanza. The old water-power mill belonging to the company is being torn down, and a fine new mill, to be driven by steam power is being erected near the hoisting works. With this improvement completed the company will be in a condition second, perhaps, to none in the county to work a quartz mine to advantage. And they have the mine to work. Between 200 and 300 tons of rich ore is already on the dump, awaiting the completion of this new mill.

SANTA CLARA COUNTY.

OUR MINERAL WEALTH.—San Jose Mercury, Jan. 16: It has long been believed that Santa Clara county possessed mineral wealth in some degree, but to what extent but little has been known from the fact that scarcely anything has been done towards the development of her mines. The belief of those who held that deposits of various kinds of ore could be found in our hills has been confirmed by recent discoveries. In addition to our valuable quicksilver mines, there are many traces of iron, lead, coal, and even gold and silver and other rich minerals. Of silver and lead a rich discovery has already been made, and there are places where there are fine prospects for gold, both quartz and placer. At Steven's creek, west of the valley, there are fine indications for the latter. At the head of the stream several Mexicans are now at work, and we are told by responsible parties that they are making on an average \$3 per day. If properly developed, we doubt not our mineral resources would contribute largely to our wealth.

SONOMA COUNTY.

VALUABLE DISCOVERY.—Sonoma Democrat, Jan. 16: About two thousand feet east of the Moulton mine, on J. A. Carrie's place, near Cloverdale, Tom Thompson, Dr. Ramie, John Field and others, have located a new mine which promises to be of great value. Tom Thompson, of Cloverdale, was the discoverer. In the gulch near the reservoir, the ledge is said to show very plain. The outcrop is pronounced by experts to be first-class, and the general impression is that the mine will prove immensely valuable.

QUICKSILVER LOCATIONS.—The law regulating the location of quicksilver claims provides that the greatest quantity that can be located by any one person, or by any association of persons, is fifteen hundred feet on the ledge, together with a surface location of three hundred feet on each side of the ledge. Parties intending to work a claim as a company should make their locations as individuals before forming their company, otherwise they will be limited to a single individual's allowance. A "discoverer" is entitled to no more than any other person, whether he has a family or not.

SIERRA COUNTY.

STRUCK IT RICH.—Mountain Messenger, Jan. 16: Jack Hardy has found rich diggings in his claim at Chapparral Hill. Jack deserves to be rewarded for years of unremunerative prospecting in this ground, and his many friends hope that he has at last struck a good lead.

PURCHASER.—J. Denoon, the superintendent of the Empire, Howland Flat, has bought the Phoenix mine, at Heppidam, for \$7,000. Jim, we trust this may prove a profitable investment.

PAYING WELL.—The Empire claim, at Howland Flat, is steadily turning out large amounts of gold, with no prospect of any cessation in the yield.

SISKIYOU.

GOLD PROSPECTS.—Yreka Journal, Jan. 2: Sam Jackson informs us that there is a hill near Maxwell's mill, at the head of Shasta valley, over all parts of which a gold prospect can be obtained. He further says there are very large quartz ledges in the vicinity. He thinks it not improbable that the hill would pay for working by hydraulic process. The matter is at least worth the attention of prospectors.

TUOLUMNE COUNTY.

LANT WASHINGTON.—Tuolumne Independent, Jan. 16: Shaft is now down 140 feet below the tunnel level, being at a point 300 feet below the surface. The rock looks better as they sink, and they have now a three-foot vein which prospects splendidly. The intention is to put the shaft down 200 feet further—making 500 feet from the surface; and if the rock at that depth shows as good as at present, the shaft will still continue its prospecting journey towards the center of the earth.

Nevada.

WASHOE DISTRICT.

OPERA.—Gold Hill News, Jan. 14th: Daily yield, 260 tons, taken from the 1300 and 1465-

ft levels, and the stopes and floors between. The north winze below the 1465-ft level continues in very rich ore, and the same may be said of the cross-cuts from the winze below this level, near the California line. The cross-cuts east from the 1465-ft level having gone considerably beyond the ore body are in the east country rock, with occasional seams of low grade ore, encouraging further explorations in that direction.

CONSOLIDATED VIRGINIA.—Daily yield, 425 tons, from the 1300 to the 1550-ft levels, exclusive. The ore breasts and stopes throughout never looked so well. The winze on the 1550-ft level has been sunk several feet since last report and continues in ore of very high grade. The north drift has been extended through the mine into the California some 35 feet, and continues in very excellent ore.

BELORE.—Daily yield, 400 tons, from the old ore sections. Nothing new to report from the winzes below the 1400-ft level; they all continue in good ore, and it remains for the drift, now being run from the main incline into the 1500-ft level to develop the true value of that level.

CALIFORNIA.—All the crosscuts on the 1400-ft level are looking exceedingly well, crosscut No. 1 being in a vein of ore of exceeding richness, assaying over \$300 per ton on the average. Judging from the levels below, this vein must be of great width. The ore in the various crosscuts on the 1500-ft level is identical in appearance and value with that found in crosscut No. 1, at the southern boundary. The ore in the face of the breasts in all the crosscuts is of a very high grade.

GEORGIA.—This mine lies between the Rock Island and Florida, upon the south side of the American Flat division of the great Comstock. It is an old location, and the old tunnel and winzes which have been lying idle for years past are now, under the new proprietorship, being reopened and worked, with a view to ascertaining the situation and dip of the ledge, preparatory to sinking a first-class working shaft.

JUSTICE.—The station at the fourth level of the main Justice shaft is well opened, and the connection with the drift north from the Waller Defeat shaft will be made very shortly.

JULIA.—Shaft still sinking at a lively rate, with the bottom in soft porphyry, clay and quartz. The south drift at the 1000-ft level shows decided improvement.

LEO.—The face of the tunnel is now in quite soft ledge matter. The ledge is over four feet wide, and steadily improving in character as headway is made. The prospects are very favorable for developing a rich body of ore soon.

EUROPA.—The winze below the tunnel, at the west side of the vein is now down 82 feet. At the depth of 100 feet it is proposed to crosscut east into the vein, to ascertain its value and dip at that point.

GOULD & CURRY.—The double winze sunk from the 1000-ft level has reached the 1700-ft level, and the work of drifting south to connect with the main incline is making good headway.

FLORIDA.—New shaft down 355 feet to-day, with the bottom in hard blasting rock, with fine looking stringers of quartz, dipping east and showing considerable improvement as farther sunk upon.

LOWER COMSTOCK.—Work is about being resumed on this old claim at Silver City, under the superintendence of Capt. Sam Curtis. A deep shaft is to be sunk, with a crosscut at the bottom through the lode. The old workings, although developing good bunches of ore giving high assays, were not deep enough for a good concentrated ledge.

CROWN POINT.—Daily yield, 500 tons. Nothing new in the crosscuts east at the 1500-ft level, or other prospecting movements at that or other levels of the mine. The main incline is sinking deeper very satisfactorily, and the 1600-ft level is being opened. The ore breasts and stopes of the old regular working levels are looking and yielding finely as usual.

CHOLLAR-POTOSI.—Daily yield, 40 tons. Car sample assays \$36 per ton, showing a slight improvement in the quality of the ore extracted. Prospecting operations going ahead as usual.

SILVER HILL.—The drifts both north and south at the third level show considerable improvement in the way of good pay ore.

WOODVILLE.—The new shaft is making excellent progress downward, the rock improving all the time, and works operating finely. The ore sections yield enough to keep the mill running steadily.

BUCKEYE.—The material being sunk through at the lower end of the incline indicates close proximity to the ledge.

LANT WASHINGTON.—The station for the 300-ft level is being opened. Staking the shaft below this point, however, will be suspended, but it will be continued down to see if good ore developments cannot be found, similar to that in the neighboring mine, the Justice.

HALE & NOBROSS.—Daily yield, about 100 tons, from the upper workings. On the 2100 ft level they are extending the cross-cuts west from the main incline, and making good progress.

BALTIMORE.—Work is temporarily suspended at the 750-ft level, but drifting will be resumed in a couple of days. The new and powerful hoisting and pumping machinery for this mine is on its way.

YELLOW JACKET.—The main incline is sinking at a good rate of progress, and the various prospecting drifts at the lower levels are going ahead.

Kern County Mines.

The Kern County *Courier* says: Not long after the era of quartz mining in this State it was found that an immense vein of this mineral extended from the southern confines of Mariposa to the northern limits of Amador county. In some places it was a solid lead of from thirty to seventy feet in thickness, and in some cases it ramified into numerous strata or branches separated by the country rock. Many parts of this vein, or vein system, was found to be rich, and all the valuable mines of Mariposa, Tuolumne, Calaveras and Amador are located thereon; and, in process of time it was found that all leads of gold bearing quartz that had no connection with this great mother lode were not permanent, and that, however rich they might be, they were sure to "peter" out. Experts in deciding upon the value of any new discovery made the matter of its connection with the mother lode one of the first subjects of consideration. Their judgment almost invariably conformed to the way this was decided. The fact that the mother lode was believed not to extend south of Mariposa long exerted a prejudicial influence to the mining interests of this county, preventing investments of capital adequate to their development, although it was admitted in no part of the State were external indications more favorable. But of late, as this country has been more thoroughly explored, this unfavorable judgment is found not to be sustained by facts. A great mother lode—a true fissure vein—has been distinctly traced, not only entirely across this county, but well into the counties of San Bernardino and Tulare, and if it is not an extension of that to the northward it is a similar and more extensive one, giving the same or even greater promise of permanence to mining operations on the line of its course. In this county several valuable discoveries have been made upon it, chief of which is the Big Blue or Sumner mine, at Kernville, but there are half a dozen others that will prove just as permanent and valuable in the same stage of development, at Hot Spring Valley, Walker's Basin and Tehachapi. An expert who has devoted much time to an examination of this great mother lode, recently gave it as his deliberately formed opinion that Kern county is the best gold mining region in the State. This we have always believed, and predict in less than five years there will be a half dozen mines in operation, as productive, extensive, and enjoying the same confidence of capital as that at Kernville, affording an insatiable market for home produce, and enhancing the value of farming lands to unprecedented figures. There is danger, as things look now, of an over-production of silver, but not of gold. We contemplate the vast deposits of this precious metal in Kern county with profound pleasure and hope, undisturbed by the most distant and intangible apprehension.

Waste.

Everybody knows that a great deal of gold and silver are, every year, wasted from our mines and mills. No process of working has yet been found which will save all of the precious metals. Improvements in saving have been made every year and perfection is being gradually approximated to, and may, some day be attained. But the waste has been very great. We venture to say that the tailings which overspread the farms below, and which the classical grangers call "slickens," are rich in gold and silver, not to speak of the quicksilver. It will pay somebody, some of these days, to work portions of these "slickens" for the metals they contain. A few days ago a gentleman who is sojourning here and who has a machine for saving gold, after one of our best mills has got done with its slimes, casts his eye on the big pile of sulphurets which have been put through the chlorination process of working. He thought there might be something of value in those cast aside sulphurets. He accordingly made a careful assay of some samples taken from one of these piles. His assay showed a value of \$15 per ton, in silver. The chlorination process has taken the gold out of those sulphurets but had left the silver in them. The same gentleman will make still further assays from those old sulphurets piles, with a view to extracting the silver that is in them, by some cheap and rapid process of working. Those sulphurets have been used somewhat extensively as a paint, and they make an excellent fire-proof paint, and yet they are worth about \$15 a ton for silver. That waste is likely soon to be corrected.—*Grass Valley Union*.

SCORPION.—This is a '59 location, and one of the oldest on the Comstock lode. It is situated north and east of the Union Consolidated ground, directly on the curve which this lode is supposed to make toward the east, at the north end, as shown by the recent developments in Consolidated Virginia, California and Ophir. There are 4,000 feet and 40,000 shares in the claim. The stock is concentrated in strong hands, and is quoted on the stock board at \$5 per share. A tunnel 1,200 feet in length has been run on the ledge, and crosscuts and winzes are now being made to determine the character and dip of the vein at that point. R. N. Graves has been appointed Superintendent, and the explorations now going on are for the purpose of guiding him on the selection of a suitable location for permanent works and a main shaft.

About \$16,000 was cleaned up at the Virtue mill, near Baker City, Oregon, during the month of December.

Alameda Coal Mines.

Livermore Coal Mine.

Work is still progressing in the tunnel approaching the main strata.

Black Hawk Mine.

The tunnel in this mine has progressed about forty feet, with very encouraging prospects. An offer has been made from San Jose of capital to develop this mine.

A New Mine.

A prospecting tunnel has been opened near Sonol, and a sample of the coal has been sent to San Francisco for testing its qualities.

H. A. Coal Mine.

The work on this mine is suspended for the present. The present issues of pro-rata shares are all taken up, and work will be again commenced in the spring. Mr. Wm. F. Cantley, a former superintendent of a mine in Pennsylvania, has made an examination of this mine, and reports that the shale covering is now being taken from the coal strata or bed. He speaks very favorably of the mine. He was so favorably impressed that he at once took sixty shares of the stock.

Contra Costa Mine.

Work is suspended on this mine preparatory to opening the tunnel 300 feet below the present prospecting tunnel. The prospects above warranting the extra outlay of a new tunnel.

Ethel Coal Mine.

This mine is located on a branch of the San Leandro creek, about a mile above the Chabot water works. A tunnel is being opened 16 feet wide and eight feet high; and although but a few feet into the hill, good prospects have been struck. The line of this coal strata has been surveyed, and passes directly through the H. A. and Black Hawk mines.

Grass Valley Mine.

Work in this mine is suspended until the application to the Government for condemnation of the land for mineral purposes is granted. Prospecting has been going on for the past week in the hill below San Leandro for coal deposits. Coal croppings have recently been discovered on Lucas and Cull's places, above Hayward. An offer has been made to Thomas Haller of a thousand dollars, to be taken in shares, if he will open the coal mine on his place.—*Oakland Transcript*.

THE ALTA gravel lead seems to be a pretty hard thing to follow up or find. Several nice fortunes have already been taken out of the deposits opened and worked thereon, and, considering that it is a well defined ancient river bed, and must be continuous above and below the part opened, there is every reason to believe there are several fortunes left. Clendenin, who has had an experience of over twenty years in this kind of mining, and has made the subject a special study for over twelve years past, says there are six more deposits on the Alta lead near Grass Valley, just as good as the No. 2 was, and he seems very certain that he has the knowledge of their whereabouts and can put men on the track thereof, so that no great waste of labor and money need be made in opening them up. As there has been much work thrown away in useless search for the channel and lead above and below the discovery claim, would it not be well to listen to the old man a little? He may not be so crazy on the subject as many put him up for. He has a claim himself that he is sure he can reach the canal in by running 100 feet more of tunnel, and being unable to prosecute the work alone, he offers a good lay-out to capital or labor to come in and help him through. He says there is a fortune for two in that claim, and a very small sum will enable him to reach it.—*Foothill Tidings*.

THE CONSOLIDATED VIRGINIA MILL.—Persons who visit the new mill of the Consolidated Virginia mining company, the sound of which is like music, and whose sixty stamps do not make as much noise as many five-stamp mills, should not confine their observations to the reducing works alone, but should pass down the hill and see the extensive preparations being made to save the tailings. Walls of earth have been raised around two large excavations, which are now blue lakes of liquid debris and pulverized ore, which is now continually flowing into them from the settlers. But the operations do not terminate here. Wooden sluices are being extended as far as the mouth of the old Latrobe tunnel, several hundred feet further down the hill where a large reservoir has been enclosed into which the refuse of the mill will flow and deposit what tailings it contains before it finally escapes down Six-Mile Cañon. A large force of men are engaged in completing the works and several teams are hauling lumber for their construction. A long trestlework is being built with a flat surface, divided by longitudinal strips of wood. Upon this blankets will be spread to catch the metal as the tailings flow over them. No experienced person can view without admiration the perfection of the new mill in every department and the close attention paid to detail. The building itself and the operations connected with reducing the ore occupy several acres of ground, every foot of which is economized for some useful purpose. When thoroughly completed the establishment will be superior in many respects to any other silver-bearing quartz mill in existence in this or any other mining country.—*Virginia Chronicle*, Jan. 12th.

Mica Mines in North Carolina.

The discovery of a valuable deposit of mica in Nevada recently, renders the following facts in regard to the only other mines known in this country, of interest. The *Scientific American* says:

Among the most interesting relics of the mysterious races of mound builders, who occupied the Mississippi valley previous to the advent of the more barbarous Indians, are numerous ornaments of mica. Like the weapons of hammered copper from Lake Superior, the shells from the Gulf of Mexico, the implements of Mexican stone and of Missouri iron, these plates of a mineral not found in this great valley, give a plain hint of the extensive commercial relations of these prehistoric peoples.

Mica was evidently mined in Western North Carolina, where their long abandoned workings have lately been reopened, and made the scene of a very modern enterprise. Seven years or so ago, a prominent citizen of North Carolina set some laborers to work in one of the ancient mines, in search of silver, supposing that metal to have been the one sought for by the original miners. A considerable quantity of mica was thrown out, but its value was not recognized until a sample, which had been sent to Knoxville, as a curiosity, was seen by a Mr. Clapp, who followed up the clue and leased the mine for its mica, and revived an industry which has added immensely to the wealth of the region. The mine is known as Blaylock's, about twelve miles from Bakersville, the county seat of Mitchell county. Four or five other ancient mines have since been re-opened in the same neighborhood, besides many new ones in the same and adjoining counties.

The mica trade has given general occupation to the population of Mitchell county, and has made money plentiful and thereby enabled the county to pay off its indebtedness, which it otherwise would have been unable to do. Mines have also been opened in Yancey, Heywood, Burke, McDowell and other counties. The business is still in its infancy, and the methods of mining are exceedingly primitive, yet the amount of mica produced is more than enough to supply the large and growing demand for the article. Dealers and manufacturers supply the mines with patterns ranging in size from 2 by 3 inches up to 15 inches square, according to which the mica is prepared for market. The dark or brassy colored mica brings the best price. Associated with this mica is an abundance of decomposed snow-white feldspar, which will, no doubt, be utilized in time, for the manufacture of porcelain.

THE NEW OREGON MINES.—Mrs. Heard received letters this first of the present week from her husband at the New Oregon mines on Rogue river near the mouth of Galice creek. He thinks the mines, without question, are extremely rich. Owing to the bad weather and lack of facilities of all kinds, but little work will be done in the way of developing them, till spring. However considerable work is being done in the way of taking out quartz to be crushed when mills shall be erected. One mill has already been ordered and will be up and ready for use by spring. The place is yet without hotels for the accommodation of people or stables for the accommodation of horses. Mr. Heard has taken up two claims on the ledge and a land claim in the vicinity for a farm. The country is, we understand, very mountainous, but has, notwithstanding, small bits of land here and there on the streams adapted to agricultural and grazing purposes. Mr. Heard's account of the richness of the mines, the prospects of the district, and of his own prospects in particular are quite flattering, but we hope more so than future developments will justify.—*Yreka Journal*.

SITKA MINES.—The Portland (Oregon) *Bulletin* says: J. H. Fisk, the well known assayer of this city, is corresponding with parties who have been engaged in prospecting and mining on the Sitka region during the past summer. From a letter recently received from Sitka we extract the following in relation to this wonderful mine lately found: "The discoverers of this mine went up to it in October, but there was so much snow they had to leave. As soon as the snow disappears I will accompany them. They seem to think it a permanent discovery. * * * On an island in front of this place, where they are prospecting for coal they have struck a two-foot ledge, containing copper and gold. This country is a mine of wealth, and I intend to remain with it."

AVAILANCES IN UTAH.—Dispatches from Salt Lake city, dated the 14th inst., say: Terrible snow storms are prevailing throughout the Territory. The cañons of Cottonwood are completely blocked with snow, and avalanches are occurring hourly, the citizens of Alta, Utah, fearing the destruction of the town from snow. They have guides out daily for the purpose of warning the people. The four men killed by an avalanche on Tuesday will be buried to-morrow, under the auspices of the Masonic fraternity.

CASTLE DOME district, above Yuma, in Yuma county, Arizona, is yielding considerable ore and bullion. Geo. Tyng, Esq., writes us on December 24th, that 160 tons of ore had just gone to the mouth of the river for shipment to San Francisco, and that 200 tons more were ready for shipment by the next steamer.

Quartz Mining on South Yuba.

From a correspondent near Washington in this county we learn that the well-known Lindsay mine in that vicinity has lately been incorporated under the name of the Fall Creek company, with Capt. Kidd Bell and others as Directors, and a capital stock of \$5,500,000. It is reported that they will remove the mill and works from the top of the hill down near the river, which will give them 1600 feet of ground above the tunnel to their present works, and our correspondent thinks if they do and select the right point and open the mine well, there is no trouble about making big dividends from this property. South of this is the Yuba mine, owned by F. A. S. Jones, which is looking splendidly, having rich rock at the surface for 400 feet, and a tunnel driving in to open it up. North and south on the same lode are several locations of much promise, which our correspondent says he will mention at some future time. Still farther south than any previous locations a rich lead of quartz has lately been discovered by J. F. Smith. His ledge is about two feet thick, and the rock will average eighty dollars per ton. It is stated that it will produce \$200 rock, and our correspondent says "so it will, but the average is the thing, and what it will mill, and this can be put at eighty dollars."

The California mine near Washington, is going on nicely. The Canyon Creek is doing a little, and has the appearance of good rock, but the mill has not started up yet. The tunnel on the Blue Tent ditch continues in hard rock, but is expected to be through in two or three weeks.—*Foothill Tidings*.

Cheap Boxes for Plants.

The cost to the amateur of handling and potting plants in the early stages of their growth is trifling; but to the nurseryman, who carries thousands of horticultural nurslings through from one period of growth to another, the expense of boxes and pots is considerable. We learn, however, that some of the nurserymen of Capay valley have adopted a device which almost does away with this expense. One of them, while on a visit to Swan & Co.'s Union Box Factory had his attention called to a method by which boxes may be formed by simply folding a scored piece of board so as to form a box with four sides, the ends lapping, and requiring nothing but a string tied about it to constitute a box sufficiently strong for nursery purposes. When the plant is to be transferred from this to a larger box or to the garden, by simply cutting the string and unfolding the sides, the plant is disengaged without disturbing the earth by sliding.

Some of these scored pieces were recently examined by us at the above named factory. They were about a foot in width and long enough to form a box 4x4 inches. This is to be cut into three sections; each being 4 inches square; though the size, of course, can be varied; and being only the thickness of the common strawberry box they can easily be cut into sections with a pocket knife. The factory furnishes these boards, scored and ready for folding, at one cent each. Thus the purchaser has the material for three boxes at the cost of one cent; and in a condition as convenient for transportation as a package of pasteboard.

THE NEW SHAFT.—The new California and Consolidated Virginia shaft, better known as the C. and C. shaft, although recently commenced, already begins to present the appearance of regular hoisting works. A large building has been erected over its mouth, an engine is in full operation, the shaft is down a distance of 75 feet, and a dump-pile extends from 25 to 30 feet down the hill, and is in miniature that which it will become when the shaft has been sunk to the required depth. There is plenty of room to the eastward to extend it, even should it in future times equal the proportions of the Savage dump or that of the Gould & Curry. A large amount of lumber is being hauled upon the ground for the purpose of timbering the shaft, and the neighborhood exhibits a lively appearance. Three months ago it was one of the most barren localities about town, but now an army of workmen are engaged in the vicinity, the scream of steam-whistles and noise of engines are heard, teamsters are making new roads through the sagebrush, and a portion of the city which was heretofore deserted and without attractions of any kind, has suddenly sprung into a new existence.—*Virginia Chronicle*.

SMELTER DESTROYED.—The Helena *Independent* says: On Friday evening, about seven o'clock, the furnace situated about two miles from Jefferson City, was discovered to be on fire, and as the wind was blowing a gale at the time, the whole building was soon enveloped in flame, and in a shorter time than it takes to write this article, all that was left of the Jefferson smelter was a heap of smoking ruins. Many of the surrounding miners were working in the expectation of selling their ores to Mr. Nowlan, and with some of whom we believe he had contracts. To these parties it will prove a great disappointment.

THE CORRECT WAY.—We understand that a movement is on foot to thoroughly test the worth and value of the Santiam mine during the present season. For 15 years this section has been scratched over after a fashion, resulting as could be expected.—*Portland (O.) Bulletin*.

GOOD HEALTH.

Treatment of Diphtheria.

The following rules for the prevention or extirpation of diphtheria form the concluding sentences of a report submitted recently by Dr. Stephen Smith, of the U. S. Board of Health.

Precautions—The Dwelling or Apartment.

Cleanliness in and around the dwelling, and pure air in living and sleeping rooms, are of the utmost importance wherever any contagious disease is prevailing, as cleanliness tends both to prevent and mitigate it. Every kind and source of filth around and in the house should be thoroughly removed; cellars and foul areas should be cleaned and disinfected; drains should be put in perfect repair; dirty walls and ceilings should be lime washed; and every occupied room should be thoroughly ventilated. Apartments which have been occupied by persons sick with diphtheria should be cleansed with disinfectants, ceilings lime-washed and woodwork painted, the carpets, bedclothes, upholstered furniture, exposed many days to fresh air and sunlight. All articles which may be boiled or subjected to high degrees of heat should be thus disinfected. Such rooms should be exposed to currents of fresh air for at least one week before re-occupied.

Well Children.

When diphtheria is prevailing, no child should be allowed to kiss strange children, nor those suffering from sore throat (the disgusting custom of compelling children to kiss every visitor is a well contrived method of propagating other grave diseases than diphtheria) nor should it sleep with or be confined to rooms occupied by, or near articles (as toys taken in the mouth, handkerchiefs, etc.) belonging to children having sore throat, croup or catarrh. If the weather is cold the child should be warmly clad with flannels.

When Diphtheria is in the Family.

The well children should be scrupulously kept apart from the sick, in dry and well aired rooms, and every possible source of infection, through the air, by personal contact with the sick and by articles used about them in their rooms, should be rigidly guarded. Every attack of sore throat, croup, or catarrh, should be at once attended to. The feeble should have invigorating food and treatment.

Sick Children.

The sick should be rigidly isolated in well aired (the air being entirely changed at least hourly) unlighted rooms the outflow of air being, as far as possible, through the external windows by depressing the upper and elevating the lower sash, or a chimney heated by a fire in an open fireplace; all discharges from the mouth and nose should be received into vessels containing disinfectants, as solutions of carbolic acid or sulphate of zinc, or upon cloths which are immediately burned, or if not burned, thoroughly boiled or placed under a disinfecting fluid.

WHY AMERICAN WOMEN ARE UNHEALTHY.—If we trace the history of New England back a few generations, we find a stalwart race of mothers and grandmothers; and even now there are specimens of these, healthy, active, happy, of ages varying from three-score-and-ten to one hundred years; and if we trace the history of American women from the landing of the Pilgrims to the advent of Dr. Clarke's book, we shall find the degeneracy exactly corresponding with the increase of sedentary habits, fashionable dress, gormandizing on indigestible food and condiments, forced and precarious development, sensational literature, and dosing and drugging for the multitudinous ailments consequent on a mode of life which has so little of nature and so much of the preternatural about it. Until the children and young women of America return to the more normal ways of their ancestors, they will go down, down, in the scale of vitality, with, or without co-education, or school education of any kind. Co-education is one of the measures that will exercise a saving influence; but alone it will not arrest the deteriorating tendency. This requires a thorough indoctrinating into the laws of hygiene and their strict application to practical life. In this, and in this only, is the hope, not only of American women, but of American men, and, indeed, of the human race.—*Phrenological Journal*.

DIPHTHERIA A MALARIAL POISON.—The microscope demonstrates that typhus and typhoid fevers and all their genera, diphtheria, etc., are generated by malarial poison. New York is given as an example, where the sewers and stoves murder 18,000 people annually; the death rate being 34,000 whilst the normal rate should be but 11,000. The remaining 5,000 are thrown into other channels of murder and suicide. The same evil prevails throughout the territory we have mentioned, and we do not believe the *Manufacturer* can do a greater service to its readers than to urge reform in stoves, sewers and ventilation.

MEASLES.—The *Callistoga Free Press* understands that this epidemic is prevailing there, and has become quite wide spread. It is mostly confined to children, and that which has, thus far, made its appearance, is of a mild type and readily yields to care and suitable attendance.

Scarlet Fever and Dyptheria.

The prevalence of scarlet fever, and dyptheria, as an epidemic in many sections, induces us to call attention to the use of bromo-chloralum, as an agent for purifying the air of the dwellings and sick rooms, by neutralizing and destroying at once all noxious odors and gases, as well as germ of disease, and putrescent particles floating imperceptibly in the air.

It is a concentrated solution of aluminum chloride and bromide, inodorous and non-poisonous and after repeated trials, has been found to be both agreeable and potent. It promptly absorbs and decomposes all ammoniacal and noxious gases, and renders the atmosphere and surrounding objects sweet and wholesome. It has been tested in such a variety of cases with such uniform success, that we feel warranted in recommending it to the public for general use, in all places or circumstances that give rise to unhealthy, bad odors.

A striking merit of bromo-chloralum is, that it operates by removal and not by creating an odor greater than the one sought to be removed. Can be applied in the most simple manner, directing it according to the object or locality to be purified. Indeed one great element of its success is the capability of free diffusion, causing it to purify the air as well as the walls, ceilings and floors.

For scarlet fever and other contagious diseases suspend towels in the room moistened with it diluted. Use freely on all bedding and in the chamber utensils, previous to use, as by this method the poison of excretions is neutralized.

Also when the throat is ulcerated or inflamed, gargle with it diluted one to ten of water. We are advised that patients feel much comfort from the use of a dilution of one part to 12 or 16 of water as a wash; all speak of its soothing influence when applied to the burning, itching surface. It neutralizes the poison, limits the spread of the disease. Attendants should use the same freely upon their clothes and person.

For diphtheria, sore throat, etc., dilute one part to ten of water, or stronger according to circumstances, and gargle the throat when advisable, also swallow 5 to 10 drops in a teaspoonful of water. The general directions as to purifying the air of the house and room should be observed fully.—*Journal Materia Medica*.

CASTOR OIL AMONG THE CHINESE.—A writer in the *Journal of Applied Science* states that castor oil has so little effect on Chinese intestines that the Celestials use it habitually in cookery.

USEFUL INFORMATION.

WHY NOT EAT OYSTERS IN SUMMER?—According to the popular notion; which, in the main, is correct, the spawning season of the oyster embraces those months which have not in their spelling, namely: May, June, July and August, the four warm months in the year. The fact is, that oysters generally, do their spawning during these four months; but a few are liable to spawn whenever the water is warm enough, and large numbers pass through the year without spawning; and these, were it not for the difficulty of assorting them, would be available for food at any time. But the prejudice is universal against their use during the summer months. That they are not in as good condition then as during the cooler months, is reasonable to suppose; but that they are all necessarily unwholesome in the warm months, is far from being proved. In business phrase, oysters in spawning time are said to be 'milky.' This means the presence of an opaque fluid in considerable abundance, and which has to do with the wants of its young—perhaps, remotely, a sort of fluid of amnion.—*Popular Science Monthly*.

A NEW "RATESANE."—And now the flowering plant "asphodel," is to drive away the rats wherever they may be. This is a perennial, but where it is to be obtained we know not. Perhaps at some of our seed-stores. We, however, would not advise the destruction of all the cats until after a thorough trial and proof of the efficacy of the new "exterminator."

[The asphodel is a fine garden bulbous plant, much cultivated in Europe. It has a stem about three feet high, thickly covered with three-cornered yellow leaves. Its flowers are of a yellow color, reaching from near the base to the top of the stem. The ancients were in the habit of planting the flowers in burial places, to afford nourishment for the Shades of the dead. It is said that the bulbs of some varieties of this plant, when dried and ground to powder, make an excellent glue.—*Eds. Press*.]

LEATHER FROM TAPE.—A method has been patented in France for preparing leather from tripe and other animal membranes, the leather thus made to be used for glove making, etc.

ANTS, CAICRETS, and other insect annoyances may be driven from their nests and holes by sprinkling carbolic acid diluted with water around these places of resort.

THE Popular Science Monthly ridicules the idea that oysters shouldn't be eaten in the months that haven't an r in them as well as in other months.

ARTIFICIAL FURS.—M. Tassand, of London, suggests an ingenious way of preparing the hair or fur of animals for use without employing the skin. The process consists in first soaking the fur in lime water to loosen the adhesion of the hairs. After washing and drying, the pieces are stretched upon a board, fur side up, and a solution of glue laid over it, care being taken not to disturb the natural position of the hairs. After the glue has hardened, the skin may be pulled off, leaving the ends of the hair exposed. The latter are then washed with proper substances to remove fat, bulbs, etc. An artificial skin of gutta percha, or other waterproof substance, is next laid on top of the glue and allowed to dry, so as to form a continuous membrane, when the glue is washed out with warm water. These artificial skins are entirely free from any animal odor, and are more durable, lighter, and more pliable than the natural ones.

CEMENT FOR ATTACHING LABELS TO METAL.—Many of our lady readers have no doubt been much troubled in putting up fruit, to make the labels stick to the tin cans. The *Medical Journal* says that a paste made as follows will meet the case: Ten parts tragacanth mucilage, ten parts honey, and one part flour. The flour appears to hasten the drying, and renders it less susceptible to damp. Another oment that will resist the damp still better, but will not adhere if the surface is greasy, is made by boiling together two parts of shellac, one part of borax, and sixteen parts water. Flour paste, to which a certain proportion of sulphuric acid has been added, makes a lasting cement, but the acid often acts upon the metals.

WEATHER OBSERVATIONS.—When you wish to know what the weather is to be, go out and select the smallest cloud you can see. Keep your eyes upon it, and if it decreases and disappears, it shows the state of the air which will be sure to be followed by fine weather; but if it increases in size, take your great coat with you if you are going from home, for falling weather is not far off. This reason is this: When the air is becoming charged with electricity you will see every cloud attracting all lesser ones towards it, until it gathers into a shower; and, on the contrary, when the fluid is passing off or diffusing itself, then a large cloud will be seen breaking to pieces and dissolving.

THE FIRST PATENT.—It is said that the first patent issued by the United States was granted to Samuel Hopkins on July 30, 1790, for the manufacture of pot and pearl ashes. The third was to Oliver Evans, of Philadelphia, so famous for inventions in high pressure engines, of whose inventions President Jefferson remarked that "it was too valuable to be covered by a patent, and there should be no patent for a thing no one could afford to do without after it was known." This was in December of the same year in which Hopkins obtained his patent. For many years after this date the Patent office was but a clerkship in the State department.

PAINTING OLD BUILDINGS.—An inexpensive but durable method of painting old buildings is as follows: First give them a coat of crude petroleum, which is the oil as it comes from the wells, and which can be procured for four or five dollars per barrel. Then mix one pound of "metallo paint," which is brown or red hematite iron and finely ground, to one quart of linseed oil, and apply this over the petroleum coat. The petroleum sinks into the wood, and makes a groundwork for the iron and oil paint. The color of the iron paint is a dark reddish brown, and is not at all disagreeable; it is a color not easily soiled, very durable, and is fire-proof.

MINUTENESS OF FUCHSIA SEEDS.—A gentleman recently visiting a fuchsia house (hot house) in Europe was asked to guess the amount of fuchsia seed gathered in one year from the house—10 by 30 feet in size. Twenty, ten, and even as little as one pound were suggested, but the fact proved that the entire product was only one quarter of an ounce. The *Garden* says that Mr. Cannell's specimen fuchsia-house, 30 feet by 20 feet has not yet afforded him a quarter of an ounce in one season. One may infer from these facts how fine the seed is.

GILDING AND SILVERING SILK THREAD.—In a process that has been patented in England, gold or silver leaf is rubbed on a stone with honey until reduced to a fine powder. The silk thread is soaked or boiled in a solution of chloride of zinc, and, after being washed, it is boiled in water with which the gold or silver powder has been mixed. When washed and dried it will be found coated with a fine layer of gold or silver, which may even be polished in the usual manner.

VARNISH THAT WILL ADHERE TO METAL.—In order to make alcoholic varnish adhere more firmly to polished metallic surfaces, A. Morell adds one part of pure crystallized boracic acid to two hundred parts of varnish. Thus prepared it adheres so firmly to the metal that it cannot be scratched off with the finger-nail; it appears, in fact, like a glaze. If more boracic acid is added than above recommended, the varnish loses its intensity of color.

TO PRESERVE COLOR IN DRIED FLOWERS.—To preserve the natural color in dried flowers, lay them when fresh into alcohol for a few minutes—they will fade at first—but recover their color.

DOMESTIC ECONOMY.

Useful Recipes.

EDITORS PRESS:—I send you some cooking recipes which we have tried and found very good and they are so simple that even a dyspeptic could not object to them:

BROWN BREAD.—1 cup of corn meal, scalded; 1½ cups Graham flour; 1½ cups white flour; ½ cup of syrup or molasses; 2 tablespoonsful brewer's yeast, or two-thirds cup of home-made yeast; a little salt and water, enough to make a stiff batter. Set in a warm place to rise, and when light bake in a hot oven in muffin rings or loaves, the muffin rings are best.

TAPIOCA PONDING.—1 cup of tapioca and a teaspoon of salt; put in three large cups of warm water and soak three or four hours; pare and core enough apples to cover the bottom of a pudding dish, and fill the hollows where the cores were taken out, with sugar and a very little nutmeg or cinnamon; pour the tapioca over the apples and bake three-quarters of an hour. This recipe is for apples that cook easily. Serve with sugar, cream, or milk or a warm sauce.

CREAM CAKE.—1 cup of sugar; 2 eggs; 1 tablespoon of butter; heat together with a little salt; 4 tablespoons of water; 1 teaspoon of yeast powder mixed with the flour, flavor with lemon. This makes two cakes. The cream is made with one-half pint or more of milk. Heat the milk in a dish in a kettle of water and thicken with two eggs, a little salt and sugar, beated together, and one tablespoon of corn-starch mixed in a little cold milk, stir well and let it just come to a boil. When cold flavor with lemon, cut open the cakes and put the cream between the pieces. L.

Santa Cruz.

WATERED BUTTER.—In the course of some investigations made by Professors Angell and Hehner, England, out of analyses of fifteen samples of butter which were determined by them, twelve of the samples, which were undoubtedly good butter, contained 6 to 13 per cent. of water; the astonishing quantity of 42.3 per cent. was found in one sample from London, or an excess of about 32 per cent. of water, for which Londoners pay from 32 to 48 cents per pound. Another butter from the same place had 24 per cent., these high ratios being due to the fact that the butter had been treated with milk. On the other hand, a sample purchased in Ventnor was found to contain under 4 per cent. of water, and according to the authors it contained 50 per cent. of foreign fat. The authors also found that genuine butter spread out on sheets of paper and exposed for a week to the air in the laboratory became, so far as the senses could judge, indistinguishable from tallow.

BEAN PORRIDGE.—Parboil the beans as if for baking; drain and put them in the liquor. This needs the salt earlier than the soup, and no flavor save the beans. Boil until the beans become broken and tender, and then add hulled corn, or Indian meal, or both. Stir in the meal carefully, not to lump, or get too thick. When it is well cooked and seasoned properly, take a large spoon, and stir thoroughly together. You will have a luscious dish, and "better when nine days old," says the proverb.

A slice of a nice piece of pork is a relish in either of the above dishes, for the meat should be kept for shortening, as there is usually enough left in the bones for the soups. I never knew an edge-bone to cost more than ten cents, often only six cents per pound. Two or three good meals and pies can be obtained from one. The coming winter some one may like to try it.

MAKING COFFEE.—A correspondent gives this receipt for coffee: Use about one tablespoonful for each person, and one egg mixed with it. Place this in a coffee-pot, put in a little cold water, and then the desired amount of boiling water; place upon the stove and let it come to a boil. If no egg is used, it should never boil over a minute. If an egg is used, it may boil two minutes, when it will be ready for use. The coffee-pot should be as close as possible, so as to retain the flavor. The object of using a little cold water is to give a little time for hot water to extract its virtues before it boils.

ROYAL FRUIT CAKE.—Five cups of flour, five eggs, one and one-half cups of sugar, one cup of molasses, one and one-half cups of butter, one teaspoonful of saleratus, one-half a cup of milk, two pounds of chopped raisins, three pounds of currants, one and one-half pounds of citron, two tablespoonfuls of cinnamon, one nutmeg, two teaspoonfuls of cloves. This is a splendid receipt. I have some cake now that I made a year ago, and it is nicer now than when first baked.—*The Household*.

GROUND RICE GAUDEL.—Daisy Eyebright gives the following: "Boil one tablespoonful of ground rice, rubbed smooth with a pint of cold water, in a pint and a half of milk, with a bit of cinnamon and lemon peel. Sweeten slightly, or season with salt."

BAKED EGGS.—Beat up six eggs, one tablespoonful of flour, six of sweet milk; melt your butter in the frying-pan; when hot, turn the whole in, well-beaten, and bake in a hot oven

MINING SCIENTIFIC PRESS

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A San Francisco Stone Front.

The Safe Deposit company's building now being erected on the southeast corner of California and Montgomery streets, bids fair to be one of the finest in appearance in the city. It is to be four stories high with 137½ feet frontage on Montgomery, and 69 feet on California street. Its whole front will be of Frear stone with handsome ornamental projections and foings. Last week we visited the Frear manufacturing works, and found over 51,000 cubic feet of stone already manufactured for this building. The total weight of Frear stone required for the building will be 450 tons.

Coarser sand than usual has been used in the manufacture of this particular stone, which gives it a nearer resemblance to natural stone than any of the Frear we have before seen. It is believed that this improves its texture as well as its appearance.

We cannot here describe the various ornamental designs which will appear in the building. As arranged in parts about the works, the ornamental pieces seem almost innumerable. They also appear to be in good taste, and when erected the structure will form an entirely novel piece of architecture in San Francisco. The columns are rounded. Fluted, Corinthian and composite capitals are employed. The window heads are truly ornamental and very bold in relief. On the right of the grand corner window will rest a stone relief design, representing mining, embracing the pick, pan, spade and bar, etc., on the left, agriculture, with plow, wheel, rake, grape, etc. Wm. Patton is the architect. We should like hereafter to give a fuller description of his designs.

By the manufacture of this artificial stone we shall see a massive and beautifully wrought block arise during a few months in our midst that would otherwise have been years in building at more than double the cost. By the erection of this structure the Frear stone company takes a front stand in our city and in our home manufactures. We shall be pleased to see them maintain it. They have some of the best business partners in San Francisco in the enterprise. Their Superintendent is indefatigable in his labors. Their works are a living example of home industry that ought to be liberally duplicated in this State.

A large quantity of stone is also being turned out by the Frear company for the front of a new building on Sansome street. Portland cement is used exclusively in the manufacture of Frear stone on this coast. Over 2,600 barrels are now held in store by the company. Artizans and others who look with pride on such works will find the present a favorable time to call on Capt. Cushing at the manufactory on Bluxome street, near Fourth.

The Mining Interests in 1874.

The miners of the Pacific Coast never had more cause for congratulation in finishing a years work than they had in completing that of 1874. The year has been one of hard work and well earned profits, and the miners may well look with pride on the array of figures representing the result of their labor. We have heard of successful mining ventures on every hand, and fewer failures than usual. This is due to the fact that the people on this coast are fast awakening to the idea that they must engage in mining, as they do in any other business, and invest their money without excitement and with judgment and forethought. The day has long gone by when a man can come to San Francisco with a few lumps of quartz and sell a claim for thousands of dollars. He must now bring the proper papers to prove his ownership, location, etc., and then an expert will accompany him to the mine and examine it in the interest of the purchasers. It takes several months, as a general thing, to dispose of a mine in these days which, a few years ago, could have been sold in a week. This is a fact in which we really ought to congratulate ourselves as it shows that those who invest their money in mining property only do so after a thorough examination and mature deliberation. They will therefore work their property in a more legitimate manner, and trust less to stock-jobbing operations.

This matter is one of more importance than many suppose and exercises a potent influence on the mining interests. With mines scattered all over the country, worked properly and with due regard for economy, money can be made rapidly. It will encourage capital to help out labor and encourage the prospectors in their work of bunting up new mines.

A large number of new mines were opened up last year of which we will hear more in the future. In California and Nevada, moreover, particularly the former, we hear of many old abandoned mines being taken up again and reworked. In many cases costly works were put up years ago and mines opened by inexperienced men, which were afterward abandoned as failures. Many of these old locations are now being worked by competent men and made to pay well.

The year 1874 has been marked, perhaps, for a lack of any of the furious "excitements" of former years, which lured thousands of miners away from steady work, paying claims, and comfortable cabins, to travel in search of a new El Dorado. The nearest approach to anything of this kind we have had has been the "Panama excitement" but this was a very mild form of the disease compared with previous epidemics. Moreover, Panama, was comparatively "get-at-able," and not such a distance from ordinary mining centers as Fraser River, Stickeen, etc.

We have had few mining accidents of large proportions; that of the fire in the Belcher air shaft on the Comstock, by which several lives were lost being the most important. We have been compelled, however, to chronicle from week to week during the year, many accidents by which precious lives were lost. These casualties seem to increase from year to year, which is attributable to the fact that more men are engaged in deep mining than formerly. A noticeable feature has been also that very few mills or reduction works have been destroyed by fire. This class of property is considered by insurance companies to be as risky as any with which they have to do, and insurance is no small item to the mill man. Of late years, however, where large, costly and permanent mills are erected, reservoirs are dug, pipes laid, hydrants put up and every possible precaution is taken to prevent the destruction of the property by fire.

Another fact indicating the faith of capitalists in mining investments and proving that as a business, mining is gaining strength among us, is that the mills now made are larger than ever, the hoisting and pumping gear heavier and stronger, and the buildings and surface works are built in a manner indicating that the owners intend to work properly. The developments in some of the deep mines on the coast have induced mining men to go deeper with a surer hope of success. We no longer scratch over the surface and consider a mine worked out with a 200 ft shaft. In Nevada they have shafts over 2,000 feet deep and are putting up machinery to work 4,000 feet. It was at one time supposed that by the regular increase of temperature with depth, mining below 2,000 feet would be almost impossible and so expensive as to be impracticable. Practice has proved that this idea is fallacious and by various means the heat in the lower levels is decreased and the miners made more comfortable.

We are unable to chronicle this year any very marked improvement in the processes or machinery in use, but are gratified to know that millmen and miners show more care in working ores than they used to and that they manifest great interest in anything calculated to reduce expenses. Machinery is a great deal heavier and more costly than ever. The foundrymen of this city have reaped a harvest from the miners of late, and nearly all the foundries here are kept busy with this class of work. Where formerly a 20-stamp was considered a large order, 40, 60 and 80-stamp

mills are now ordered. The Consolidated Virginia 80-stamp mill started up on the first of January and another mill of the same size will shortly go up alongside of it. On the Summer mine in Kern county an 80-stamp mill is being erected to run by water power and many other large mills in different parts of the State have been erected during 1874.

There is no way for us to make any calculation of the number of men employed in mining on this coast; nor can we tell whether there were more in 1874 than in 1873. The supposition is, however, that there was an increase this year, as so many new mines were opened.

It gives us satisfaction to know that last year capital was much readier to invest in good mines than has been the case for some time. California mines have been to some extent neglected, however, as the capitalists were more interested in Nevada. English capital which flowed into Utah last year so abundantly has been turned to some extent toward this State and some considerable amounts invested in gravel mining property. Our miners complain, however, that good property which will pay three per cent. per month goes begging in this market unless in the shape of stock. The late stock excitements have interested many in mining matters, who may continue to look favorably on them as a means of investment.

There have been no drawbacks to our mining property save alone the high price of quicksilver, which is spoken of at length further on. Tailings mills and works have in some instances shut down and the price of this metal has had an injurious effect. This matter of rich tailings is now receiving considerable attention and they are now in many cases carefully saved. Nevertheless, large quantities of tailings run to waste in the rivers and cañons. With cheap power and quicksilver considerable money can be made in working them over.

Before speaking in detail of this State and its prospects it may be well to give some general remarks on the

Bullion Product of 1874.

Which is considerably higher than that of 1873. The figures given further on ought to open the eyes of the most thoughtless man to the importance of the mining interests of the Pacific Coast. If we could get at the exact number of men employed in each calling we are confident that the miners would make a better showing per capita than the farmers, in the respective States and Territories. The miners of this coast have this year produced according to the most reliable figures obtainable, over 74,000,000 of dollars. And this has been done without any political machinery, without any class organizations, without the passage of any "Resolutions" on any subject and with very little stir about the matter at all. They have been hard at work at their legitimate business and have turned out the useful coin for the commercial purposes of the world in abundant measure.

Mr. Valentine, General Superintendent of Wells, Fargo & Co., publishes the following statement showing the amount of precious metals produced in States and Territories west of the Missouri River during 1874:

The total bullion product of the Pacific States and Territories for the year 1873 was \$72,258,693. This year it was \$74,401,055 showing an increase of \$2,142,362 over 1873. Jno. J. Valentine, General Superintendent of Wells, Fargo & Co.'s Express, who computes the most reliable statistics on this point writes as follows:

We hand you herewith a copy of our annual statement of precious metals produced in the States and Territories west of the Missouri River, including British Columbia, during 1874, which shows an aggregate yield of \$74,401,055, being an excess of \$2,142,362 over 1873. California, Nevada, Utah, Colorado and British Columbia increased; Oregon, Washington, Idaho, Montana, Arizona and Mexico (west coast) decreased. The increase in Nevada and Colorado is merely nominal, but in California and Utah it is \$3,100,000, three-fourths of which is to the credit of California.

STATES AND TERRITORIES.		Gold Dust and Bullion by Express.		Gold Dust and Bullion by other Conveyances.		Silver Bullion by Express.		Ores and Base Bullion by Freight.		TOTALS.	
Year.	California.	Year.	California.	Year.	California.	Year.	California.	Year.	California.	Year.	California.
1873.	\$5,000,000	1873.	\$10,000,000	1873.	\$10,000,000	1873.	\$10,000,000	1873.	\$10,000,000	1873.	\$10,000,000
1874.	22,000,000	1874.	30,000,000	1874.	30,000,000	1874.	30,000,000	1874.	30,000,000	1874.	30,000,000
1875.	30,000,000	1875.	40,000,000	1875.	40,000,000	1875.	40,000,000	1875.	40,000,000	1875.	40,000,000
1876.	40,000,000	1876.	50,000,000	1876.	50,000,000	1876.	50,000,000	1876.	50,000,000	1876.	50,000,000
1877.	50,000,000	1877.	60,000,000	1877.	60,000,000	1877.	60,000,000	1877.	60,000,000	1877.	60,000,000
1878.	60,000,000	1878.	70,000,000	1878.	70,000,000	1878.	70,000,000	1878.	70,000,000	1878.	70,000,000
1879.	70,000,000	1879.	80,000,000	1879.	80,000,000	1879.	80,000,000	1879.	80,000,000	1879.	80,000,000
1880.	80,000,000	1880.	90,000,000	1880.	90,000,000	1880.	90,000,000	1880.	90,000,000	1880.	90,000,000
1881.	90,000,000	1881.	100,000,000	1881.	100,000,000	1881.	100,000,000	1881.	100,000,000	1881.	100,000,000
1882.	100,000,000	1882.	110,000,000	1882.	110,000,000	1882.	110,000,000	1882.	110,000,000	1882.	110,000,000
1883.	110,000,000	1883.	120,000,000	1883.	120,000,000	1883.	120,000,000	1883.	120,000,000	1883.	120,000,000
1884.	120,000,000	1884.	130,000,000	1884.	130,000,000	1884.	130,000,000	1884.	130,000,000	1884.	130,000,000
1885.	130,000,000	1885.	140,000,000	1885.	140,000,000	1885.	140,000,000	1885.	140,000,000	1885.	140,000,000
1886.	140,000,000	1886.	150,000,000	1886.	150,000,000	1886.	150,000,000	1886.	150,000,000	1886.	150,000,000
1887.	150,000,000	1887.	160,000,000	1887.	160,000,000	1887.	160,000,000	1887.	160,000,000	1887.	160,000,000
1888.	160,000,000	1888.	170,000,000	1888.	170,000,000	1888.	170,000,000	1888.	170,000,000	1888.	170,000,000
1889.	170,000,000	1889.	180,000,000	1889.	180,000,000	1889.	180,000,000	1889.	180,000,000	1889.	180,000,000
1890.	180,000,000	1890.	190,000,000	1890.	190,000,000	1890.	190,000,000	1890.	190,000,000	1890.	190,000,000
1891.	190,000,000	1891.	200,000,000	1891.	200,000,000	1891.	200,000,000	1891.	200,000,000	1891.	200,000,000
1892.	200,000,000	1892.	210,000,000	1892.	210,000,000	1892.	210,000,000	1892.	210,000,000	1892.	210,000,000
1893.	210,000,000	1893.	220,000,000	1893.	220,000,000	1893.	220,000,000	1893.	220,000,000	1893.	220,000,000
1894.	220,000,000	1894.	230,000,000	1894.	230,000,000	1894.	230,000,000	1894.	230,000,000	1894.	230,000,000
1895.	230,000,000	1895.	240,000,000	1895.	240,000,000	1895.	240,000,000	1895.	240,000,000	1895.	240,000,000
1896.	240,000,000	1896.	250,000,000	1896.	250,000,000	1896.	250,000,000	1896.	250,000,000	1896.	250,000,000
1897.	250,000,000	1897.	260,000,000	1897.	260,000,000	1897.	260,000,000	1897.	260,000,000	1897.	260,000,000
1898.	260,000,000	1898.	270,000,000	1898.	270,000,000	1898.	270,000,000	1898.	270,000,000	1898.	270,000,000
1899.	270,000,000	1899.	280,000,000	1899.	280,000,000	1899.	280,000,000	1899.	280,000,000	1899.	280,000,000
1900.	280,000,000	1900.	290,000,000	1900.	290,000,000	1900.	290,000,000	1900.	290,000,000	1900.	290,000,000

In our statement for 1873 we referred to the yield—\$72,258,693—as "undoubtedly the lar-

gest, for one year, in the history of the coast." The accuracy of the statement has been questioned, and the yield of 1853 referred to as being greater. Dr. Lindernum, Director of the U. S. Mint, whose information is probably as reliable as may be had, names \$65,000,000 as the amount produced in 1853, and that amount was not exceeded until 1873, which is now exceeded by 1874, and the recent developments on the Comstock lode justify the belief that the total product for 1875 will approximate \$80,000,000.

We append to this a comparative table, showing the bullion yield for the past three years as follows:

	1872.	1873.	1874.
California.....	\$19,049,038.24	\$18,062,928	\$20,300,531
Nevada.....	25,648,401.09	35,254,507	25,452,233
Oregon.....	1,905,584.92	1,376,389	609,070
Washington.....	226,051.06	209,395	155,535
Idaho.....	2,514,089.78	2,343,664	1,880,004
Montana.....	4,442,134.90	3,889,800	3,439,498
Utah.....	3,521,020.09	4,406,387	5,911,278
Arizona.....	143,770.00	47,788	26,058
Colorado.....	3,001,750.85	4,083,268	4,191,405
Mexico (W Coast).....	535,071.80	888,708	798,678
British Columbia.....	1,350,074	1,250,035	1,636,557
Total.....	\$62,376,914	72,258,693	74,401,055

This makes a total bullion product for three years, including the west coast of Mexico and British Columbia, which do not properly belong in the table, of \$208,896,762. This is a very good showing, and is one to be proud of.

The receipts of treasure in this city for 1874 is given as follows by Mr. Valentine:

1874	Silver Bullion.	Gold Bullion.	Coin.
January.....	\$ 959,962	\$583,195	\$820,437
February.....	1,099,461	630,424	714,944
March.....	1,805,863	610,250	670,662
April.....	1,363,418	807,830	729,246
May.....	1,971,458	949,139	907,077
June.....	1,973,575	856,856	1,320,472
July.....	1,464,179	916,163	1,025,573
August.....	1,495,898	918,082	934,118
September.....	1,654,367	790,978	1,087,613
October.....	1,627,388	767,147	1,222,115
November.....	1,573,972	629,034	1,049,395
December.....	1,118,917	543,133	1,202,276
Total.....	\$18,905,448	\$8,897,471	\$11,633,979
In 1873.....	12,177,598	10,052,123	9,515,385
In 1872.....	12,777,598	10,052,123	9,515,385

There has been less gold and more silver. The sources of the receipts last year are annexed:

From northern and southern mines.....	\$34,621,330
From northern coast route.....	2,206,232
From southern coast route.....	501,437
From Mexico.....	2,007,599
Total.....	\$39,436,588

In 1873..... 31,855,208
In 1872..... 33,842,737

We append a table showing the total gold and silver production of this coast since California was first settled by the Americans. The figures are such as to astonish those who have no idea of the amount of mining done here. About 20 per cent. is added to Wells, Fargo & Co.'s figures to cover bullion conveyed by other means.

Total Gold and Silver Production.

Year.	Gold.	Silver.	Total.
1848.....	\$5,000,000	.....	\$5,000,000
1849.....	23,000,000	.....	23,000,000
1850.....	59,000,000	.....	59,000,000
1851.....	60,000,000	.....	60,000,000
1852.....	50,000,000	.....	50,0

\$22,075,400 in 1873, an increase of \$5,245,500. Of the coinage last year, \$24,460,000 was in gold, and \$2,867,000 was in silver. During the same time the mint at Carson coined \$2,620,775 in gold, and \$1,411,781 in silver, making a total for both mints of \$3,412,265.

The operations of the San Francisco assaying and refining works were as follows for 1874:

Months.	Ounces.	Value.
January.....	66,754.65	\$1,368,442.97
February.....	84,914.50	1,761,610.70
March.....	86,493.24	1,779,861.90
April.....	85,161.68	1,745,840.03
May.....	25,926.40	526,038.10
June.....	129,329.93	2,596,790.65
July.....	127,369.29	2,598,863.95
August.....	130,828.19	2,681,257.48
September.....	119,964.59	2,444,163.55
October.....	108,885.28	2,170,051.15
November.....	94,130.47	1,915,888.39
December.....	95,480.06	1,915,359.66

Totals.....1,137,726.28 \$22,724,108.52

It is but just to say in connection with the table of hullion product given above, that figures they are compiled with care by Mr. Valentine, and are approximately correct. Nevertheless, they should be much larger from the nature of things. These figures represent the bullion, gold-dust, etc., which passes through the hands of Wells, Fargo & Co. as common carriers. Fully 20 per cent. should be added, however, for the sum which passes from the mines by private hands, and other modes of conveyances than Wells, Fargo, & Co. This being the case, if we deduct Mexico and British Columbia from the aggregate, it will still be much larger than is shown in the above table.

The next important question is that of Mining Dividends. As it has an intimate connection, of course, with the bullion product. We give a comparative table showing the dividends from mining companies called on the Stock Boards in this city:

	1872.	1873.	1874.
Belcher.....	\$2,184,000	\$6,762,000	\$5,304,000
Black Bear.....	45,000	69,000	.....
Crown Point.....	1,860,000	5,100,000	3,400,000
Cons. Virginia.....	.....	2,592,000	.....
Cons. Amador.....	50,000	.....	.....
Cedarburg.....	36,000	24,000	.....
Chollar.....	56,000	.....	.....
Charlot Mill.....	.....	.....	51,000
Eureka Cons.....	40,000	300,000	.....
Eureka Cons.....	.....	200,000	125,000
Golden.....	.....	85,000	.....
K. K. Cons.....	30,000	62,500	.....
La Grange.....	.....	12,500	.....
Meadow Valley.....	360,000	180,000	.....
Monitor Belmont.....	.....	75,000	.....
Minnesota.....	.....	60,000	.....
Mahogany.....	15,000	.....	.....
North Star.....	27,000	.....	.....
Pioche.....	.....	.....	.....
Providence.....	3,100	.....	.....
Raymond & Ely.....	2,070,000	300,000	.....
Redington Quick.....	.....	.....	264,000
Yule Gravel.....	10,000	.....	.....

\$6,730,100 \$13,366,000 \$11,805,000

In summing up the above only those mines are taken into account which advertise their dividends in this city. All the above mentioned are on the lists of the Stock Boards, except the Redington Quicksilver, Minnesota and the Black Bear. A falling off is shown in the dividends this year, which is principally due to the decrease of the dividends of the Belcher and Crown Point. It will be noticed by even the casual observer that not one gravel mine is represented in the figures of dividends for this year. This fact alone goes to show how unsatisfactory it is to have any calculation on the dividend list published. Of the hundreds of private corporations mining profitably, not one is mentioned. Some of these mines, like the Idaho at Grass Valley, are what is known as "close corporations," the stock being held in few hands and the mines worked as mines and not as a stock jobbing operations.

We can mention the following prominent California mines, only one of which is on the Stock Board which have yielded \$2,996,503 from 187,391 tons of ore, this year, making nearly \$300,000 each on the average, yet no mention is made of them in the dividend lists published. They are as follows: Idaho, Eureka, Black Bear Plumas-Eureka, Sierra Buttes, Sumner, Hite's mine, Keystone, Empire. We shall speak more in detail of these mines further on. The following table gives an account of all the dividends disbursed by the different mines called in the Stock Board from its organization, up to January 1, 1875:

Belcher.....	\$14,135,000
Crown Point.....	1,368,000
Cons. Virginia.....	2,592,000
Chollar.....	3,080,000
Confidence.....	78,000
Charlot Mill.....	51,000
Cedarburg.....	100,000
Cons. Amador.....	216,000
Danville.....	56,000
Eureka.....	2,084,000
Empire Mill.....	713,500
Eureka Cons.....	675,000
Gold & Curry.....	3,826,800
Golden Chariot.....	500,000
Hale & Norcross.....	1,598,000
Idaho.....	1,087,500
Ida. Edmore.....	30,000
Keystone Quartz.....	30,000
Kentuck.....	1,252,000
K. K. Cons.....	62,500
Meadow Valley.....	1,200,000
Mahogany.....	15,000
Monitor Belmont.....	75,000
Sutton.....	1,394,000
O. H. Treasure.....	31,399
Pioche.....	60,000
Raymond & Ely.....	3,075,000
Rye Patch.....	22,500
Sierra Nevada.....	102,500
Savage.....	22,800
Ida. Edmore.....	4,400,000
Yellow Jacket.....	2,184,000
Yule Gravel.....	140,000

Total.....\$56,261,499

Assessments and Dividends.

The following table shows the total assessments and dividends on mines called on the San Francisco Stock Board:

Companies.	Tot'l amt. Asses. Levied.	Tot'l amt. Divs. Disb'd.
CALIFORNIA MINES.		
Alpine.....	\$75,000	\$.....
Cons. Amador.....	200,000	200,000
Bellevue.....	101,000	.....
Cedarburg.....	12,000	100,000
Charlot Mill.....	15,000	40,000
Kentuck.....	15,000	2,094,000
Independent.....	83,000	.....
Keystone Quartz.....	10,000	5,000
Magnolia.....	10,000	.....
St. Patrick.....	10,000	.....
Teconmeh.....	72,000	.....
Yule Gravel.....	5,000	40,000
Alamo.....	7,500	.....
Alpha Con.....	150,000	.....
Alta.....	5,000	.....
American Flag.....	75,000	.....
Arden.....	75,000	.....
Baltimore Con.....	251,000	.....
Belcher.....	186,192	.....
Belcher.....	890,400	14,135,000
Bullion.....	1,897,000	.....
Buckeye.....	188,000	.....
California.....	10,000	.....
Chollar-Pioche.....	742,000	4,084,000
Confidence.....	242,360	78,000
Cons. Virginia.....	411,200	2,592,000
Crown Point.....	425,271	11,805,000
Crown Point Ravine.....	15,000	.....
Daney.....	196,000	56,000
Dayton.....	100,000	.....
Dardanelles.....	25,000	.....
Elipse Winters Plats.....	12,500	.....
Empire Mill.....	415,400	713,500
Europa.....	190,000	.....
Farquhar.....	190,000	.....
Globe Con.....	114,000	.....
Gold & Curry.....	1,532,900	3,826,800
Great.....	10,000	.....
Hale & Norcross.....	1,450,000	1,598,000
Imperial.....	1,270,000	1,067,500
Indus.....	15,500	.....
Interoceanic.....	12,000	.....
Julia.....	428,700	.....
Justice.....	431,500	1,252,000
Kentuck.....	270,000	1,252,000
Kentuck.....	270,000	1,252,000
Kosuth.....	54,000	.....
Lady Bryan.....	100,000	.....
Lady Washington.....	30,000	.....
Leo.....	24,000	.....
Mint.....	40,000	.....
New York.....	207,000	.....
Oceania.....	212,000	.....
Og Gold Hill.....	30,000	.....
Ophir.....	1,832,800	1,394,100
Overman.....	1,531,000	.....
Paul Sherman.....	12,000	.....
Pioche.....	38,200	.....
Rook Island.....	108,000	4,468,000
Savage.....	1,714,000	.....
Sage.....	302,400	.....
Senator.....	75,000	.....
Sag. Caledonia.....	1,000	.....
South Constock.....	20,000	.....
Sutton.....	15,000	.....
Sutro.....	12,000	.....
Silver Cloud.....	8,000	.....
Sierra Nevada.....	452,000	.....
Sierra Nevada.....	800,000	102,500
Succor M. and M.....	273,500	22,800
Trench.....	5,000	.....
Tyler.....	212,000	.....
Union Consolid.....	60,000	.....
Utah.....	100,000	.....
Wells Fargo.....	3,026	.....
Wood.....	24,000	.....
Yellow Jacket.....	2,118,000	2,184,000
WHITE MINE.		
General Lee.....	15,000	.....
Hayes.....	58,000	.....
Mammoth.....	85,000	.....
Or. Hidden Treas.....	340,061	31,999
Silver Wave.....	160,000	.....
EMPIRE.		
Golden Chariot.....	555,000	500,000
Ida. Edmore.....	4,400,000	.....
Mahogany.....	348,800	15,000
Poorman.....	25,000	.....
Silver Cloud.....	102,000	.....
South Constock.....	20,000	.....
Virtue.....	120,000	.....
War Eagle.....	100,000	.....
Red Jacket.....	50,000	.....
COPE DISTRICT.		
Excelsior.....	24,000	.....
Amador Tunnel.....	60,000	.....
American Flag.....	156,000	.....
Alps.....	25,000	.....
Bowling Green.....	84,500	.....
Chatter Oak.....	30,000	.....
Chapman.....	37,500	.....
Chenoweth.....	25,000	.....
Chief of the Hill.....	67,500	.....
Condon.....	37,500	.....
Hahn & Hunt.....	219,000	.....
Idaho.....	1,087,500	.....
Ingham.....	10,000	.....
Kentucky.....	127,500	.....
Kintson.....	15,000	.....
Lulu H. Hill.....	11,250	.....
Meadow Valley.....	210,000	1,200,000
National.....	135,000	.....
Newark.....	25,000	.....
Paga & Panga.....	190,000	.....
Payne.....	37,500	.....
Pioche.....	180,000	60,000
Pioche Chariot.....	120,000	.....
Pioche West Ex.....	66,500	.....
Portland.....	71,000	.....
Raymond & Ely.....	180,000	3,075,000
Rye.....	61,500	.....
Silver Peak.....	90,000	.....
Silver West Con.....	37,500	.....
Standard.....	42,750	.....
Spring Mountain Tun.....	33,000	.....
Wash. & Creole.....	262,500	.....
Watson.....	30,000	.....
UTAH.		
Wellington.....	59,000	.....
EUREKA DISTRICT.		
Adams Hill.....	50,000	.....
Columbia.....	87,500	.....
Eureka Con.....	675,000	.....
Jackson.....	62,500	.....
K. K. Con.....	62,500	.....
Phenix.....	337,500	.....
Star Consolidated.....	30,000	.....
PHILADELPHIA.		
Belmont.....	225,000	.....
El Dorado North.....	12,500	.....
El Dorado South Con.....	51,000	.....
Josephine.....	3,750	.....
North Con.....	15,000	.....
Quintero.....	15,000	.....
Monitor Belmont.....	75,000	75,000
ESMERALDA DISTRICT.		
Juniata Consolidated.....	62,500	.....
Totals.....	31,043,830	56,261,499

It is only worth while to mention a few of the mines which have paid and are not included in this list. The Idaho, at Grass Valley, paid in dividends the last fiscal year the sum of \$317,750. Since this mine began running, in 1869, it has paid 517 per cent on the capital stock, or a sum total of \$1,602,700 in dividends. It paid \$102.50 per share last year. The Bald Mountain, from July 1, 1872, to July 1, 1874, paid \$164,000 in dividends. The Spring Valley mine, Butte county, turned out in the year ending last July, \$476,112, of which the owners received \$150,000. The Black Diamond coal company paid this year \$275,000 in dividends, and the Eastport Coos Bay Coal mining company paid \$12,500. Many of the quicksilver mines are paying well, and almost all the

hydraulic mines which are in operation are paying. None of these, however, are called in the Board, and their names do not therefore appear. Many other quartz mines are in the same category. But even taking those called in the Board, in the list given above, by comparing the total assessments and the total dividends, we see a profit to the stockholders of the large sum of \$25,212,569, showing an immense gain on the capital invested. We have said enough on this subject to inform the reader that while the richest mines are represented in the tables given, it is not practicable to gather the same information from close corporations.

Ditches and Gravel Mines.

It is impossible, within the limits of a newspaper article, to give more than a brief review of the operations in the different States. We shall therefore confine ourselves entirely to California; and even then can only mention in general terms the results of the year. The statistics of hullion production give us an increase over the year 1873 of \$2,247,709. This is mainly due to the fact that last year was a much better one, from a miner's point of view than the previous. The water supply was large, and consequently more washing could be done. Many new hydraulic mines have been opened this year, and many more are shortly to be opened. Several important mining ditches were dug in 1874, which will open new tracts of country, and furnish a more abundant supply for old mines. Prominent among these was the Amador Canal, as it is called. This will be of inestimable advantage to Amador county, and already many new mines are being opened that will last for years to come. Heavy gravel mining will in future be a feature in the county, and will add largely to the wealth of the community. The canal will not only furnish water for the gravel mines, but will furnish power to the quartz mines. It has a capacity of 5,000 miner's inches of water, and the water can be so utilized as to make a single head serve many purposes. When used for mills, it can be used for placer mining, and thence to the plains for irrigation. An immense reservoir is being built for this canal at New York Ranch, which shall cover 140 acres of ground and hold 800,000,000 gallons of water. The head of this reservoir is of granite formation. The canal is 45 miles long, and is built with great strength and care.

The big ditch of the North Fork company, built particularly to work the mines near the North Fork of the Feather river, about six miles south of Big Meadows, in Plumas county, was finished last month. This was also a difficult undertaking. This ditch is 25½ miles long, and there are eight miles of pipe in addition to reach the company's property. Considerable tunnel work was done in building this ditch, which is six feet wide on top and three feet deep. It furnishes water for a large extent of country, and the result of the undertaking will be shown in the bullion product next year.

The El Dorado Water and Deep Gravel mining company's canal is also an undertaking worthy of mention. They have had sometimes as high as 1,200 men at work in this ditch during the season. The capacity of the canal is 12,000 inches for 24 hours, and as the company can only use 3,000 inches they can sell to miners on the route some 7,000 inches, allowing for evaporation and leakage. The canal is big enough to float lumber nearly to Placerville. Some 5,000 inches will run through this season, but the whole work will not be done until the next season. It will furnish water for many mines in the gulches and flats which have been short before this.

The Maxwell ditch, in Plumas county, which was commenced in 1872, will probably be extended down the river as fast as necessary to work the numberless bars and gravel beds under the ditch line. The ditch carries 2,000 inches of water, with one of the best water privileges in the county.

At Cherokee Flat, Butte county, some of the largest hydraulic operations in the State are going on. The Spring Valley company, at that place, have expended in works, flumes, ditches, reservoirs and water privileges, over one million dollars. They have four miles of pipe on the line of their ditch, and ten miles of sluices, varying from four to six feet in depth; they have also twenty-three undercurrents. They employ about 160 men, and for the year ending July, 1874, shipped \$476,112. The two ditches owned by the company are 60 miles in length, six feet wide on the bottom and eight feet wide on top. They are four feet deep and run a stream of 2,200 inches of water. This mine proposes to send a bar of gold worth \$100,000 to the Centennial Exposition.

Another big ditch run this year was that of the Milton Water and Ditch Co., in Nevada county. This company purchased this year extensive water rights and storage reservoirs in the middle Yuba river. Their ditch holds 2,500 inches of water. The North Bloomfield Gravel Co., at the same place, last year constructed extensive works for the improvement of their property. They completed their large tunnel last month. It has taken about two and one-half years time and the expense has been enormous. It will pay for itself soon, however. This tunnel is nine thousand feet long. These mines are on the San Juan range, in which are located several important gravel districts, such as Birch Corral, Empire Flat, Kate Hayes Flat, Birchville, Buckeye Hill, Sweetland, Manzanita Hill, San Juan, Badger Hill, Cherokee, Chimney Hill, Columbia Hill, Kenneho Hill, Grizzly Hill, Lake

City, Malakoff, Hombug, Relief Hill, Wolsey, Moore's Flat and Snow Point, all old camps on the gravel channel.

Around Dotch Flat and Gold Run extensive hydraulic operations are going on. The Gold Run Ditch and Mining Co. bring water from Bear and South Yuba rivers, through 23 miles of ditches, and use some 2,000 inches of water on their claims. They are running a 3,000-ft. tunnel to get the necessary fall to work certain claims, a 1,000-ft. branch tunnel from it is finished. The Cedar Creek, an English company, who bought the Placer county ditch, now own 60 miles of ditch. The main ditch gives them 6,000 inches of water. This company now owns 32 claims, or 200 acres of mining ground, and sells about 1,500 inches of water to outside parties. They are running an 8x8 tunnel 3,000 feet long. The South Yuba Canal Co., at this place, is also selling to miners about 3,000 inches, which is brought through 28 miles of ditch from the South Yuba. In this vicinity everything is flourishing. The Indiana Hill Co. are running a tunnel 2,200 feet long, and they will begin washing in February.

Calaveras county now rivals the more northern counties in hydraulic mining. New locations are constantly being made, and various tunnel and hydraulic operations are vigorously prosecuted. The mines are of a permanent character, and the result of the present season's work will be a good one. Some of the mines now worked were a few years since considered as exhausted diggings.

The improvements recently made in hydraulic mining and the reduced price of water in many places consequent on competition, have increased the value of mining property in many places. Though hydraulic mining has been carried on for nearly twenty years, at many points it was only recently that steps were taken to develop the deep gravel deposits, all the work having been done at easily accessible points. The value of a hydraulic mine depends greatly on the facilities for working it, and each year new mines are opened up by ditches and flumes.

Drift Mining.

Drift mining has of late years become quite profitable in California. The term drifting, as applied to this class of operations, relates to the mode of extracting the auriferous gravel by means of tunnels and gangways, or galleries, and washing the dirt in sluices. This system is rendered necessary on account of the capping of volcanic matter overlying the ancient channels and rendering hydraulic operations impossible. In hydraulic mining the entire face of the bank is removed by the pipe; in drifting claims only the lower stratum of gravel lying on the bedrock is mined and washed. The average depth of pay gravel, when mined in this manner is three feet. Careful estimates place the yield of gravel generally at \$1 per car-load of 16 cubic feet to be considered profitable for drift mining, and the minimum yield is fixed at from 85 cents to \$1 per cubic yard of broken ground—not ground in place. The old Live Yankee claim in Sierra county now nearly worked out, yielded during active operations (from 1855 to 1863, inclusive), the sum of \$698,534, of which \$370,100 was used for opening up the claim, and the dividends disbursed were \$328,368. For several years after, and until the ultimate exhaustion of the ground, the dividends averaged \$10,000 per annum. The claim yielded from date of opening \$1,000,000, of which half was paid in dividends. The Bald Mountain claim now being worked in Sierra county, may be taken as a specimen of this class of claims. We gave a detailed description of this claim a short time since, so it is only necessary to refer to it here incidentally, with respect to the profit of this class of claims. This company paid out \$200,000 in dividends between April, 1872, and January 1st, 1873, the only outlet being \$20,000 for running their tunnel 1,800 feet long. The total yield from July 1st, 1872, to July 1st, 1874, was \$328,352, of which \$164,000 was paid out in dividends. The ground has paid them \$2.76 per car-load, or over \$1.09 per cubic yard. The percentage of dividends to gross amount is 50 per cent. Up to last October they had taken out \$345,079 from a piece of ground 1,000 feet long by 500 wide, exclusive of the unworked ground within the area, and not including the gravel piles in the company's yards. These figures and those given below give an idea of the relative profit of this kind of mining, which is very little understood outside the mining districts even in California.

The Indiana Hill Blue Gravel Co., or Cement Mill Co., as it is sometimes called, at Gold Run, is also a drift claim. They crush the gravel with an 8-stamp mill. They work a breast seven feet high and 100 feet wide. The mill crushes 45 car-loads in 24 hours, each car-load weighing 1,600 pounds. The company has been running a long time. We give from a reliable source the result of the last three years' work. In 1874, with nine months run, they crushed 10,017 car-loads, which yielded \$30,811.50, an average of a little over \$3 per car-load. In 1873, with seven months run, 6,600 car-loads yielded \$24,000, or an average of nearly \$4. In 1872, with four and a half months run, they crushed 3,300 car-loads, which yielded \$19,410, an average of a little over \$5 per car-load.

The placer mines near Oroville, in the "Lava Beds," have been purchased this year by Chinamen, who have been working them with profit. Upwards of 4,000 Chinamen are at

A Chapter of Tule History—Staten Island.

[From Pacific Rural Press.]

EDITORS PRESS:—The season of 1873-4 is completed and its lessons of success or failure are ready for our instruction. There are many tasks and many learners in this school, and each learner has his own task. The present theme is a chapter from the experience of the tule lands of our State. The swamp lands generally, of California, have been growing in favor within the past few years, and all information on the subject excites attention. Unfortunately for the very object aimed at in recent publications exceptional facts and circumstances are insisted upon too much as if of common occurrence. It must be noticed, as prefatory to every remark, that experiment has not yet given sufficient data from which to deduce a certain rule. Our chief concern still is to gather and compare data, and such is the purpose of the writer of this article. The remarks are also intended to be confined to one district of swamp land and will detail briefly the history of that district.

Staten Island.

The tract in question is formed by the forks of the Mokelumne river just before that river unites with the San Joaquin, and is also within easy reach of Sacramento river, either across a narrow neck of land, or farther by means of the many streams that link this well-watered region. It lies in Sacramento county, and from Walnut Grove Post-office, which is one mile from the head of the island, a good road extends 30 miles through a thickly-settled and fruit-bearing country to Sacramento city. Like all other fresh water tule lands, Staten island, in its natural condition, was a swamp over which the higher tides flowed, keeping it continually wet. As would be expected, the banks of these lands are usually somewhat higher than the interior, and the water flowing in at a spring tide is kept within, as in a basin, so that there are usually several inches of water always on the land back from the shore. In very dry seasons, however, the lowness of the river lessens the frequency of the tidal overflow, and this, with the large evaporation, renders the land dry enough for pasturing stock. At such times in the past, large herds of cattle and bands of sheep have been pastured on the tule lands, without any reclamation or leveeing whatever, and considerable quantities of the wild grass have been cut and baled under like circumstances. This grass has a bayonet-shaped blade and grows from a strong root and stock, branching out a few inches from the ground. It prefers a soil composed almost entirely of vegetation, in which it thrives luxuriantly, attaining a height of four or five feet. Wherever the quantity of sediment increases in the soil, the tule, a tall, round rush, often ten feet high, becomes more common. It is this plant, said to be so termed by the Indians, that gives name to the lands under consideration. The first settlement on the tule lands were made along the Sacramento river and for a long time were confined to the high ridge of bank land formed by the sediment which had accumulated from the winter floods. This bank land has been and still is very valuable as orchard and garden land. The settlers in time discovered that the back land was good for pasture and also that the soil was chiefly of vegetable formation—in many cases a fair quality of peat—and that when dried it would burn in the ground. They also found that any crops planted in the ashes of the burnt land would grow and yield remarkably well. In this way, the value of the tule lands was demonstrated upon a small scale, and capitalists, thus assured, have undertaken the problem upon a large scale, and one phase of that problem is here presented in this account of Staten island.

The Work of Reclamation

Was begun in June, 1872. Eight dams were put in as many sloughs, without the aid of piling, except in the instance of the largest slough, which also was the first dam built. Had it been left to the last it could likely have been completed without piling. The great difficulty in the way of building dams, and levees, too, on the tule lands is the lightness of the earth. In many cases the sods cut from the ground float. Such material should be avoided entirely and heavier sought. This can always be found in the vicinity of the sloughs, and, with the judicious use of light brush, a substantial bond can be made.

The largest portion of the leveeing was done by a steam dredge in charge of W. C. Sullivan. This machine digs a ditch twelve feet wide and four and one half feet deep, somewhat after the Osgood plan, except that the bucket is attached to a movable frame on a turn-table, which turns to the right or left to dump the earth. The whole apparatus is operated on a scow which floats in the ditch it digs, and is drawn up to its work by means of a capstan and anchor ahead. It was claimed for the machine that the large mass of a full bucket, about one cubic yard, dropped six or eight feet while soft, would make a more compact levee than the small sods cut out, handled and laid in the levee by Chinamen. The experience of the past winter seems to confirm this claim. The machine

levee was indeed broken in a number of places; but the embankments were small, and in no case was the earth carried away. The expense of excavation is also less than by Chinamen; but unfortunately the machine cannot change the depth and width of its ditch, nor vary its cast of the earth, and hence, being confined to a uniform ditch, the field of its operations is very limited. It is a matter of great regret that steam dredging apparatus has not been employed to a greater extent. Both on Staten island and on other tracts of tule land large mud flats have been formed by sedimentary deposits brought down by the winter rains, and this material can be put into levees at a reasonable cost by steam dredges. But the cost of it double or treble that of the peaty soil of which Chinamen build levees, still it would be cheaper than the peat. It has required the loss of several large crops and the overflow of valuable lands to teach the reclaimers of tule lands the absurdity of erecting barriers against water of material that might float.

The first step toward proper reclamation was in the use of the earth taken from the river bank on the outside of the levee. There the sediment already spoken of had accumulated to the depth of 18 inches, though considerably mingled with the roots of vegetation, and the sediment and roots combined make a very substantial levee. This method was first tried on Staten island, in the spring of the year just passed, in the face of many prophecies of evil results, founded mainly on the bad effects of cutting ditches on the outside of the levee on Sherman island. On that island breaks in the levee and serious cracks in the soil under it have occurred, but the experiment on Staten island has been eminently satisfactory, and the example there set is being followed on other similar tracts. The earth taken from the outside of the levee is a yellow loamy clay, and the embankment built of it was found, after six months' usage, to have shrunk and settled very little compared with the previous levee of peat, and a large percentage of what loss did occur was, doubtless, owing to the foundation upon which the addition was built. Nor was there any break in the levee after the exterior soil was added, although the levee was subjected to the tides of June, the largest of the year. After this satisfactory showing it remains now but to take one step further, and with a steam dredge get a material entirely free from vegetable matter, and furnished in unlimited quantities on the margin of the land to be reclaimed, and with it erect on an unbroken sod, effectual walls against the inroads of floods.

Cultivation.

The problem of the tule lands now turns wholly upon their reclamation, and involves mainly the substance of which the levees are built. There is no longer any question regarding their productiveness. All who know these lands are satisfied in this respect. Even those who have been disheartened by the loss of their crops bring no charge against the soil, but commend it saying: "The land is good enough if you only keep the water off." The soil is composed mainly of roots and decayed tules, grass and other plants, and consequently is generally nothing but a peat bed, varying in depth from 5 to 30 feet. The surface kept dry in the summer will burn in the fall to the depth of several inches, and in the ashes of the sod the crops are planted. In the fall of 1873 Staten island was fired, but owing to the short time the levee had been completed the burning was not extensive. Planting was begun by the three or four settlers in January, 1874. Wheat was first sown until about the 1st of March; after that common and chevalier barley were sown until the 15th of May. Most of the crops were put in with sheep, which were driven compactly over the burnt land after the seed had been sown. The remainder were harrowed in. The planting of the crop was found to be comparatively light work whether with sheep or harrow, and at a cost of from \$2 to \$4 per acre, including the seed. The chief trouble was from the miring of the horses. Various appliances in the way of horseshoes were resorted to, the best of which was an iron shoe with an exterior ring attached to it so as to receive the horse's weight. With such a "tule shoe" teams could get over the ground with considerable ease.

Harvest.

Seed-time being past, harvest began to be looked for. The grain sprouted and looked well; The heads appeared and nodded in the wind and gladdened the eye of the farmer. Then, when the fields were whitening for the harvest, a serious evil threatened in the shape of red rust. The wheat and barley were both affected; but it was noticed that the late sown grain suffered most. Wheat sown previous to the first of February escaped almost entirely without injury, and the later sown resisted the rust much better than was expected when it first appeared. It was thought also that the continued wet weather and late high water had as much to do in causing the rust as the late sowing. Early sowing, however, seems to be successful in any condition of weather, and a remedy in case of a very wet season. When harvest came, crops of undoubtedly large yield stood ready to be gathered. Good judges estimated the yield from 40 to 80 bushels per acre. Actual experiment found samples that produced, one, 77½ bushels per acre; another, 58½ bushels per acre, both of wheat. Elated by these large figures, the farmers, inexperienced on tule soil, declined contracts which they thought too high, and undertook the work of harvesting themselves. On account of the softness of the ground it was thought that

headers would be too heavy, and reapers were employed instead to cut the grain. In most cases the grain lay on the ground for several weeks after it was cut, and was at length loaded, loose, into wagons by Chinamen and hauled either to the attack or to the threshing-machine. The tires of the wagons were two and one half inches wide, and the ease with which they, and also the reapers got over the soil was quite conclusive that headers might have been used, and thus saved the large expense of so much handling of the grain in the field. A large portion of the crops was not harvested till long after they were ripe, and, in consequence, the grain fell down so that the reapers could not cut cleanly, but left on the ground as much as one-fourth to one-half of the crop. Headers with their lifters would have prevented this serious loss.

The Yield.

Notwithstanding the defective harvesting, the yield was very good. The land was cultivated in scattered tracts, and no exact measurements could be readily made; but, estimated by the quantity of seed sown, there were about 1,000 acres—450 in wheat and 550 in barley. The figures taken from the threshers' accounts show, in the aggregate, a yield of 5,800 sacks of wheat and 8,400 sacks of barley. The average yield per acre was, consequently, thirteen sacks of wheat and fifteen sacks of barley or, by measurement, twenty-nine bushels of wheat and thirty-four bushels of barley. While these figures show a good yield, they do not show the entire production of the crops. In addition to what was left on the ground, one large stack of wheat was burned up and a very considerable quantity of barley was destroyed by the early rain which overtook the late threshing. It is very safe, therefore, to say, that one-fourth of the crop was lost, and the true average yield would be represented by thirty-nine bushels of wheat and forty-five bushels of barley per acre. A crop of wheat cut for hay yielded about three tons per acre. A number of acres of Indian corn were planted, but not being cultivated after the planting nothing came of it but promises of an abundant yield in case of a proper cultivation.

The Coming Season.

Such is the issue of the first year's crop on Staten Island. While it did not fulfill the sanguine expectations of the farmers, still the result is quite satisfactory. The defects and losses were due mainly to inexperience on new ground, and were no more than what should have been expected in an untried field. Indeed it is a matter of surprise that the outcome was as fortunate as it was. But now, since experience has been gained, another year will see better cultivation, better harvesting, and a far better yield. A larger force, with vastly increased facilities, undertake the coming crop. Ten farmers are already busily engaged upon the island, and they will cultivate not less than 4,000 acres, mostly in wheat and barley. Excellent dwellings and very substantial barns, just completed, add largely to the comfort of the residents and change the spacious area into a well-settled neighborhood. The levee is being enlarged, notwithstanding the successful resistance to the severe test of last winter's waters, as it is the determination of the settlers to make "assurance doubly sure." December has passed without rain, and a prosperous season is confidently expected. Should these reasonable expectations be fulfilled, the tule lands will, during the coming season, take a great stride toward that high position they are destined to hold among the richest agricultural districts of our favored State.

L. C. MOFFEE, Engineer.

Staten Island, December 31, 1874.

MINING ACCIDENT.—Workmen were engaged in stoping at the California mine, on Tuesday night, when, without warning, they struck through into the old Illinois works, and were instantly flooded with the water which was penned up in those works. The men all rushed to get through the tunnel and succeeded in doing so without injury, except Mr. Herrihausen, who escaped with some severe injuries about the head and shoulders. The tools, cars, etc., which were used by the employees were left in the stopes, and are probably covered up with the sediment and other debris from the old works. The accident resulted very fortunately. It is a wonder that every man was not drowned or bruised to death by the rushing torrent of water which was let loose by breaking the wall separating the works.—*Nevada Transcript.*

ARIZONA MINES.—The Arizona Citizen says: At no time in the history of Pima county, has mining operations been so numerous and full of encouragement. We have an article prepared showing in detail many facts, but it goes over for the present.

In Yavapai, the condition is much the same. Within a few days Mr. C. P. Crawford has applied for survey for patents to six copper mines Eugene E. Burlingame for two, and C. M. Shannon and B. M. Hughes for one, in Yavapai county at Clifton, and very soon we are told applications for survey of about 10 more will be made.

The Stockton Woolen Mills, says the Independent, constitute one of the best managed and most useful industries in Stockton. Forty thousand dollars is invested in the business. There are 25 employees, to whom \$1,000 wages is paid per month. During 1874 the mill consumed 20,000 pounds of wool. The manufactured goods during the same period consisted of 75,000 yards of flannel and 7,500 pairs of blankets. Total value of manufactures, \$75,000.

Banking and Financial.

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by CHARLES SUTRO & Co.]

SAN FRANCISCO, THURSDAY, JAN. 14, 1875.
LEGAL TENDERS IN S. F., 11 A. M., 89 to 89½.
GOLD BARS, 880. SILVER BARS, 3 per cent. discount.
MEXICAN DOLLARS, 1¼ and 2 per cent. discount.
EXCHANGE ON N. Y., 5-10 per cent. premium for gold;
Currency, 15 per cent. On London—Bankers, 49½; Com-
mercial, 50. Paris, 5 francs per dollar.
LONDON—Consols, 92½ to 92¾; Bonds, 90½; Liverpool
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QUICKSILVER IN S. F., by the flask, per lb, \$1.50

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DIVIDEND NOTICE.

Pioneer Land and Loan Association.
Bank of Savings and Deposit. No 405 California Street, Opposite Bank of California. Incorporated, 1869. Guarantee Fund, \$300,000. The Eightieth Dividend will be paid on the 6th of February. Deposits in Gold, Silver and U. S. Currency received, and interest paid in the same. Certificates of Deposit and Pass Books issued, payable at ten days' notice, bearing ten per cent. per annum. Ordinary Deposits, payable without notice, nine per cent. per annum. Term Deposits receive twelve per cent. Reports can be obtained at the Bank. This incorporation is in its seventh year, and refers to over two thousand and one hundred depositors for its economical and successful management, thereby securing the full amount of interest earned. No charge for entrance fees or pass books. Bank open from 9 A. M. to 5 P. M. On Saturday evenings until 9. Money to loan on approved securities.
First-class Fire and Burglar-Proof Vaults for the safe-keeping of Treasure, Special Deposits and Trust Funds, Bonds, Silverplate, etc.

H. KOFAHL, Cashier.

THOS. GRAY, President.

J. O. DUNCAN, Secretary.

3-v29-3m

DIVIDEND NOTICE.

California Savings and Loan Society,
612 California Street, San Francisco, have declared a dividend of nine and six-tenths (9 6/10) per cent. per annum on Term Deposits and eight (8) per cent. per annum on Ordinary Deposits, for the half year ending 31st December, 1874, free from Federal Tax, and payable on and after Wednesday, 6th January, 1875. By order,
3-v29-1m

D. B. CHISHOLM, Secretary.

DIVIDEND NOTICE.

San Francisco Savings Union, 532
California Street, Cor. Wash, for the half year ending with December 31st, 1874, a dividend has been declared at the rate of nine (9) per cent. per annum on Term Deposits, and seven and one-half (7½) per cent. on Ordinary Deposits, free of Federal Tax, payable on and after January 13th, 1875. By order,
3-v29-1m

LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

Bank of the Western Savings and
Trust Co., San Francisco, Jan. 4th, 1875. Depositors' Dividend.—The Directors of this Corporation have this day declared the semi-annual dividend, at the rate of ten (10) per cent. per annum on Term Deposits and eight (8) per cent. on Ordinary Deposits, payable on and after January 10th, 1875, at the office of the Bank, northeast corner of Post and Kearny streets.

F. CLAY,

Vice-President and Cashier.

H. J. BOOTH, President.

3-v3-1m

DIVIDEND NOTICE.

The Farmers' and Mechanics' Bank of
SAVINGS have declared a Dividend for the half year ending December 31, 1874, at the rate of ten per cent. per annum on term, eight per cent. per annum on class one ordinary, and six per cent. per annum on class two ordinary deposits, payable on and after January 15th, 1875. By order
3-v3-1m-bp

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There is but this one machine that has ever had these improvements employed. It is an old machine, formerly built for another device, and is unfavorably constructed for Ball's improvements; yet this first temporary experimental machine has filled a scow of eighty-five cubic yards in sixteen minutes in unfavorable digging. For durability, digging hard material and fast work, it has a reputation (supported by leading engineers) as having no equal.

Testimonials and references will be given on application to the inventor, who is the sole owner of patents (excepting having made an assignment of the one machine now belonging to the Central Pacific Railroad Company) Having resolved not to sell any rights unless upon a basis of actual work performed by a machine built by myself for the purpose of fairly establishing the worth of the invention, I therefore offer to sell machines or rights on the following plan, which is warranting the capacity of the machine by actual work:

I will enter into an agreement with any responsible party to build and sell a machine, scows and tender, all complete, and right of all my improvements in dredging machines throughout the Pacific Coast for \$20,000, warranting the machine to dredge six cubic yards per minute (to fill a scow at that rate). \$20,000 will but little more than pay the cost of building the machine, scows, etc., all complete; therefore I am proposing to ask nothing for my patents unless my machine dredges more than six cubic yards per minute. But it shall be further agreed that in case (at a fair trial to be made within a stated time) the machine shall fill a scow at the rate of more than six cubic yards per minute, then \$10,000 shall be added to the price above stated for each and every such additional cubic yard thus dredged per minute, and for additional fractions of a cubic yard thus dredged in the same ratio the \$10,000 is to be added to said price above stated.

I will sell any other Territorial or State rights (either United States or Foreign) upon the same plan and at a lower price proportionately than the rights for the Pacific Coast.

I will sell a single machine with scows and all complete, and right to use the same in a limited territory, for \$20,000 on the same plan as above stated, but will add only \$2,000 to each additional yard over the six cubic yards per minute. Each machine is not to employ more than two 10x20 inch engines.

Payments to be made in U. S. gold coin on delivery of machine, as may be indicated by agreement.

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AYER'S HAIR VIGOR, by long and extensive use, has proven that it stops the falling of the hair immediately, often renews the growth, and always surely restores its color, when faded or gray. It stimulates the nutritive organs to healthy activity, and preserves both the hair and its beauty. True brassy, weak or sickly hair becomes glossy, pliable and strengthened; lost hair regrows with lively expression; falling hair is checked and established; thin hair thickens; and faded or gray hair resume their original color. Its operation is sure and harmless. It cures dandruff, heals all humors, and keeps the scalp cool, clean and soft—under which conditions, diseases of the scalp are impossible.

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Stoves and Metals, Tinners' Goods, Tools and Machinery;
111 and 113 California St., 17 and 19 Davis St., San Fran-
cisco, and 178 J St., Sacramento. 18v1-ly

(Continued from Page 57.)

work in this vicinity. They have plenty of water, and sink small shafts to get out the gravel.

Quartz Mining.

In Amador county reports for the developed quartz mines are encouraging; lodes in course of development giving, as a general thing, good promises of future business. In the county during the year ending in June last, 83,450 tons of ore were crushed. There are 15 quartz mills in this county, and 11 mining districts 296 miles long in the aggregate. There were 2,890 tons of coal mined in this county last year.

Monterey county is one of the counties lately brought into notice as a mining region. New mines have recently been opened there, but no extensive developments have yet been made. Cinnabar and coal are the principal things sought for, and prospectors have for several months been searching for both.

In Inyo county, beside Panamint, elsewhere referred to, the Cerro Gordo mines are working away, turning out base bullion by the ton. There are two furnaces, there each about 30 tons capacity. These furnaces produce each about 12½ tons of bullion per day, which is worth about \$115 in silver and \$90 in lead per ton. The mines in this camp are not half opened, yet they are doing very well. A correspondent of ours a short time since gave us some figures of the yield in which he puts that of 1874 as follows: capital invested in furnaces, mines, bed-rock tunnels, etc., during the year, \$15,000; bullion produced 6,000 tons; net profits at \$80 per ton, \$540,000; total capital invested in the camp, \$100,000; total net profits since 1869 at above estimated, \$1,800,000. This is a very good showing.

Panamint, the seat of the last stamped, is in a mountainous rocky region at an elevation of 7,000 feet. The ore is quartz, containing silver, copper, lead, and a little gold. The ore is rebellious, and is shipped to Liverpool for reduction. It assays all the way from \$100 to \$3,000 per ton. It costs to ship this ore to Liverpool \$55 per ton. The ores contain from 10 to 30 per cent. copper, which assists greatly in paying these freight expenses. There are now about 2,000 men in the camp, a 20-atamp and a 5-atamp mill, a newspaper of diminutive size, and lots of prospective millionaires. The capitalists who have invested there are in earnest, and have gone to work properly to develop the mines. Panamint has yet to prove its claim to be called a "Second Washoe." It is young yet, however, and may begin to pan out in the spring.

We have not space to enumerate any details of the result of quartz mining operations in California. Mines are being worked in all directions, and with varying results of course. It gives us pleasure to record, however, the fact that some attention is being turned to this partly neglected branch of operations in California, as people are beginning to find out that they can make money out of quartz at home as well as in the neighboring States. The California quartz mines are worked at a less cost than those on other parts of the coast. There are hundreds of good mines, however, lying idle, only needing the required capital to become good paying properties. The operations of some heavy capitalists in the Southern counties has given a wonderful impetus to quartz mining in those localities, and if they are successful, it is to be hoped that the example will become contagious. At any rate, it has already had the effect of greatly stimulating prospecting, and several new districts have been found. In the spring, when the weather becomes propitious, the Southern counties will be alive with the overflow of prospectors from Panamint, and new discoveries will be the result.

Results from Ten Leading Mines.

We are able to give, through the courtesy of Mr. Skidmore, who is collating statistics of California for the U. S. Mining Commissioner's report, a brief summary of some of the leading quartz mines of California. These are the Idaho, Nevada County; Eureka, Nevada City; Empire, Nevada county; Black Bear, Siskiyou county; Plumas-Eureka, Plumas county; Sierra Butte, Sierra county; Sumner, Kern county; Hite's mine, Mariposa county, and Keystone, Amador county. There are some fifteen of these mines which have yielded over \$200,000 each. These returns embrace ten of the leading mines, exclusive of the Consolidated Amador and Chert Mill, returns from which have not yet been received. The product of the ten mines above enumerated, was \$2,995,500 in 1874, from 187-391 tons of ore, making an average of nearly \$300,000 each. The average product of the ten mines was \$21.39 per ton. Average cost of milling was \$1.84. Average cost of mining was \$5.70. Average earnings was \$13.85 per ton. Only one of these mines is called in the Stock Board—Eureka—so their yield or dividend is not mentioned in the list of dividends. The cost of milling by steam runs from \$2 to \$2.10 per ton, and the lowest cost of milling by water power was at the Sierra Butte mine—83 cents per ton. All these mines own their own mills. They have an aggregate of 361 stamps, which does not include the 80-stamp mill being built by the Sumner mine, Kern county, which is to be run by water power. The greatest weight of stamp is 900 pounds, at the Empire mill, Grass Valley. The smallest weight of stamp is 500 pounds at the Hite's mine, Mariposa county. The greatest yield per ton from one any of the ten mines, \$40 per ton. The lowest yield per ton was \$13. The miner's wages run from \$2.50 to \$3.50 per day. These

ten mines employ 997 skilled miners, exclusive of the surface and mill men. The highest production from any one of the mines was \$684,811 and the lowest was \$160,000. Strange to say the one which made the lowest product is considered the one which will sell for the most money, and at the same time, the one which produced the highest grade ore gave the smallest total yield. These figures will give, without going into details of the particular mines, a good idea of costs, etc., as the figures are reliable and carefully averaged. The low cost of milling will probably surprise those people who are paying from \$7 to \$15 per ton for crushing at custom mills.

To the Barleigh drill, now so extensively used on this coast, must be given considerable credit for cheapening mining and hurrying up tunnel work. They have been of the greatest assistance, and have very much lessened the cost of large operations, either in sinking, sloping or tunneling.

Change of Mining Centers.

To those who were in this State only a few years ago it may be interesting to note the changes of mining centers which has taken place in California within the past two years. Here are all the coast counties coming into notice as mining regions which were considered "cabbage orchards" by the miners not long since. Many of the counties now look with as much interest on their mineral as on their agricultural products. Napa, Sonoma, Solano, Lake, Mendocino, Alameda, Contra Costa, Monterey, Los Angeles, Santa Barbara, San Diego, Santa Cruz, San Luis Obispo, Colusa, Yolo and Fresno counties, all have mining districts. The coast counties were formerly considered only fit for agricultural purposes, but now there is as much prospecting as plowing done. In Napa, Sonoma, Lake, Colusa, Monterey and San Luis Obispo counties, they are very much excited over the subject of quicksilver, as they are in fact in the other counties mentioned. Coal has been found in some of these counties, as has also silver and gold. But the principal object of search in most of the counties mentioned, is that slippery metal

Quicksilver.

This has become a metal of even more importance than ever of late on account of its scarcity and consequent high price. The quicksilver excitement as well as its price may be said to have kept up to the biggest pitch during the whole year. The value of the metal, the accessibility of the localities where it is found, the broad area of country where it is likely to be met with, and the value of a good mine are all incentives which combine to keep up the excitement. It is confined to no particular locality in the State, and all classes of people have turned prospectors to find it. Honest farmers have dropped the plow and taken to the pick, and even the female part of the population in some places, have obtained prospectors' outfits and scoured the hills in search of the precious metal. It has been selling at \$1.55 per pound for some months past, and is likely to go higher before it falls lower. Our mines must be actively worked to meet the extraordinary demands which the immense mills and heavy mining operations at present conducted require. Only a few of the new mines are yielding quantities of any moment, though many of them are being steadily developed. A great many small claims are being rapidly developed which will in the future add to the production. It is impossible to state the number of quicksilver claims in California, but after some difficulty we have been able to arrange the following list of producing mines, and add to it a list of a number of others which are likely to become good mines when further developed. We give in this list also the number of retorts, and furnaces in use at the producing mines, together with the name of the style of furnace:

Producing Quicksilver Mines in California.

ALMADEN MINE, Santa Clara county. Has six "Almaden" furnaces; building one more. Mr. Randol the Superintendent, informs us that the product of the mine in 1874 was 9,084 flasks.
REDINGTON MINE, Napa county. Has two Knox & Osborne, and two Almaden furnaces running. Building two more Knox & Osborne furnaces. The mine is supposed to yield about 1,000 flasks per month, exceeding the product of the Almaden, and producing more than any other mine in California.
CALIFORNIA BORAX CO.'S MINES, Lake county. Has two Luckhardt furnaces, a Knox & Osborne furnace, a Wallbridge furnace and five large retorts. Will erect another Knox & Osborne furnace in the Spring.
GREAT WESTERN, Lake county. Has one 10-ton Luckhardt furnace; also one known as the Great Western or Green furnace—30 tons.
AMERICAN MINE, Lake county. Has a ten-stamp mill for crushing the ore, 12 retorts, a Luckhardt furnace, a Wallbridge furnace, and a Pirschbacher furnace.
NEW IDRIA MINE, Fresno county. Has two "Almaden" furnaces and a Maxwell furnace.
MONTEREY MINE, near New Idria, has a small Almaden furnace.
GUADALUPE MINE, Santa Clara county. Has two small Almaden furnaces and building a Maxwell furnace.
ENRIQUITA, Santa Clara county. Hoisting ore which is reduced at the Almaden mine.
NORTH ALMADEN, Santa Clara county. Building a "Nestle" furnace.
CERRO BONITO, Fresno county. Has a Knox & Osborne furnace.
CALIFORNIA MINE. On line of Napa and Yolo counties; has a Knox & Osborne furnace.
OCEANO, San Luis Obispo county. Building a Louis Janin furnace.
KEYSTONE, San Luis Obispo county. Just completed a furnace.
BUENA VISTA, San Luis Obispo county. Have a very small Almaden furnace.
SUNDERLAND, San Luis Obispo county. Has a Luckhardt furnace.
MANHATTAN, Napa county. Has a Knox & Osborne furnace.
PRINCE, Napa county. Has a Knox & Osborne furnace.
ATENA, Napa county. Has a Knox & Osborne furnace.
IDA OLATTON & YELLOW JACKET, Napa county. Have a Knox & Osborne furnace between them.

ABBOT MINE, Lake county. Has a Knox & Osborne furnace.
BUCKEYE, Colusa county. Has a Knox & Osborne furnace and retort.
BARTLENAKE, Sonoma county. Has a Luckhardt furnace and retort.
ANNIE DELOHER, Sonoma county. Has a Knox & Osborne furnace, just completed.
GREYSER, Sonoma county. Has a Knox & Osborne furnace just completed.
CLOVERDALE, Sonoma county. Has a Knox & Osborne furnace just completed.
JOSEPHINE, San Luis Obispo county. Small 8-ton furnace.
LIVERMORE, Sonoma county. Has a modified form of the Knox & Osborne furnace.
SONOMA, Sonoma county. Has a Luckhardt furnace.
MOSQUITO, Sonoma county. Has five retorts.
OAKLAND, Sonoma county. Has five retorts.
EXCELSIOR, Sonoma county. Just completed a Winterburn furnace similar to the Green or Great Western.
ST. JOHN, Solano county. Has a Neate furnace.
KEARSARGE MINE, Lake county. Has retorts; but no furnace.
EASONS, Sonoma county. Erecting a Wallbridge furnace and will put up a Knox & Osborne.
WESTERN or MOUNT JACKSON, Sonoma county. Have one small Almaden furnace built by Winterburn.
WASHINGTON MINE, Napa county. Has an Almaden furnace with Colt condenser.
OAKVILLE MINES. Has three Luckhardt furnaces. (No work done during 1874.)
AMERSON, Sonoma county. Has one retort; commenced running in December.
COMSTOCK MINE, Santa Clara county. Has one retort.
ELGIN MINE, Colusa county. Has one retort.
STATTON MINES, San Benito and Merced counties. This is a group of 12 mines consolidated in one company. Have one retort running and will erect a Knox & Osborne furnace in the Spring.

The following list of quicksilver claims give promise of being mines when developed, and will have furnaces or other reduction works this year. The list is not supposed to embrace one-half of the good prospects which will be so improved:

The Los Prietos claim, Santa Barbara county; Jeff Davis, San Luis Obispo county; Todoo Santa, San Luis Obispo county; Pine Mountain, San Luis Obispo county; Quien Sabe, San Luis Obispo county; Amador, El Dorado county; Kentuck, Sonoma county; Socrates, Sonoma county, will be opened and ready for furnace. Flagstaff, Sonoma county; Mercury, Sonoma county; Wall Street, Lake county; Columbia, Lake county; London, Lake county; El Madre, Napa county; Georgia, Sonoma county; Cedar, Napa county; Montezuma, Colusa county; Empire, Colusa county; Cochran, San Luis Obispo county; Live Oak, Sonoma county; Hercules, Sonoma county; Emma, Sonoma county; Illinois, Sonoma county; Peerless, Napa county; Thompson, Sonoma county; Central, Napa county; American, Lake county; Yosemite, Napa county; Bacon mines, Sonoma county; Pilot Knob, Lake county; Alice Cross; Brandt mine, Sonoma county; Lytle, Trinity county; Boston, Trinity county; Edith, Sonoma county; Empire mine, Mendocino county; Gibson & Phillips, San Luis Obispo county.

There are many other claims being worked, which have yet assumed no prominence, and which are not mentioned above. We are unable to give any figures of the quicksilver product of the year. Most of the metal is consumed at the mines in the different mining States and Territories, the Comstock mines using the largest amount of any one section. The item of quicksilver, at its present prices, is an important one to the mining interests. How much we have consumed, it is difficult to tell. It all goes out of the State, and none of it ever returns. When our mills lose from half a pound to a pound and a-half for every ton they work it does not take long to use several tons of mercury. By the statistics of the Central Pacific Railroad Company, we see that 432,635 pounds of quicksilver were shipped from this city as through freight, (which means that it went out of the State), and 36,444 pounds were shipped from San Jose. As local freight they carried 47,007 pounds. Our exports by sea from this city from 1859 to 1874 inclusive were as follows:

Quicksilver Exports.

Year.	Flasks.	Value.
1859.....	3,367	\$ 126,202
1860.....	8,962	318,320
1861.....	35,218	1,112,654
1862.....	35,707	1,169,197
1863.....	26,060	846,748
1864.....	37,282	1,227,963
1865.....	41,266	1,373,283
1866.....	30,789	1,062,940
1867.....	28,824	920,726
1868.....	43,607	1,390,054
1869.....	28,365	947,671
1870.....	19,959	669,015
1871.....	11,244	352,125
1872.....	14,721	475,414
1873.....	6,169	202,495
1874.....	6,388	219,525
Totals.....	365,788	\$14,226,441

The following table shows the destination of the quicksilver shipped by sea:

New York.....	Flasks.	Value.
Central America.....	2,405	\$23,300
China.....	547	54,472
Japan.....	1,150	94,500
British Columbia.....	83	11,930
Australia.....	2	220
Mexico.....	50	7,500
New Zealand.....	1,146	119,654
Totals.....	5,504	\$498,330

Quicksilver mining is destined to become even more important to California than it has ever been before, for we have the only mine of the kind in the United States.

During the past year

Copper Mining
Has not been in so flourishing a condition as one would suppose. All the copper mined is shipped from here to Liverpool for reduction, none of it being worked here. The high rates of freight ruling during most of the year have deterred owners from shipping, and the mines have in consequence not been worked very

actively. The figures of export for the year, which are the figures of production, show a lower average than they have since we began to mine copper here. The exports of copper from 1861 to 1874, inclusive, were as follows:

Year.	Tons.	Value.
1861.....	1769	\$ 122,581
1862.....	3389	236,194
1863.....	6993	512,925
1864.....	14315	1,994,660
1865.....	25380	1,821,360
1866.....	19813	1,383,852
1867.....	7833	421,546
1868.....	6077	227,925
1869.....	2542	117,133
1870.....	2254	103,732
1871.....	2562	121,960
1872.....	2198	116,970
1873.....	1832	114,862
1874.....	1352	67,400
Totals.....	96,674	\$7,439,080

Lead.

In a previous portion of this article, we mentioned the product of the Cerro Gordo base bullion mine. The lead refined in the city in 1874 was 20,000 tons, and 10,000 tons were shipped. San Francisco is fast becoming one of the most important lead refining centers in the world. For a few years past the bullion from the Cerro Gordo mines with some from Nevada has been refined at Selby's works at North Beach, and last year the amount refined was 12,000 tons, of which 10,000 was exported. Every year this establishment grows, and we hope are long to say that the whole product of the Pacific is being manufactured here. Many new mines producing lead have been opened of late, and the industry is fast growing to large proportions.

A very important article to every one here as elsewhere is

Coal.

California though abounding in everything else has very little true coal. The lignites of some of the counties are now being utilized however, and several new coal mines were opened during the year. The receipts of coal in this city from all Pacific Coast sources have largely increased during the year save alone from Bellingham Bay and the Rocky Mountains. About 325,520 tons were received in this city from Pacific Coast mines, including 47,982 tons from British Columbia. The receipts of Mount Diablo coal during 1874 were 203,255 tons. The production of California, as represented by the Mount Diablo mines, has increased 33,255 tons. The deposits at Lincoln are, if the quality of coal be all that has been said of it, of the greatest importance to the future industrial development of the State. Other discoveries were made in the southern part of the State earlier in the year, but nothing has since been heard of them as is the case with several other localities.

Conclusion.

In concluding our remarks on California mines we most heartily congratulate our miners on the result of their year's work. Everything is in a prosperous condition and the late rains will make plenty of business for all hands for some time to come. As yet, however, there is not an abundance of snow supply in the mountains for this season's purpose, but it is to be hoped that before the winter closes it will be piled deep and high in the mountains and transfer itself gradually into the miners' greatest want, water. Several of the new districts opened this year have yet to prove their worth and by spring we expect to hear of many new mines being opened.

We have in this article confined ourselves entirely to California mining matters with the exception of the statistics relating to bullion productions. We are unable for want of space to enter into any details of neighboring States and Territories.

They have made on the Comstock lode, in Nevada, some of the greatest mining developments ever made in the world. We have of late given considerable space to detail these discoveries, and regret that we have no space here to speak at length concerning them. The details are, however, fresh in everybody's mind, as they are attracting the attention of the whole world.

The stock excitement in San Francisco consequent on these discoveries has been general, and many people have made large fortunes. Of this, also, we have given details from time to time. The aggregate amount of sales at the San Francisco Stock and Exchange Board during 1874 was \$260,471,915, about double that of any previous year. The sales last month alone were \$50,000,000.

JNO. P. RANKIN. Established 1850. A. P. BRATTON

Pacific Iron Works,

FIRST STREET, SAN FRANCISCO.

Geo. W. Fogg, Supt.

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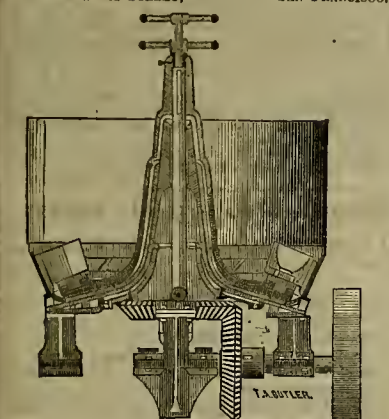
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IRON CASTINGS of all descriptions at short notice.
Sole manufacturers of the Hepburn Roller Pan
and Callahan Gate Bars, suitable for Burning
Screens.
NOTICE.—Particular attention paid to making Super-
ior Shoes and Dies. 20x25.3m

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Nos. 137, 139 and 141 FREMONT STREET, SAN FRANCISCO,
RICHARD SAVAGE, Proprietor.

Heavy and light Castings of every description. House
Fronts, Mining and General Machinery estimated and con-
structed at shortest notice. On hand the celebrated Occi-
dental and French Ranges, Burial Caskets, Grates and
Fenders, Road-Scrapers, Hydraulic, Tugger Irons,
Ploughwork, Saw Weighs, Ventilators, Dumb Bells,
Gripes, Ship Castings, SOIL PIPE of all sizes, Fittings
and Cauldron Kettles in stock at Eastern rates. SHOES
and DIES a specialty. Ornamental Fences in large
variety. 4x30-1yr.

DIVIDEND NOTICE.

Savings and Loan Society, 619 Clay
Street. The Board of Directors have declared a divi-
dend for the six months ending December 31, 1874, of
Nine per cent. per annum on all deposits free of Fed-
eral tax, and payable on and after January 15, 1875.
By order **CYRUS W. OARMANY, Cashier.**

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SOLE AGENT FOR THE
TANITE EMERY
WHEELS
SAN FRANCISCO

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DIVIDEND NOTICE.

Pioneer Land and Loan Association.
Bank of Savings and Deposit, No. 405 California Street,
Opposite Bank of California, Incorporated, 1869.
Guarantee Fund, \$200,000. The Eightieth Dividend
will be paid on the 5th of February, 1875, and interest paid in
the same. Certificates of Deposit and Pass Books is-
sued, payable at ten days' notice, bearing ten per cent.
per annum. Ordinary Deposits, payable without notice,
nine per cent. per annum. Term Deposits receive
twelve per cent. Reports can be obtained at the Bank.
This incorporation is in its seventh year, and refers
to over two thousand and one hundred depositors for
its economical and successful management, thereby
securing the full amount of interest earned. No charge
for entrance fees or pass books. Bank open from 9
a. m. to 5 p. m. On Saturday evenings until 4.
Money to loan on approved securities.
First-class Fire and Burglar-Proof Vaults for the safe-
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THOS. GRAY, President. **H. KOFAHL, Cashier.**
J. C. DUNCAN, Secretary. 3-v29-3m

Semi-Annual Statement

OF THE

PIONEER

Land and Loan Association

BANK

—OF—

SAVINGS AND DEPOSIT,

No. 405 California Street,

(OPPOSITE BANK OF CALIFORNIA.)

January 1, 1875.

Subscribed Capital.....\$200,000 00
Paid-up Capital.....100,000 00

ASSETS.

Real Estate, Loans on Mortgage, Loans on
United States, City and County Bonds,
and interest due thereon.....\$985,596 40
Office Furniture.....1,760 08
Cash on hand.....32,481 50

\$969,838 08

LIABILITIES.

Term Deposits.....\$482,147 60
Ordinary Deposits, Certificates of Deposit,
and all other liabilities.....387,600 48
Paid-up Stock Capital, being Guarantee
Fund, above all liabilities.....100,000 00

\$969,838 08

Number of Depositors.....2,075
Increase in the past six months.....710
Gross earnings for the past six months.....\$53,274 15
Expenses for the past six months.....5,451 75
Rate of Dividend: Term Deposits, twelve
per cent.; Ordinary Deposits, nine per
cent.; being an average dividend of ten
and five-eighths per cent. per annum.

H. KOFAHL, Cashier.

THOS. GRAY, President. **J. C. DUNCAN, Secretary.**

NIMRON BAULSR. **RICHARD O. HANSON.**

RICHARD C. HANSON & Co.,

Block and Pump Makers,

IMPORTERS OF ALL KINDS OF

Patent Bushings & Gearing Apparatus.

STEEL FRICTION ROLLERS,

MINING BLOCKS OF ALL DESCRIPTIONS.

PRESSED LEATHER FOR PUMPS,

Lignum Vitæ for Mill Purposes.

NO. 9 SPEAR STREET.

Near Market, SAN FRANCISCO.

Mining and Other Companies.

Calaveras Hydraulic Mining Company—

Location of principal place of business, San Fran-
cisco, California. Location of works, Central Hill,
Calaveras County, California. Notice is hereby given,
that at a meeting of the Board of Directors, made on the 7th day of December, 1874, the
several amounts set opposite the names of the respective
shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
W. H. Knight, trustee.....	1875	1	\$93 75
W. H. Knight, trustee.....	1875	1	93 75
C. H. Stover.....	15	500	25 00
C. H. Stover.....	15	500	25 00
C. H. Stover.....	14	500	25 00
C. H. Stover.....	17	375	18 75
G. R. Eckley.....	8	750	37 50

And in accordance with law, and an order of the
Board of Directors, made on the 7th day of December,
1874, so many shares of each parcel of said stock as
may be necessary will be sold at public auction at the
office of the Company, 321 Battery street, San Francisco
Cal., on Monday, the twenty-fifth day of January, 1875,
at 12 o'clock, m., to pay the delinquent assessment, together
with costs of advertising and expenses of sale.

Office, 321 Battery street, San Francisco, California,
(office of U. S. Internal Revenue Collector.)

POSTPONEMENT.—The date of payment of assessment
on the above described stock is deferred until Monday,
February 1st, 1875. **ABRAM SHEAR, Secretary.**

California Beet Sugar Company.—Loca-

tion of principal place of business, San Francisco, Cal-
ifornia. Location of works, Sonoma, Santa Cruz County,
California. Notice is hereby given, that at a meeting of the Board of
Directors, held on the 23d day of December, 1874, an as-
sessment of Five Dollars per share was levied upon the
capital stock of the corporation, payable immediately in

United States gold coin, to the Secretary, at the office
of the Company, 214 California street, San Francisco, Cal.
Any stock upon which this assessment shall remain un-
paid on the 31st day of January, 1875, will be delinquent
and advertised for sale at public auction, and unless
payment is made before, will be sold on the 21st day of
February, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.

Office, No. 314 California street, San Francisco, Cal.

California Consolidated Mill and Mining

Company—Location of principal place of business, San
Francisco, California. Location of works, Nashville, El
Dorado county, California. Notice is hereby given, that at a meeting of the Directors,
held on the 14th day of January, 1875, an assessment of
(\$1) one dollar per share was levied upon the capital stock
of the corporation, payable immediately, in United States
gold coin, to the Secretary, at the office of the company,
408 California street, room 15, San Francisco, California.

Any stock upon which this assessment shall remain un-
paid on the sixteenth day of February, 1875, will be delin-
quent and advertised for sale at public auction, and un-
less payment is made before, will be sold on Friday, the
5th day of March, 1875, to pay the delinquent assessment,
together with costs of advertising and expenses of sale.

Office, room 16, 408 California street, San Francisco,
California.

Confidence Mining Company—Location

of principal place of business, San Francisco, California.
Location of works, Tuolumne County, State of Califor-
nia. Notice is hereby given, that at a meeting of the Board of
Directors, held on the sixteenth day of January, 1875, an
assessment of thirty (30) cents per share was levied upon
the capital stock of the corporation, payable immediately
in United States gold coin, to the Secretary, at the office
of the company, 210 Battery street, San Francisco, Califor-
nia.

Any stock upon which this assessment shall remain un-
paid on Tuesday, the twenty-third day of February, A. D.
1875, will be delinquent, and advertised for sale at public
auction, and unless payment is made before, will be sold
on Wednesday, the seventeenth day of March, 1875, to pay
the delinquent assessment, together with costs of adver-
tising and expenses of sale.

Office, 210 Battery street, San Francisco, Cal.

Electric Mining Company—Location of

Principal place of business, San Francisco, Cal.
Notice is hereby given that on the following
described stock, on account of assessment, levied
on the twenty-eighth day of November, 1874, the
several amounts set opposite the names of the respec-
tive shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Geo. Hosen.....	301	300	15 00
C. J. Rader.....	302	150	7 50
C. J. Rader.....	324	100	5 00
C. J. Rader.....	330	300	15 00
C. J. Rader.....	331	100	5 00
C. J. Rader.....	332	1200	60 00
T. B. Wingard Trustee.....	322	50	2 50
T. B. Wingard Trustee.....	326	100	5 00
T. B. Wingard Trustee.....	347	2825	141 25
J. B. Houghton.....	90	50	2 50
J. B. Houghton.....	91	25	1 25
J. B. Houghton.....	392	41	2 05
J. B. Houghton.....	202	3	2 1/2
J. B. Houghton.....	314	475	23 75
Wm. R. McCaw.....	348	150	7 50
John Muller.....	158	750	37 50
G. W. Malone.....	55	50	2 50
G. W. Malone.....	57	50	2 50
G. W. Malone.....	58	50	2 50
G. W. Malone.....	59	50	2 50
G. W. Malone.....	60	50	2 50
G. W. Malone.....	177	1000	50 00
G. W. Malone.....	205	187	9 35
G. W. Malone.....	211	500	25 00
M. Ellsworth.....	78	250	12 50
G. W. Muller Trustee.....	04	100	5 00
G. W. Muller Trustee.....	04	150	7 50
Mrs. Annie Woods.....	76	100	5 00
Mrs. Annie Woods.....	131	500	25 00
Mrs. Annie Woods.....	280	150	7 50
Mrs. Annie Woods.....	303	547	27 35
Mrs. Annie Woods.....	318	150	7 50
Mrs. Annie Woods.....	346	600	30 00
Herbert Eastwood.....	102	60	3 00
Herbert Eastwood.....	224	7	35
E. Wolke, Trustee.....	105	25	1 25
E. Wolke, Trustee.....	113	100	5 00
E. Wolke, Trustee.....	114	100	5 00
E. Wolke, Trustee.....	115	100	5 00
E. Wolke, Trustee.....	116	100	5 00
E. Wolke, Trustee.....	117	100	5 00
E. Wolke, Trustee.....	118	100	5 00
E. Wolke, Trustee.....	119	100	5 00
E. Wolke, Trustee.....	121	50	2 50
E. Wolke, Trustee.....	122	100	5 00
E. Wolke, Trustee.....	123	100	5 00
E. Wolke, Trustee.....	124	50	2 50
E. Wolke, Trustee.....	294	138	6 90
O. W. Claves.....	145	400	20 00
Joseph White.....	154	250	12 50
Joseph White.....	155	250	12 50
Joseph White.....	255	75	3 75
Louisa Thompson.....	239	40	3 00
Henrietta Grant.....	240	40	3 00
Wm. H. Sharp.....	153	100	5 00
Wm. H. Sharp.....	241	45	2 25
M. G. Rader.....	317	1200	60 00
J. B. Weston.....	183	75	3 75
J. B. Weston.....	308	25	1 25
J. W. Weston.....	257	175	8 75
J. W. Weston.....	313	125	6 25

And in accordance with law, and an order of the
Board of Directors, made on the 28th day of November,
1874, so many shares of each parcel of said stock as
may be necessary, will be sold at public auction at the
east room of Maurice Dore & Co., No. 326 Pine street,
San Francisco, on the 26th day of January, 1875, at the
hour of 12 o'clock, m., to pay the delinquent assess-
ment thereon, together with costs of advertising
and expenses of sale.

T. B. WINGARD, Secretary.

Office—Room 13, No. 318 California street, S. F.

Gen eva Consolidated Silver Mining Com-

pany. Principal place of business, City and County of
San Francisco, State of California. Location of works,
Crescent Mining District, White Pine County, Nev-
ada. Notice is hereby given that at a meeting of the Board of
Directors, held on the 21 day of January, 1875, an assess-
ment of twenty-five cents per share was levied upon the
capital stock of the corporation, payable immediately, in
United States gold coin, to the Secretary, at the office
of the Company, Room 14, 302 Montgomery street, San
Francisco.

Any stock upon which this assessment shall remain un-
paid on the 8th day of February, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Monday the first day
of March, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.

Office—Room 14, No. 302 Montgomery street, S. F.

Gold Mountain Mining Company—Loca-

tion of works, Lower Rancheria, Amador County, Cal.
Notice is hereby given, that at a meeting of the Board of
Directors, held on the 4th day of January, 1875, an assess-
ment of twenty-five cents per share was levied upon the
capital stock of the corporation, payable immediately, in
United States gold coin, to the Secretary, at the office
of the Company, Room 14, 302 Montgomery street, San
Francisco.

Any stock upon which this assessment shall remain un-
paid on the 8th day of February, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Monday the first day
of March, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.

Office—Room 14, No. 302 Montgomery street, S. F.

Orleans Mining Company—Location of

principal place of business, San Francisco, Cal. Loca-
tion of works, Grass Valley Township, Nevada County,
Cal. Notice is hereby given, that at a meeting of the Trust-
tees held on the 4th day of January, 1875, an assessment
(No. 2) of one dollar (\$1) per share was levied upon the
capital stock of the corporation, payable immediately, in
United States gold coin, to the Secretary, at the office
of the Company, Room 8, 315 California street, San Fran-
cisco, Cal.

Any stock upon which this assessment shall remain un-
paid on the 8th day of February, 1875, will be delinquent
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Tuesday, the 2d
day of March, 1875, to pay the delinquent assessment, to-
gether with costs of advertising and expenses of sale.

Office—Room 8, No. 315 California street, S. F.

Germania Mining Company—The Annual

Meeting of the stockholders of the Germania Min-
ing Company, for the purpose of electing a Board of
Directors, and such other business as shall properly
come before the meeting, will be held at the office of
the company, room 16, 408 California street, San Fran-
cisco, California, on the 1st day of February, 1875, at
the hour of 1 o'clock p. m.

J. W. TRIPP, Secretary.

"Golden Rule" Silver Mining Company—

Location of principal place of business, San Fran-
cisco, Cal. Notice is hereby given, that on the following
described stock, on account of assessment levied
on the 8th day of December, 1874, the several amounts
set opposite the names of the respective shareholders,
as follows:

Germania Mining Company—The Annual
Meeting of the stockholders of the Germania Min-
ing Company, for the purpose of electing a Board of
Directors, and such other business as shall properly
come before the meeting, will be held at the office of
the company, room 16, 408 California street, San Fran-
cisco, California, on the 1st day of February, 1875, at
the hour of 1 o'clock p. m.

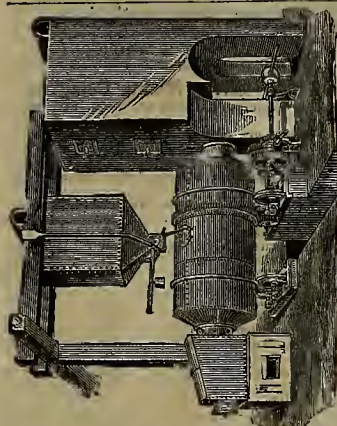
J. W. TRIPP, Secretary.

"Golden Rule" Silver Mining Company—

Location of principal place of business, San Fran-
cisco, Cal. Notice is hereby given, that on the following
described stock, on account of assessment levied
on the 8th day of December, 1874, the several amounts
set opposite the names of the respective shareholders,
as follows:

Names.	No. Certificate.	No. Shares.	Amount.
J. Wertheimer, Trustee.....	23	25	\$1 25
J. Wertheimer, Trustee.....	2	25	1 25
J. Wertheimer, Trustee.....	3	25	1 25
J. Wertheimer, Trustee.....	4	25	1 25
John P. Sanders, Trustee.....	8	50	2 50
A. Meyer, Trustee.....	16	5	2 50
F. A. Borel, Trustee.....	17	25	1 25
John P. Sanders, Trustee.....	22	100	5 00
John P. Sanders, Trustee.....	23	100	5 00
Jacob Sunstatt, Trustee.....	31	20	1 00
Jacob Sunstatt, Trustee.....	41	40	2 00
Wm. Small, Trustee.....	42	100	5 00
A. Meyer, Trustee.....	58	100	5 00
A. Meyer, Trustee.....	59	100	5 00
A. Meyer, Trustee.....	60	100	5 00
A. Meyer, Trustee.....	61	100	5 00
A. Meyer, Trustee.....	62	100	5 00
A. Meyer, Trustee.....	63	100	5 00
A. Meyer, Trustee.....	64	100	5 00
A. Meyer, Trustee.....	65	110	5 00
A. Meyer, Trustee.....	66	100	5 00
A. Meyer, Trustee.....	67	100	5 00

Mining Machinery.



TEATS' PATENT FURNACE.

TEATS' PATENT FURNACE

For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to emitting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces, controls them with ease adding heat or air, stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, heating the water for amalgamation and the boilers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln," for drying ores direct from the mine or breaker, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874. For particulars address

TEATS & BREED,

No. 12 West Eighth Street, Cincinnati, Ohio

Circulars, &c., will be furnished, if required.

18v28-3m

STEEL SHOES AND DIES

FOR QUARTZ MILLS.

Made by our improved process. After many years of patient research and experiment we have succeeded in producing STEEL SHOES AND DIES for QUARTZ MILLS, which are unequalled for



Die.

Shoe.

Strength, Durability, and Economy

Will wear three times longer than any iron Shoes

BUILDERS AND CONTRACTORS

Of Quartz Mills, Pans, Separators, Concentrators, Jigs, Hydraulic Rock Breakers, Furnaces, Engines, Boilers and Shafting, and general Mining Machinery in all its details and furnishers of Mining Supplies. All orders promptly filled.

MOREY & SPERRY,

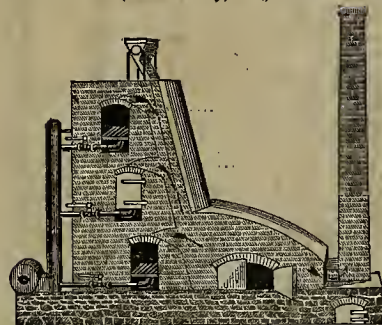
88 Liberty street, N. Y.

Examination solicited.

9v28-1y

EAGLE IMPROVED CHLORINIZING AND DESULPHURIZING FURNACE.

(Patented July, 1873.)



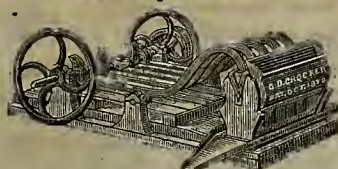
The Cheapest and Most effective Furnace now in use. Parties desirous of building above furnace, or for any information on same, address,

I. T. MILLIKEN,

No. 302 Montgomery at., room No. 14, S. F.

CROCKER'S PATENT

TRIP HAMMER QUARTZ BATTERY.



This machine complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 200 blows per minute, in a mortar provided with screens on both sides, and crushes FINE 600 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$500.

G. D. CROCKER,

17v26-1f 315 California street, San Francisco.



PARKE & LACY,

SOLE AGENTS FOR THE

Burleigh Rock Drill Company.

—MANUFACTURERS OF—

PNEUMATIC DRILLING MACHINES,
AIR COMPRESSORS AND OTHER MACHINERY.

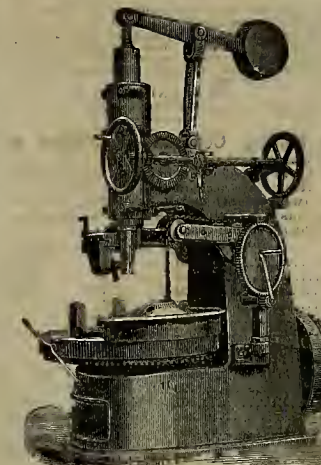
Also, Farmers' Dynamic Electric Machine and Hill's Exploders for Blasting, Putnam Machine Company's Tools, Wright's Steam Pumps and Haskin's Engines.

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310 California St., S. F.



No. 4 Car Wheel Borer.



We have the best and most complete assortment of

Machinists' Tools

In the Country,
Comprising all those used in

MACHINE, LOCOMOTIVE,

AND

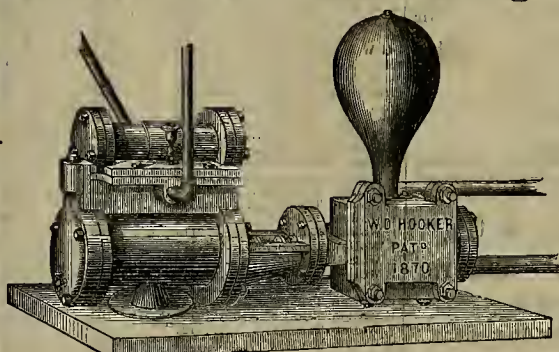
R. R. REPAIR SHOPS.

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NEW YORK STEAM ENGINE CO.,
98 Chambers Street, New York.

15v28-eow-1y

Hooker's Patent Direct Acting Steam Pump



N. B.—Also manufacturer of Hooker's Deep Well and Double-Acting Force Pump. Received the Silver Medal awarded at the last Mechanics' Fair in San Francisco.

18v27-2am3m

W. T. GARRATT,
Cor. Fremont & Natoma
streets, S. F.,
Sole Proprietor & Manufacturer for the Pacific Coast.

SIMPLE, CHEAP AND
DURABLE.

Adapted for all purposes for which Steam Pumps are used.
The Best Pump in Use.

SEND FOR CIRCULAR

THE BIRMINGHAM SHOVEL.

These Shovels have No Rivets nor Straps.

The blade is made of one piece of BEST SOLID CAST STEEL, the blade and shank being one piece.

THEY WILL WEAR TWICE AS LONG

As the ordinary shovel. They are the STRONGEST, BEST and CHEAPEST SHOVEL EVER MADE. Examine the engravings carefully and you can see how they are made.

THEY NEED ONLY TO BE TRIED

To prove their value. Prices same as ordinary shovels. Ask for the BIRMINGHAM SHOVEL. Take no other.

TREADWELL & CO., Sole Agents for Pacific States,

2v8-eow-hp

San Francisco, Cal.



Stamp Mill For Sale at Ophir Canon.

Nye County, Nevada. Midway between Austin and Belmont, belonging to the Twin River Consolidated Mining Co. A complete mill, comprising twenty (20) 800lb stamps, (dry-crushing) with Rock Breaker, Pans, Settlers, and entire outfit of milling appliances; together with an excellent engine (18x42), two tubular boilers and all requisite shafting, gearing, belting, &c.; valuable lot of Sierra Nevada timber in Battery frame and building. The whole offered cheap. For further information apply to J. A. D. HAGUE, 240 Montgomery St., S. F. 17v28-3m

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

10v27M

J. HENDY, No. 32 Fremont Street.

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery to the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tanned Manila Rope; Hay Rope; Whale Line, etc., etc.

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TUBES & CO., 611 and 613 Front street, San Francisco.

Glasgow Iron and Metal Importing Co.

Have always on hand a large Stock of Bar and Bundles Iron, Sheet and Plate Iron, Boiler Plates, Gas and Water Pipes, Cast Steel, Plow and Shear Steel, Anvils, Cumberland Coal, Etc.

WM. MCCRINDLE, Manager, 22 & 24 Fremont St., S. F. 18v28-2

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS OF AND DEALERS IN

ASSAYERS' MATERIALS

Chemical Apparatus and Chemicals,

Druggists' Glassware and Sundries,

PHOTOGRAPHIC GOODS, ETC.,

512 and 514 Washington street, SAN FRANCISCO

We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our large and well adapted stock

ASSAYERS' MATERIALS

—AND—

Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast. Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assay in Grains Grammes, will be sent free upon application.

7v26-1f

JOHN TAYLOR & CO.

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam hot water, as desired.

This Amalgamator Operates as Follows.

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Sellers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.
Ores sampled.
Assaying in all its branches.
Analysis of Ores, Minerals, Waters, etc.
Plans furnished for the most suitable process for working Ores.
Special attention paid to the Mining and Metallurgy of Quicksilver.

E. HAHN,

C. A. LUCKHARDT,

Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS.

ADVANCES MADE

On all kinds of Ores, and particular attention.

PAID TO

CONSIGNMENTS OF GOODS.

4v16-3m

LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical CHEMIST,

No. 611 Commercial Street,

(Opposite the U. S. Branch Mint.

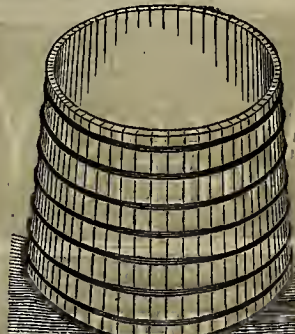
SAN FRANCISCO CAL.

7v21-3m

California Assay Office—J. A. Mars &

Wm. Ireland, Jr., Chemists and Assayers, Rooms 47 and 48 Merchants' Exchange, San Francisco. Analysis of Ores, Mineral Waters, Etc.

8v28-3m



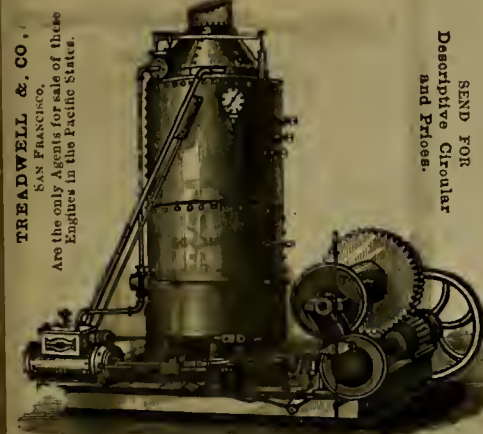
WATER TANKS of any capacity, made entire by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Cost less than elsewhere.

WELLS, RUSSELL & CO.,

Mechanics' Mills, Cor. Mission & Fremont Streets, 3v28-3m-sa

IMPROVED HOISTING ENGINES.

HOISTING ENGINES.



Descriptive Circular
and Prices.

COOK, RYMER & CO.'S Celebrated Hoisting Engines have been too long in use on the Pacific Coast to require any special recommendation from us. We refer with confidence to any one of the hundreds now in use. We simply state that they still maintain their old reputation, the manufacturers not having followed the now too common practice of reducing the quality of material and workmanship for the sake of competing with cheaper engines. For details of sizes send for price list. We desire to call particular attention to our new

MINING HOISTING ENGINES.

(Manufactured by the same parties.)

Which have just been introduced on this Coast. The plans and specifications are the combined efforts of our most successful MINING ENGINEERS, and the result is the most complete

DOUBLE-DRUM HOISTING ENGINE

Ever built. Their advantages will be seen at a glance by any one familiar with the necessities of a mine. One of these engines may be seen at work in the Belcher mine, and one in the Ophir, on the Comstock lode, to both of which we refer. We have all sizes of these engines constantly on hand. For sale only at

TREADWELL & CO.'S,

San Francisco, Cal.



MINING MACHINERY
of all kinds,
TREADWELL & CO., San Francisco.

Portable Saw Mills,
Turbine Water Wheels,
Wood Working Machines,
Bulldozing Engines,
N.Y. "Safety" Tools,
Gardner Governor,
Dodge's Hydraulic Jacks,
Engineers' Supplies.

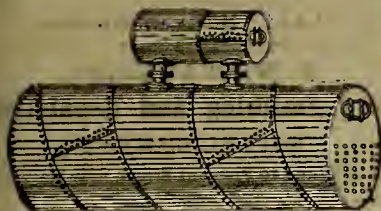
Iron and Machine Works.

San Francisco Boiler Works,

123 and 125 Beale Street.....SAN FRANCISCO

F. I. CURRY.

Late Foreman of the Vulcan Iron Works, Proprietor



High and Low Pressure Boilers of all Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED

SPIRAL BOILER.

SHEET IRON WORK of every description done at the Shortest Notice.

All kinds of JOBBING and REPAIRING promptly attended to. 17v25-3m

THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868.
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,
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Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

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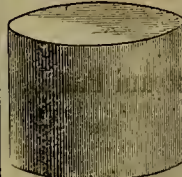
Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

[PATENTED MAY 26TH, 1874.]

Price Reduced to 16 CENTS Per Pound.

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1v29-3m

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Embracing ALL SIZES of
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Of every description and size

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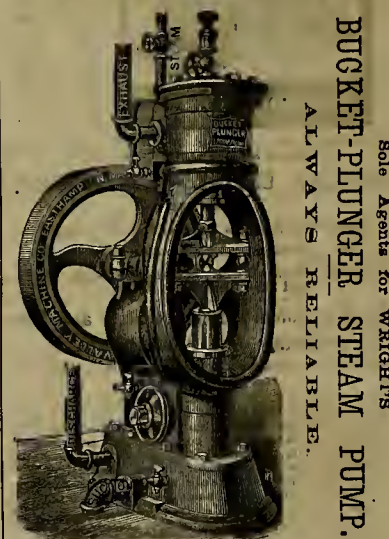
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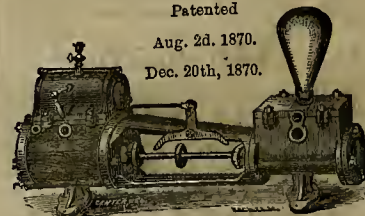
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A. CARR, Manufacturer & Proprietor.

Patented

Aug. 2d, 1870.

Dec. 20th, 1870.



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As a Mining Pump it is Unsurpassed.

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STEAM, GAS & WATER PIPE, BRASS WORK STEAM & WATER GAUGES, FITTINGS, ETC.

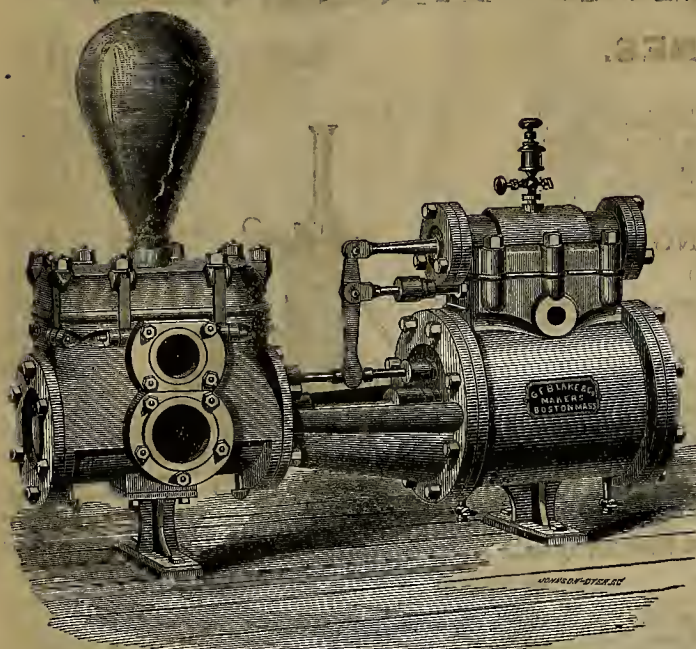
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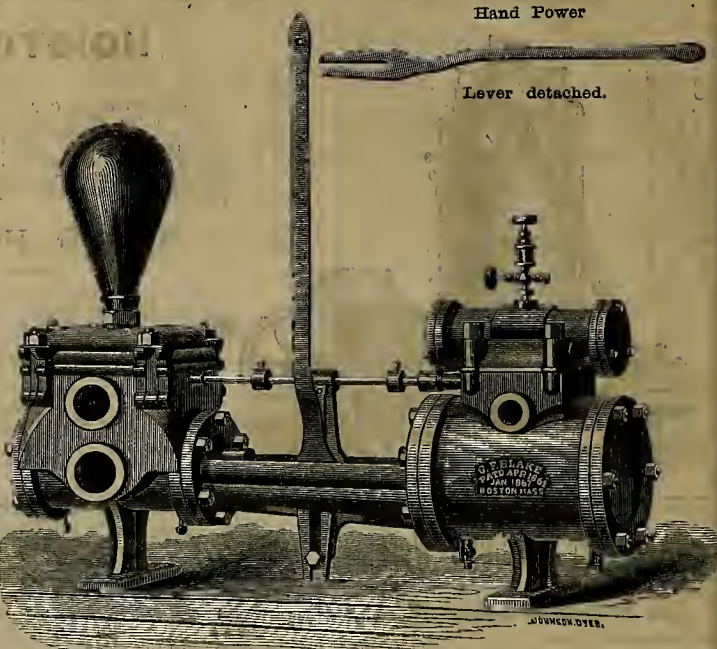
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BLAKE'S PATENT STEAM PUMP—MORE THAN 7000 IN USE.



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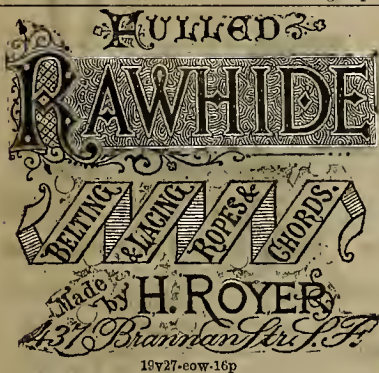
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CENTENNIAL PACKING.

SELF-LUBRICATING.

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Water Pumps
OF ALL KINDS.

The CENTENNIAL is composed of the finest Hemp, made in strands or sections, of different sizes, each being saturated in a composition of pure German Black Lead and Tallow and covered with a braiding of the best Italian Hemp to be found in the market. It is manufactured in a shape the most convenient to use and handle, and gives from 50 to 100 per cent. more length compared with an equal weight of other makes. It runs with less friction on the rod than any other Packing made, from the fact of its being so perfectly soft and pliable, and so well lubricated so to require a minimum pressure on the rod. It cuts off smooth and makes perfect joints, is easily adjusted to any size rod, and only requires occasionally a new ring to keep the stuffing box full. ENGINEERS, TRY IT. For sale in any quantity by TREADWELL & CO., San Francisco.

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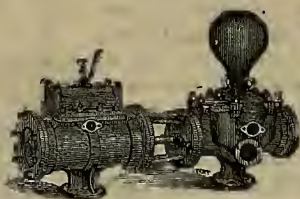
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THE ONLY SAFE BLASTING POWDER IN USE.

GIANT POWDER, NO. 1,

For hard and wet Rock, Iron, Copper, etc., and Submarine Blasting.

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They have proved to be the most durable and economical
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Each Saw is Warranted in every respect.

Particular attention paid to construction of

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JANUARY 30, 1875.

VOLUME XXX
Number 5.

Reduction of Silver Ores.

First Lecture of the Scientific Course by Prof. Becker.

Our annual mining review crowded out last week the lecture by Dr. Becker, which was delivered at the Mechanics' Institute, last Saturday week. We give, however, below a summary of his remarks. This was the first lecture of the season of the scientific course, to be given under the auspices of the Regents of the State University and the directors of the Mechanics' Institute.

The Professor, after a few preliminary remarks on the condition of metals as they occur in nature, said that gold never occurs unaccompanied by silver, and the same is true of lead, and the deposits of these two metals generally contain silver in sufficient quantities to pay for its extraction. Copper, too, is very often accompanied by silver, and minerals containing silver as an essential element are sometimes found in large quantities. Native metallic silver accompanies native gold, and is also, though much more rarely found alone. The most important ore of silver is galena, or, properly speaking, a lead ore—the sulphide of lead. All the silver obtained in Great Britain, most of that derived from continental ores, and an immense proportion of the bullion obtained in America is reduced from galena, although, when the value of silver in this ore is great, it is generally called a silver ore, instead of an argentiferous lead ore, just as the product of its reduction is called on this coast, but nowhere else, base bullion, instead of argentiferous lead. There is a whole series of antimony compounds of silver, which are generally very rich, but always very troublesome. It is antimony which renders such ores refractory.

Treating Pure Ores.

The more common ores are generally treated for extraction by melting down in such a way that a fluid metal and fluid slag are formed, which separate in virtue of their different specific gravities, and may be tapped from the furnace at different levels, the metal being cast into marketable bars and the slag thrown away. A lead ore containing but fifty per cent. of metal would be but a second-class material. A silver ore containing the same percentage would be worth over \$18,000 per ton, but such valuable ores are not found by the ton. Silver ore of such richness that the metal bears a sufficient proportion to the whole weight to allow of a proper separation by the ordinary methods never occurs. We are therefore compelled to make up the necessary weight and volume by alloy. Three metals perform this office under different circumstances; these are lead, quicksilver and copper. Lead is the most widely used and copper is the most rarely employed.

Lead Ore.

Lead ores are treated either in a cupola furnace or in a reverberating furnace. In melting lead ores the fire is kept low and much air is admitted until a portion of the galena is roasted. The sulphur of the galena combines with the oxygen and forms sulphurous acid gas, which passes up the chimney. The oxygen attacks the lead and it becomes oxide of lead, a compound which, when tolerably pure, is known as massicot, much used in glass-making, etc. The fire is then made up and the air excluded as much as possible. The sulphur in the sulphide of lead attacks the oxygen in the oxide of lead formed by roasting, and they form more sulphurous acid, which also goes up the flue, leaving the metallic lead. This can then be tapped from the furnace and cast into bars. When the ore is argentiferous, the silver sulphide is decomposed in the same way and at the same time, and the silver is found in the lead bars.

Impure and Poor Ores

Are treated in the cupola furnace. The ore is generally roasted before melting. The gases formed by combustion are forced out of the top furnace by air driven by machinery near the bottom of the furnace and the metal accumulates below this air-nozzle. Meantime, of

course, the column of material constantly sinks, and fresh ore, flux and fuel are from time to time charged to keep the furnace full. The silver again follows the lead.

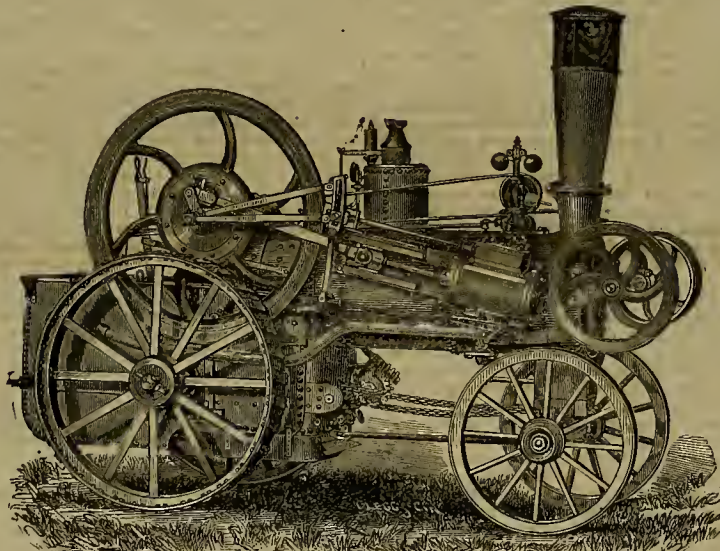
The Treatment of "Base Bullion"

Varies with circumstances. If it is rich, means are taken to extract the silver immediately. If it is poor, it is better to submit it to the processes which will effect a concentration of the silver in a comparatively small mass of lead, and thus extract the silver from this concentrated material.

The processes of concentration in use are the crystallization and the zinc processes. Pattison's crystallization process depends on the remarkable properties of alloys of lead and silver in regard to fusibility. Alloys frequently melt at a lower temperature than either of the metals of which they are composed. This is the case with some of the alloys of lead and silver. The process of desilverization by zinc depends on the tendency of zinc to form alloys

Road and Farm Locomotives.

One of our Eastern correspondents, W. C. Quimby, sends us some notes from the Eclipse Machine Works, located at Hamilton, Ohio, and conducted by the Owens, Lake & Dyer machine company. The works are among the largest of the kind in the country, and some of their productions are specially adapted to the Pacific Coast. Prominent among the articles made there are their traction engines, or road and field locomotives, an engraving of one of which appears on this page. They are claimed by the manufacturers to be superior to any of the English engines of this class, it being especially adapted to the wants of Americans; such as hauling heavy loads over uneven ground, running threshing machines, saw-mills, and other machinery. It has not been tested in plowing, reaping, etc., but if such a thing can be successfully accomplished by any



TRACTION ENGINE, OR ROAD AND FIELD LOCOMOTIVE.

with silver and its lack of tendency to form them with lead.

Cupellation.

The silver is obtained from the rich lead by cupellation, a process based upon the greater tendency of lead than silver to oxidize. The product of cupellation is refined bullion, consisting of silver and whatever gold there may have been in the ores treated.

Chemical Method.

Besides the methods of extraction referred to, there is a considerable number of processes for the extraction of silver from its ore by fluid solvents, the silver being subsequently precipitated from solution by chemical methods. These processes have many advantages over smelting, requiring little fuel in comparison, enabling the treatment of very poor ores and making quick returns. Their use is yet quite limited, because they require, as thus far developed, material nearly free from several very common impurities.

The average daily shipment of ore during the last week from the Crown Point mine has been 500 tons; Ophir, 260 tons; Hale & Norcross, 100 tons; making a total daily yield of 1,725 tons of first-class ore, from five leading Comstock mines. The Sierra Nevada, Chollar-Potosi, Woodville and several other mines are also taking out considerable quantities of ore.

The ditch belonging to the Mokelumne bill canal and mining company broke Monday last, somewhere between Mosquito gulch and the point where the water is taken out of the river. It had not been repaired at last accounts.

The Alameda mine, Tuolumne county, lately passed into the hands of a San Francisco company, who are now developing it.

traction engine, our correspondent thinks this one will do it. He says he saw one of these engines that had been doing duty for over a year, hauling from 4,000 to 5,000 feet of green oak lumber from the interior of the country to the works of the company. Ten tons of pig iron is the usual load from the depot to the foundry. Those interested can get details of work, price, etc., by corresponding with the company above referred to.

READERS, who are able, should write more for the MINING AND SCIENTIFIC PRESS. Among the miners, engineers and millmen who read this paper, there are a host who have both the education and practice to fit them for furnishing articles that, through our paper, would materially benefit present workers and future generations of toilers yet to be. Noble and intelligent men are not more frequently met with in other callings, and yet how few are they who improve their talents by way of writing for the PRESS. We do not believe it is for the want of a generous disposition toward others, but rather a lack of self-esteem and energy. Now, we will say write for our columns. You will perform a noble duty to inform others that they may work uprightly in places that you, as pioneers, have had to feel your way through. It will improve yourselves to write. We ask all to send us correct information, and we will put it in shape if it needs dressing up.

MONTANA MINING DECISION.—The Secretary of the Interior has affirmed the decision of the Land Office in the case of the application of the patent for the General Lode, situated in Montana. The decision says that all lode claims must be governed by the laws in force on the date of the location, and cannot exceed 100 feet of surface width, unless the local laws at that time will permit.

Mining Matters in Congress.

Congress has as yet done nothing of importance with reference to the bills which are of general interest to the mining community. Several bills are, however, pending, which are important. The "Negley amendment," which was laid over from last session has not yet been considered. This amendment to the Act of May 10th, 1872, provides that all companies or persons owning claims on the Comstock lode shall make applications for patents within six months from the date of the passage of the amendment, and will receipt for the patent six months after application. It also compels owners of those mines to which patents have already been issued to receive such patents. In some cases the patents to mines on the Comstock, though made out, have never been taken from the Receiver's office, because the patent specified that a certain royalty must be paid to the Sutro Tunnel Company, when the tunnel is completed. The mining companies will fight this matter, and do not want the patents with this provision therein. Consequently they have never taken them from the Receiver's office.

Pratt's Bill, which provides that all quartz lodes which have produced \$5,000 or upward, shall file applications for patents within one year, was also laid over for last session. Eastern dispatches state that this bill will shortly come before the Public Land Committee for action.

The Ward Bill, which provides that all miners must patent their claims, upon which \$500 has been expended, will also come before the Committee shortly.

Senator Sargent has introduced a bill which is of great interest to foreign corporations and owners of mines, as follows:

That in cases where foreigners or foreign corporations have purchased mining claims for a valuable consideration, of citizens of the United States who had complied in the location and possession thereof, prior to same, with the laws of the United States governing the same, and such purchase was made prior to the date of the approval of the Act "to promote the development of the mining resources of the United States," approved May 10, 1872; and when such purchasers shall have complied with the said law in the working of the same, and shall apply for patents thereof, as in other cases, and pay to the United States the price thereof as provided by law, patents shall issue to such parties in the same manner and to the same effect as in other cases.

Sec. 2. That in cases where application shall be made for patent to mining claims by citizens of the United States, being bona fide owners thereof and in possession of the same, patent shall not be refused therefor on the ground that one or more of the locators thereof may have been foreigners at the date of location; provided, that said location shall have been made prior to the 10th day of May, 1872.

This bill has been reported on favorably by the Committee on Mines and Mining, with a few unimportant amendments.

The famous McGarraban has turned up again in Congress on the New Idria quicksilver mine business, and for once he has made a point. The House Judiciary Committee has agreed to report and recommend the House to pass a resolution directing the Commissioner of the General Land Office to institute legal proceedings in the name of the Government of the United States against the New Idria mining company, for the recovery of the quicksilver mine now held by it, and of some \$7,000,000 alleged to have been illegally taken from said mines; also allowing all persons to appear in these proceedings and have an opportunity to establish title. This is intended for McGarraban's benefit. The resolution also provides for proceedings for the appointment of a receiver, and directs the Interior Department to withhold the issuance of patents to the New Idria company, and stop proceeding in the Cerro Bonito, Johnson, Fourth of July and Boston quicksilver mining claims until the suit to be instituted by the Commissioner of the General Land Office shall have been finally determined.

CORRESPONDENCE.

Cherry Creek Mines.

EDITORS PRESS:—I have been wondering of late why it is, that so little mention is made of the mines in this section, but I suppose it is all owing to the deep interest taken in the wonderful developments, made, and being made in the all-absorbing Comstock.

The mines of this, the Cherry Creek District were discovered two years ago last June, and are just beginning to show their colors, and presaging it may not come amiss to your numerous readers, I will give you a few notes in regard to their progress in the way of development and increase in the yield of bullion. While the unbouded wealth of the famous Comstock lode is attracting the attention and exciting the envy of the whole mining world, not only in America, but throughout all Europe, we, of Eastern Nevada, should not be entirely ignored, although we cannot as yet, boast of any "big bonanza;" but as our mines are situated only about 400 miles east of Virginia City, and pitching to the west we hope soon to strike it; and, in fact, are liable to open into it at any minute.

The work of prospecting and developing the mines of this district, has progressed slowly, but very persistently, for the past two years, with varied results. At times the prospects were very bright, at other times the outlook for the future wore a very gloomy one, but the great strength of the ledges, together with the favorable indications to be seen at nearly all points along the surface encouraged the owners of some of the principal mines to push their explorations further and deeper, which they have done with very gratifying results.

The great mineral belt of Cherry Creek traverses the mountain range diagonally, from S.W. to N.E. for a distance of from six to eight miles.

There are two large and heavy ledges, one on the west, and one on the east side of this mineral belt, and which are traceable nearly the whole distance, and in which lay most of the principal mines of the district, and are known as the upper and lower mineral belts. These ledges are cut in places by deep cañons and gulches, but are traced by their croppings as they appear on the high ridges that make down from the main mountains to the east, showing the main mineral belt to be very regular, as indicated by the formation and stratification of the country rocks which are quartzite, porphyry and slate. The country rock on the west of the mineral belt is mostly lime, that on the east, quartzite and porphyry. The course of these main ledges is north 15 degs. to 20 degs. east, but there are some exceptions to this rule, however, as there are a number of ledges running nearly north 70 deg. west, and it is yet a question which will prove the most lucrative the east and west, or the northerly and southerly ledges. Each have their advocates and both have strong arguments in their favor. Time will tell.

The principal companies now operating here are Geneva Cons. M. Co., owning the Teacup and Geneva ledges, the former on the upper, and the latter on the lower belt; the Cherry Creek M. & M. Co., owning the Eschequer ledge on the lower belt; the Star M. Co., owning the Star and Grey Eagle mines, which are easterly and westerly ledges, but are claimed to be on the lower belt. The Geneva Co. have a shaft on the Teacup ledge 250 feet deep, showing a very strong vein, carrying a large amount of very high grade ore, and having every promise of a large and rich mine. The company have as yet worked only their first-class ore from this mine, which has pulped from \$150 to \$1200 per ton. The ore has mostly been worked in Thompson's two-stamp mill, with a large size Hepburn pan (capable of working from 3½ to 4 tons per day) with very satisfactory results.

On the Geneva mine they have a shaft down about 60 feet and are sinking as rapidly as possible. This ledge, showed on the surface ore of the largest and finest bodies of ore ever found in the district, and is sure to develop into a large and rich mine. The Teacup carrying more high grade ore than the Geneva, is why they have worked it more extensively. That this company have a very valuable property is now beyond question, their mines have thus far paid all the expenses of development, something quite unknown in the history of silver mining in this State.

The only other mine on the upper belt which has been explored to any extent is the Chance, belonging to Geo. Treat, and others of San Francisco. On this ledge they have a large shaft down 100 feet, from which a large amount of high grade ore had been taken; they have a fine prospect and if all indications do not fail they will have a good mine. There are several other claims on the upper belt which promise well, and will probably prove as good, if not better than either of the above, among which are the Pine Nut, Union, Baltic, and several others.

The Eschequer, on the lower belt, is now one of the most promising mines in the district. On the surface they have a body of rich ore, but from some cause or other it depreciated in quality and quantity after sinking from 25 to 30 feet, and for a while work was suspended entirely. Recently they have cut their ledge by a tunnel, driven in from the base of the hill, at a depth of 168 feet below the old workings, and have opened into a large and rich body of ore, which appears to be quite extensive. It is known to be 12 feet wide and 60 feet in length, with no apparent depreciation in quality or quantity in either direction. The company can very readily take out enough ore to repay them for all their outlay, and have a magnificent property left. The walls of the Eschequer are a gray porphyry, and wherever the walls have been found on this, the Veal Madre of the district, from the Geneva on the south to the Victoria on the north, it shows the same general characteristics.

The Star ledge, situated on the same ridge as the latter, and perhaps one-fourth of a mile distant, is now looked upon as the Star mine of the district, and as far as the shipment of bullion goes, it is certainly entitled to that name, it having shipped more than any other mine in the district, the shipments from this mine alone for the month of December amounting to about \$60,000. They are now taking out from 10 to 15 tons of ore per day, that pulps from \$100 to \$200 per ton. They have a shaft down about 150 feet, with drifts running each way from the shaft following the vein, which ranges from four to six feet in width.

Adjoining them on the west is the Gray Eagle, with a shaft 100 feet deep, showing a beautiful vein from three to five feet thick, and having all the characteristics of the Star. I believe it is the intention of the Star company to erect a large mill at an early day, for the reduction of their own ores. They have one of the finest properties in Eastern Nevada, and one that will make itself known in stock circles at no distant day.

At Egan Canon.

Four miles south of Cherry creek, the San Jose company are working their mine, the Gilligan, with a full force of men, and with very cheering results. They keep their 20 stamp mill constantly running on their own ores, which are yielding well. This mine was discovered and worked quite extensively as early as 1864; and has been prospected to a greater depth, and more extensively along the ledge than any other mine in this part of the State, and shows throughout a very strong and persistent vein of good ore, and will under the able management of General Rosecrans richly repay the owners, who have with so much confidence invested their money in it. There are a number of other mines in the district which are being prospected in a small way, all of which are very encouraging, while some of the best prospects are laying idle. One of the best features of the mines of this district is that they are large and traceable for a long distance, and evidently from the explorations already made, carry some heavy chimneys of high grade ore. The ores throughout the district are very free, and readily yield their precious metals by the application of the ordinary milling process. I don't know of any ore in the State that can be milled to as high a percentage of the assay value as these can. The ores of the two belts differ materially. Those of the lower invariably carry from \$6 to \$15 per ton in gold, while the upper belt has none; they also contain less copper and more iron. All the mills in this vicinity are now running, and have been for a number of months—27 stamps in all—and the bullion shipments amount to from \$2,000 to \$8,000 every stage. Everyone anticipates a brilliant future for Cherry creek, and judging from the present outlook I think they will not be disappointed.

Cherry Creek, January 16, 1874.

FAST RIDING TO SECURE A RE-LOCATION.—Now and then, says the Sonoma Democrat, we hear of some one re-locating a quartz vein that became vacant the first of the month, for want of complying with the U. S. Mining Law. On Monday an old miner had a lawyer draw up notices for the re-location of a well known mine, and went to the vein to post them, when he had tacked up one notice he saw an acquaintance coming on horseback, who, upon reaching the spot, said "you're too late, I've got up the first notice," to which the other replied, "I don't know about that, I'll have the second up first," while the new comer run his horse for the tunnel at the same time, hauling out a paper which was supposed to be a notice. The first man ticked his second notice, and was just fifteen minutes by his watch coming five miles to have his claim placed on record. That was mighty fast time, but he was determined to be ahead somewhere in locating the claim, as he thought he was first in the idea, and that the other had accidentally got information of what he intended. Now it remains to see which will hold the claim.

PURCHASE.—Col. D. Buel has purchased the McOrackin mine, Cerbat, Arizona, from Mr. McOrackin, Chloride Jack and others, for the sum of \$240,000, and it is considered a very cheap bargain. Those who have examined this claim consider it a second Comstock. I saw some of the rock which assayed \$2,700 per ton. Men are at work taking down the mill on Colorado river, for the purpose of removing to this mine, and when once in operation, under the management of R. Stein, will, undoubtedly, give magnificent returns in gold, as the vein is enormous in size and very rich.

Sonoma County Mines.

The Sonoma Democrat gives the following concerning the mining interests of that county:

As early as 1852 there were reported discoveries of gold on Russian river, in this county. About that time one of the Kelseys, pioneers in this section, led a party to the head of the stream, in the Bel river mountains. They met with no great success and returned. The reports of gold discoveries were again revived in 1854, but soon died out.

After the discovery and occupation of the Geyser Springs, the abundant indications of cinnabar in the vicinity attracted attention. The price of quicksilver at that time was low—50 cents per pound; the cost of reduction was great, and the Almaden mine was producing a supply adequate to the demand. For these reasons no especial attention was paid to the indications of mercury everywhere visible on the surface near the Geysers.

In 1859, Col. A. C. Godwin, then the owner of the Springs, organized a mining district, located a number of claims himself, and a number of others were also taken up. These claims were afterwards consolidated into one or two companies, and some work was done upon them. The low price of quicksilver, the scarcity of labor and the lack of skill in manipulating the ore, led to loss, and finally put a stop to all work on the mines. In 1861, Col. Godwin, who had given the enterprise most of his life, sold his interests in the Springs and mines, returned to the East and was killed in the war between the States. The stock of the consolidated companies went to zero, and the mines were sold at Sheriff's sale to satisfy the demands of the creditors. Prof. Whitney, with a corps of scientists, came along soon afterwards, and with his "no view theory" in the Coast Range, extinguished the last spark of life in mining enterprises in Sonoma for the time.

Meanwhile the developments in the silver regions of Nevada, in the quartz and gravel mines of California, caused an increased demand for quicksilver. The diminished supply afforded by the Almaden company, which had passed its maximum production, gave a further stimulus to the price, and attention was again called to the indications in this section, which had not been worked successfully at the old prices.

The mountain range in which most of the mines of Sonoma Co. are located is known as the Mount Diablo range. Just west of the peak from which the range takes its name, lie the straits of Carquinez, through which the waters of the Sacramento and San Joaquin force their way and enter the Bay of San Pablo. West of the straits the mountains trend to the northwest, gradually increasing in altitude. They form the water-shed between the Sacramento and the valleys west of it to the Pacific ocean. Napa valley lies between the main range and a spur from it terminating on San Pablo bay. The great valleys of Sonoma county are formed by another spur from the same range, terminating on San Pablo bay at a point further west. This last spur forks and forms two valleys, Sonoma and Petaluma, both with a delta and frontage on the bay of San Pablo. All these spurs unite with the main range, which then passes through the northeastern corner of this county. At or near this point of intersection a rich body of quicksilver is now being developed, a deposit which bids fair to equal if not surpass the greatest in either the old or new world.

A number of mines had been opened and successfully worked in the main range, southeast of where it enters Sonoma county. Prospectors traced the croppings of the ledges along the range into this county. Granville and Green Thompson located a claim in 1872. They discovered large deposits of float ore, and took up a claim called the Sonoma. This claim was sold to a San Francisco firm who immediately built a furnace, and, by November of the same year, were reducing metal. The mine has been worked steadily, yielding a regular monthly supply of quicksilver. An excitement followed; a great number of claims were located, and rich discoveries were made. A mining town sprang up, and Sonoma county, which had long ranked as one of the finest agricultural counties in the State, was discovered to have a mining interest second only to her great wealth in wine, wool, fruit, dairy products and wheat.

This mineral district is located in the northeastern corner of the county, in the hills forming the eastern boundary of upper Russian river valley. They are about fifteen miles from Healdsburg and twenty-seven from Santa Rosa. The mountain district in which they are located is about twenty miles long by an average width of about ten miles, including the main range and the spurs from it. Two hold streams rise in the main range. They flow in a north-west direction, with the trend of the mountains, on either side of an immense spur from the main range, unite and empty into Russian river, near the northern boundary line of the county. The highest point in this spur is Geyser mountain, a rounded and beautiful peak, visible from all parts of the great valleys of Sonoma. It takes its name from the famous Geyser springs, which send up their wonderful columns of steam from a deep gorge, of which this spur is the western wall.

In this range are located some very valuable mines. Among the most prominent are the Socrates, the Flagstaff, the Sonoma, the Anna Belcher, the Rattle snake, the Missouri, the Oakland, and the Geyser. We mention these

as they are productive—all having furnaces now running, or about to commence—and with no desire to draw invidious comparisons or to disparage other claims. There is one peculiarity worthy of mention: those mines nearest the Geyser steam springs produce free mercury, the Socrates, the Flagstaff, and the Rattle snake, while those further distant produce cinnabar, which is a combination of mercury and sulphur. It is not improbable that the mines will yield during the coming summer from 1,000 to 1,500 flasks of metal a month, worth \$100 a flask. To W. A. Stuart, an enterprising merchant of San Francisco, the development of the mines in this section of the county is mainly due. He has sound judgment, untiring energy, and, above all, had confidence in the wealth of the district, risking time, money and labor when others were skeptical. It is estimated that there are a thousand people in the district. A network of good roads run throughout, and the busy din of industry and life is heard where two years ago the only trail was that of the grizzly, and the only sound the report of the woodman's rifle.

Further north there are other mines; one, the Cloverdale, is erecting a furnace, with a hillside for a mine, through which mercury seems to be evenly and thoroughly diffused. The hill has the appearance of an extinct geyser. A few miles lower, on Big Sulphur creek, the Livermore mine is erecting a furnace.

The Guerneville Mining District.

We have mentioned that Russian river broke the immediate coast range, emptying into the sea. In this section there are a number of valuable mines. The Mont Jackson and the Great Eastern are both building furnaces. The indications of a large and lasting deposit are very favorable. Many believe that they will equal if not surpass the mines in the Pine Flat district. They were only discovered during the past spring. As far as work has been done the indications are favorable, both mines having rich ore on the dump waiting for the completion of reduction works. In the same section a rich copper mine, the Olive, is now being worked.

In the vicinity of Cloverdale a chrome iron mine is worked, and regular shipments of ore are made. Of this valuable metal there is an inexhaustible supply in Sonoma county. Quicksilver mines are also being worked in the same vicinity. Our mineral wealth is in the infancy of its development. The day may not be distant when Sonoma will rank as a mining county as high as she now does for her varied agricultural resources.

THE MCGLEW FURNACE.—The Nevada State Journal says: We paid Peavine district a visit on Tuesday, and the result of our observations was most satisfactory, though it will not be known for a few days yet whether or no we are to have a prosperous mining camp in Washoe county. For the time being all depends on the successful working of the rebellions ore of the district by the McGlew furnace, just erected at a cost of something like \$6,000. If by this process the precious metals can be extracted with profit, then is the future permanency of the district assured. The result will be known within the next few days, and we hope for the best; though Mr. McGlew is quite confident there will be no trouble. By the McGlew process the ore is crushed dry and placed in a feeder at the top of the furnace. There are three flues, three feet long and twelve inches deep. As the pulp passes down the incline or main due to No. 1 it becomes heated and separated by the blast is using from the flue; thence to flue No. 2, where it is treated in the same manner; thence to flue No. 3, treated in same manner and heated to any degree of heat required; thence into the receiver, and there remains with the fires of the three flues passing over it, and giving an opportunity for the chlorine fumes to pass off with the smoke. The heat can easily be increased or diminished as required to suit the different qualities of ores. The ore after leaving the feeder instantly becomes heated by the flames issuing from the flues and a continuous heat kept up until drawn for cooling. It is then carried to the pans and amalgamated in the same manner as other ores. As we have previously stated, everything depends just now on this furnace, the life of Peavine hanging as it were by a thread, for the mines in the district are looking splendid, and yielding their usual quantity of fine ore.

The supervisors of San Diego county have appointed three road viewers to go over the road from Banner to Los Palamos and report the probable cost of opening the road to intersect the San Bernardino road to Ehrenberg. This route, it is claimed, will be twenty-five miles nearer from the Colorado river to San Diego than the present traveled road by way of San Bernardino.

THE 1000 foot level in the Gwin mine, Calaveras county, is started. It is thought rock will be struck within thirty or forty feet of the shaft, and there are good reasons for the belief that the new level will yield a larger amount than any above it. The mills are kept constantly running on a fair grade of ore taken from the 900-foot level.

THE City of Mexico Two Republics says: Several Californians, representing immense mining interests in that State, have arrived in the mining district of Bravos, Guerrero, wherewith they devote their time and capital to developing the mining interests of that district.

SCIENTIFIC PROGRESS.

The Unity of the Universe.

The Stoics delighted to dwell on the unity of the universe, and pointed out its perfect harmony. They had an anticipative view of the doctrine that heat will at last absorb all things into itself, out of which a new world will issue. The atomic theory was adopted from Democritus by the Epicureans, and was wrought into a gorgeous form by the Latin poet Lucretius. Neither Democritus nor Epicurus was a professed atheist; on the contrary, both held that the gods made themselves known to man by images or effluvia from heaven. But Lucretius pronounced his theory to deliver men from all belief in the gods and superstitious fears, and represented death as the cessation of existence. It is instructive to observe what a run there is in the present day after Lucretius, both by classicists and physicists. He is declared to be the greatest of the Latin poets, and placed above Virgil and Horace. His arguments and his rich descriptions are quoted, and students have to wade through the mantled pool of his erotics to pluck his flowers. It is curious to notice how a philosophy seeks for and creates a poetry suited to it. The philosophy of Epicurus, so prevalent among the Romans, unmentioned in "De Rerum Natura," it has to be added, in the licentious pictures on the walls of Pompeii and Herculaneum. The philosophy of Locke and Bolingbroke found appropriate verses in Pope. The subjective philosophy of Kant came forth in the grand German poetry of the beginning of this century. The physical philosophy of our day has already got a sensuous poetry in works which will doubtless be followed by others. It is because philosophy calls forth such influences, that it comes to have a sway over national character. We can believe with Montesquieu that the Epicurean philosophy exercised an influence in deteriorating the character of the Romans, in hastening their ripeness into rottenness, and determining their fall—we can understand this when we look into these fragments of obscene Epicurean verses, which have come out of the ruins of Pompeii to testify against the inhabitants. We confess that we have fears of the results when the new physics come to crystallize into the creed of the rising generation, and to lead the literature and inspire the prevailing sentiment of the age.

Dr. Tyndall has no appreciation of the benefit conferred on science by Christianity in introducing new and lofty ideas: in showing that there is only one God, and thus preparing the way for the doctrine that there is a unity in nature; in leading men to expect that there are order and wisdom through all God's works; in making the study of nature a duty we owe to God; and in giving us exalted views of the soul as fashioned after the image of God. He speaks in disparaging language of the scholastic ages, whose function it was to preserve all through the cold winter, whose seeds which had been deposited by ancient thought, and which were ready to sprout at the return of spring—he might have spoken with more respect of the medieval ages, had he reflected that in them more new metals were discovered than in all the Greek and Roman times.—*International Review*.

DISINTEGRATION OF GLASS.—A correspondent of the *Boston Journal of Chemistry* recently awarded to that journal some small flakes of glass, which were taken from an empty fruit can. The can was filled in the summer of 1873 with red Antwerp raspberries, in the usual way of canning fruit. The fruit was used out of winter, and the can cleaned and set away for future use. During the following summer when wanted for use again a "table-spoonful" of small thin flakes of glass were found in it. The can was emptied and again set away to see the result, and soon afterward flakes were again found in the can, while the glass of the can still continued to look clear and transparent. The editor of the *Journal of Chemistry* has satisfied himself that the flakes are genuine glass, and considers the spontaneous disintegration of the glass is certainly singular, but not altogether without precedent. The same result has been observed in ammonia bottles left open, and in some other instances. The change is not liable often to occur, but it may be well to examine glass fruit cans carefully, before using them.

ANOTHER EXPLOSIVE—OZOGENINE.—Foreign investigations of the actions of ozone upon certain hydrocarbons, have lately led to the discovery of an interesting substance to which the name of ozobenzene has been given. Pure ozonole, yields, under the action of ozone, acid radicals, including formic and acetic acids, and at the same time a gelatinous body separates, which constitutes the ozobenzene. When dried in vacuo, this ozobenzene is an amorphous solid, explosive to such a degree that an explosion ensues whenever it is struck or heated. The explosion of only a few decigrams of the substance will shatter the windows of a room. It is as dangerous that not more than three to five milligrams should be used for the experiment. Ozobenzene is readily and apparently spontaneously decomposed in the air, in vacuo, or in an atmosphere of carbonic acid. Water dissolves and decomposes it.

TWO GREAT SCIENTIFIC TRUTHS have been established in this century. One is the doctrine of the conservation of energy, which implies that all the physical forces are correlated, and that the sum of force, potential and actual, in the universe is always one and the same. The men who did most to prepare the way for this doctrine, such as Newton, Davy, Oersted, Herschel, and Faraday, all delighted to see God in his works, and the living philosopher who was the main agent in discovering it, Dr. Mayer, has a mind filled with the presence of God, and looks on force as the expression of the Divine power. The other great doctrine is that of development, acknowledged as having an extent which was not dreamed of till the researches of Darwin were published. How far evolution is to be carried is a disputed point among naturalists. Darwin seems to have a great antipathy to final cause; but he has somehow or other convinced himself that there is a God, and is obliged to call in three or four germs, or at least one germ, created by God. It could easily be shown that the doctrine of development properly understood, and kept within inductive limits, is not inconsistent with final cause; for we may discern a plan and a purpose, means and end, in the way in which plants and animals are evolved, and in the forms they take, which are evidently not by chance, or by blind atoms, but according to a progression foreseen from the first, and proceeding in a determined order.—*International Review*.

RESPIRATION AND NUTRITION IN PLANTS.—M. Corenwinder, says *Nature*, has contributed to a recent meeting of the Scientific Society of Lille, an account of a series of observations on the processes of respiration and nutrition in plants, wherein he holds that the process of the absorption and decomposition of carbonic acid and exhalation of the oxygen, is really a process of digestion; that the absorption and exhalation in the process is a true process of respiration, similar, in all respects, to that of animals.

By a very careful series of analysis on several varieties of plants, he has determined that the proportion of nitrogenous matter in the leaves gradually diminishes from the time that they emerge from the bud till they fall from the tree; the proportion of carbonaceous matter increases very rapidly during April and May, and there remains until nearly stationary until October, while that of the incombustible substances increases during the whole period of vegetation.

NEW APPLICATION FOR THE SPECTROSCOPE.—If the spectroscope is valuable and efficient in matters celestial it is not less so in matters terrestrial. For tests and analysis as a laboratory instrument, it becomes every day more serviceable. One of its applications is well worth notice, in testing the quality of water. In some places the water is found to be injurious to health. It is perhaps contaminated by infiltration from a sewer or cesspool. How is this infiltration to be discovered? A quantity of salt of lithium is thrown into the sewer or cesspool. After a time the drinking water is examined by the spectroscope. If the lithium line appears in the spectrum, it is a proof that a portion of the lithium salt thrown into the sewer or cesspool has found its way into the drinking water, and that the water is consequently poisoned by foul drainage. From this we see that the spectroscope may be made to do good service in protecting the public health.

PROTECTION AGAINST HAIL AS WELL AS LIGHTNING.—Observations in regard to the circumstances under which hail storms are formed, have conclusively proved that they can only originate by co-operation of clouds highly charged with electricity; therefore it was many years ago suggested that a great number of lightning rods or conductors erected on poles might protect a region from hail storms, and experience has verified this theory. We read now that it has been tried on a large scale around Tarbes, in France, where, according to a French agricultural journal, eighteen communes have been provided with such conductors, one of them being erected for every 700 acres, and that they have given full protection against both hail and lightning. This fact is important in many districts where peculiar topography renders them peculiarly liable to severe hail storms, which prove very destructive to vegetation, etc.

EFFECT OF FLAME ON AN ELECTRIC SPARK.—Mr. S. J. Mixer notices a curious effect of a gas flame on the current of a Holtz machine. The jet consists of a glass tube drawn out to a point, and the flame has a length of about an inch and a diameter of only an eighth of an inch. Inserting this between the two terminals of the machine, the length of spark obtainable was at once increased from less than ten inches to over twelve, the full distance to which the balls could be separated. The same increase was not obtained by simply inserting a conductor between the two terminals, a ball an inch in diameter only lengthening the spark about an inch.

IS HYDROGEN A METAL?—Dr. S. Worth, of Baltimore, infers from the fact that as hydrogen, occluded by palladium, is easily recovered by moderately heating the palladium, hydrogen cannot be a metal; or at least that its "occlusion" furnishes no evidence that such is a fact. The further fact that other solid bodies absorb large quantities of gases without alteration of the former he also considers further evidence that the metal hydrogen is a myth.

TECHNICAL SCHOOLS.—Where our future skilled workmen are to come from is a question which is crowding for a solution. The doctrine, or rather the total abrogation of the apprentice system has deprived the youth of the opportunity of learning trades. The result is that there are few who are learning, so that skilled labor is getting scarcer in every department of industry. It is therefore a matter of urgent importance that some method should be devised to remedy this difficulty. Of all the plans discussed there seems to be but one which promises success; that is, the establishment of technical schools. The large degree of success which has followed the introduction of these schools in some departments of our activities is strong proof of their utility in all branches. We might refer to our various schools of design and art, to our medical schools, and schools of mining and engineering.

ASTRONOMICAL SCIENCE.—So stupendous are the facts, and so bewildering are the teachings of astronomical science that it is probable but few of its statements and deductions would be believed by the masses of the community, were it not for the ocular evidence that transits and eclipses take place precisely, to the very minute, as they are calculated and predicted. These facts afford such positive demonstrations of the accuracy of astronomical measurements and researches, that all cavil and doubts have to be set aside, and the uneducated world is now compelled to acknowledge as the simple operation of the immutable laws of nature, what for countless ages had been regarded as indications of an offended deity.

MECHANICAL PROGRESS.

Economic Method of Drying Foundry Molds.

In most foundries the drying of the molds is effected by means of sheets of iron, on which a fierce coke fire is maintained. Here, evidently, is a great loss of calorific, for the drying is only effected by radiation, and in a space where the air has generally free access. In the case of large castings, such as cylinders, fly-wheels, framing etc., this plan has also the disagreeable effect of producing great heat all around, and the molds engaged in the same building suffer seriously at times. In addition to this, it is mostly necessary to employ a crane to sustain the frame, or to employ heavy materials which have to be brought to the spot and afterward carried away again, disarranging the material of the foundry and giving rise to unnecessary work.

No improved method had been attempted that we are aware of until a few months since, when M. Dehamme invented and patented a plan which was introduced four months ago into the foundry of MM. Quillaecq & Co., at Anzin, of which M. Dehamme is foreman.

The arrangement is very simple. Near the most convenient end of the mold a hole is dug in the ground, and in this is placed a coke stove, which communicates with the mold by means of a short horizontal pipe, through which all the gases of the coke pass. On the other end of the mold is mounted a chimney-pipe, the upper end of which is carried out through the roof or side of the foundry. In the chimney is a damper to regulate the draught. The stove being partially or entirely sunk in the ground, there is little or no radiation from that, and little loss of heat, and consequently of fuel, as the whole of the gases enter and pass through the mold, and are at once carried away by the pipe into the open air.

The economy is great. In certain cases in which, according to the old method, it would have required a ton of coke to dry the mold, it is effected by the new mode with one-fifth of that quantity; the saving is, however, not generally so great as this, but is said to amount on the average to 50 per cent. During the four months that M. Dehamme's system has been at work at Anzin, it has realized an economy of 600 to 700 fr. per week in the saving of coke alone, and the lighting, which, in the old time, consumed seven steres of wood per month, is now easily effected by means of a few shavings or pieces of waste wood.—*Iron*.

METALLIC FLOORS.—A method has been devised for rendering floors to a certain degree fire-proof, by employing long flat bars of thin sheet metal, with a perpendicular flange turned on each edge. Other long thin bars, which are curved or arched, and riveted at or near their edges to the first named strips, are placed edge-wise vertically, one between each two, the connection being so arranged that the tops of the arches do not rise quite as high as the tops of the first set of bars. Narrower strips are also arranged across and riveted to the lower flanges at suitable intervals apart, to serve as laths for holding the ceiling plastering to be applied to them, as well as to brace them laterally. Similar strips are arranged across and riveted to the upper flanges, or wood pieces may be bolted on to receive and support the floor boards. The outside flanges are built into and rest in the wall, and other flanges may be applied, if desired, to the outside strip for letting into the wall. For a floor of great length the bars are lapped and riveted.

NEW AND WIDE USE FOR INFUSORIAL EARTH.—The use of infusorial earth as a non-conductor of heat is suggested by the *Monetary and Mining Gazette*. Tripolite or infusorial earth, being a worse conductor of heat than coal ash, and almost as poor as flax chaff, and being refractory, is adapted for uses of ice cellars and fire proof safes, for casing steam boilers and pipes, etc., and possesses the advantage of affording protection against rats and mice. Its lightness is also a great recommendation. One cubic foot of it weighs 21½ to 26 pounds; the same bulk of dry coal ashes, 40½ to 42½ pounds. And of dry earth, 94 to 128 pounds. For casing steam pipes it is mixed with dry flax seed.

Infusorial earth occurs in inexhaustible quantities on this coast. It is largely used here for polishing powder as well as for other purposes. It is also largely employed in the manufacture of giant powder, although that obtained here is not considered sufficiently fine for that purpose—a better quality is imported from Europe.

COATING IRON WITH COPPER.—A German paper, *Deut. Illust. Zeitung* gives the following with regard to a method of coating iron with copper, so as to protect the former from the action of sea water and the like. The iron is cleaned and rendered perfectly bright by means of acid, and then immersed in a bath of melted copper, which is maintained at a very high temperature, so that it not only covers the iron but becomes incorporated with it. Iron coated in this way can be hammered and rolled without the copper tearing or peeling off. Specimens left in contact with sea water for nine months was unattacked and could be hammered and rolled out like new metal. Iron plates covered with copper in this way have two advantages over pure copper plates, namely, they cost less and are harder and stronger. There is also a great advantage in using coppered iron wire for telegraph lines, instead of galvanized iron.

THE FUTURE OF THE IRON TRADE.—The annual consumption of iron throughout the world has more than doubled within the last eighteen years—increasing from 7,000,000 tons in 1856 to 15,000,000 in 1874—and the average annual increase is greater now than ever before. England has hitherto been able to furnish one-half this supply, but as her resources are taxed to the utmost to keep up with the present demand, it is evident that the world must begin to look elsewhere for the surplus to meet the inevitable rate of progress in the demand for this great staple of industry. This will undoubtedly be America's opportunity, and hence we may look for a rapid and enormous increase in the iron industry of this country within the next ten years. The present annual increase in the demand for pig iron is not far from 800,000 tons.

PRODUCING A BROWN COLOR ON IRON.—Dr. Sauerwein recommends the following for producing a brown color on iron: The vessels to be covered are moistened with dilute nitric acid and allowed to dry, when the iron becomes covered with rust. This operation is repeated until the oxide film acquires the desired appearance. The vessel is then diligently rubbed with linseed oil varnish. The articles then possess a beautiful brown color, and are protected from further oxidation. Equally good results are obtained, but in another color, by dissolving two parts sesquichloride of iron, two parts butter of antimony, and one part gallic acid, dissolved in the least possible quantity of water, and rubbing the vessel with it. The operation may be repeated as often as desired, and then rubbed with linseed varnish.

GALVANO IRON WIRE A SILVER WHITE APPEARANCE.—This process has been devised by Dr. Heeren. The iron wire is first placed in hydrochloric acid, in which is suspended a piece of zinc. It is afterward placed in contact with a strip of zinc, a bath of two parts tartaric acid dissolved in 100 parts of water, to which is added three parts tin salt and three parts soda. The wire remains about two hours in the bath and is then made bright by polishing or drawing through a drawing iron. By this galvanic tinning wire which has been wound in a spiral, or iron of other shape, can be made white, which is an advantage over other methods, where the wire is tinned in the ore, and drawn through a drawing plate.

MOLECULAR CHANGE IN IRON.—It is generally, though not universally believed that the texture of wrought iron passes from a fibrous to a crystalline state when subjected to a long series of concessions. It is quite certain, however, that a similar change takes place, on the surface at least, when fibrous wrought iron is heated and then suddenly cooled. Professor Kick heated some of the best boiler plate in a muffle furnace, almost but not quite to a red heat, and then chilled it. On breaking, it was found that the outside portions were crystalline to a thickness of one millimeter. With thin plates this would produce great weakness.

COATING IRON WITH BRASS.—The following is given as a method of covering iron wire with brass, without the use of a battery. The process is a very simple one, and consists first in placing the clean bright wire in a solution of sulphate of copper, when it immediately becomes covered with a thin film of copper. It is then covered with a paste of pure oxide of tin, and heated to a temperature high enough to fuse the copper. Care must, of course, be taken to prevent the volatilization of the tin.

The Late Storm.

The farmers, not to be outdone by the miners have had their "honzanz" within the past few weeks, in the shape of a most abundant rainfall. It was thought at one time that the present would be a dry year for both miner and farmer, because such a long spell of dry weather followed the first rain of the season. Within the past two weeks, however, an abundance of rain has fallen; and the only trouble has been that it was more than was wanted in some localities. The late storms have been very general, extending all over this State, and a long way outside our borders.

In those places which were subject to floods, as at Marysville and some of the tule lands, they have had more water than they wanted. Sonoma county, too, which comes out best in dry years, could have done with less rain. All the islands in the delta of Sacramento county are more or less under water, except Grand Island, the most northern. The great Parks levee in Sutter county, inclosing some 120,000 acres of land, and which was made at a heavy cost, gave way. On these lands, however, a flood does not prevent a crop from being raised.

To the farmers in the great San Joaquin valley, this storm has been truly a God-send. They needed rain badly, and have got all they wanted. Their fears of a dry year are dispelled, and the faces of the farmers are wreathed with smiles.

Some of the mountain streams have done considerable local damage by overflow, and in some places were higher than during the great flood of 1861-62, carrying away debris left on the banks in the "wet winter." Some idea of the rapidity with which these mountain streams swell, may be derived from the statement of the Calaveras Chronicle, that the Calaveras rose seven and one-half feet in one hour and thirteen minutes.

In California the principal damage done was at Marysville and Yuba City, which were overflowed. In Nevada and Utah many lives have been lost by snow slide, and considerable damage done to property also. In Oregon three lives have been lost by snow slides.

Since the heavy rains we have had a severe northern blowing, which was predicted by the Signal Service Bureau. "Old Probabilities" were successful in this prediction, and saved considerable property thereby. As it was, however, a number of schooners were sunk at the wharves, and several vessels damaged by collision and churning. Some of the ferries were not running part of Monday, but by that afternoon the wind had died away. The vessels which postponed sailing by the advice of the Signal Bureau have since gone to sea. The north wind has had a very powerful drying tendency as usual, and our streets are already free from mud. The predictions of the Signal Service, telegraphed from Washington, were verified in a few hours, and afford another practical proof of the value of scientific meteorological observations.

Sales at the S. F. Stock Exchange.

Last Week. This Week.

THURSDAY, JANUARY 21. THURSDAY, JANUARY 28.

MORNING SESSION. MORNING SESSION.

590 Alpha.....32 3/4 510 Alpha.....18 3/4 3/4

15 b.....33 15 b.....33

1230 Belcher.....30 1/2 90 Belcher.....45 1/2 1/2

242 Best & Belcher.....30 1/2 242 Best & Belcher.....30 1/2

330 b.....30 1/2 330 b.....30 1/2

250 b.....30 1/2 250 b.....30 1/2

50 b.....30 1/2 50 b.....30 1/2

95 Hale & Norcross.....30 1/2 95 Hale & Norcross.....30 1/2

170 Imperial.....30 1/2 170 Imperial.....30 1/2

90 Justice.....30 1/2 90 Justice.....30 1/2

1069 Ken.....30 1/2 1069 Ken.....30 1/2

10 b.....30 1/2 10 b.....30 1/2

1344 Ophir.....30 1/2 1344 Ophir.....30 1/2

559 Overman.....30 1/2 559 Overman.....30 1/2

160 Sucker.....30 1/2 160 Sucker.....30 1/2

100 Savage.....30 1/2 100 Savage.....30 1/2

470 S Nevada.....30 1/2 470 S Nevada.....30 1/2

270 Union Cove.....30 1/2 270 Union Cove.....30 1/2

275 Y Jacket.....30 1/2 275 Y Jacket.....30 1/2

465 Meadow Valley.....30 1/2 465 Meadow Valley.....30 1/2

210 El Dorado South.....30 1/2 210 El Dorado South.....30 1/2

160 Challenge.....30 1/2 160 Challenge.....30 1/2

559 Meadow Valley.....30 1/2 559 Meadow Valley.....30 1/2

450 Raymond & Ely.....30 1/2 450 Raymond & Ely.....30 1/2

20 Eureka Con.....30 1/2 20 Eureka Con.....30 1/2

140 Piche.....30 1/2 140 Piche.....30 1/2

5250 Wash & Oreole.....30 1/2 5250 Wash & Oreole.....30 1/2

1250 American Flag.....30 1/2 1250 American Flag.....30 1/2

1150 N Belmont.....30 1/2 1150 N Belmont.....30 1/2

490 Ryck.....30 1/2 490 Ryck.....30 1/2

430 El Dorado South.....30 1/2 430 El Dorado South.....30 1/2

270 South Charles.....30 1/2 270 South Charles.....30 1/2

50 Empire.....30 1/2 50 Empire.....30 1/2

1775 Lady Bryan.....30 1/2 1775 Lady Bryan.....30 1/2

100 Julia.....30 1/2 100 Julia.....30 1/2

190 California.....30 1/2 190 California.....30 1/2

275 Knickerbocker.....30 1/2 275 Knickerbocker.....30 1/2

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt.	Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Andes S M Co	Washoe	3	50	Dec 7	Jan 11	M Landers	507 Montgomery st
Arizona & Utah M Co	Washoe	11	75	Dec 10	Jan 14	J Maguire	419 California st
Bellevue M Co	Placer Co Cal	10	50	Dec 10	Jan 14	D F Verdenal	409 California st
Bowery Cons M Co	Ely District	3	20	Dec 10	Jan 14	O E Elliott	419 California st
Caladonia S M Co	Washoe	10	30	Jan 15	Feb 12	R Wagner	210 Battery st
Oederburg G M Co	Cal	50	Dec 29	Feb 3	Feb 24	D M Booke	215 Sansome st
Charlot Mill & M Co	San Diego Co	1	50	Dec 24	Jan 23	P Swift	419 California st
Confidence M Co	Cal	20	Jan 15	Feb 2	Mar 17	W S Anderson	320 California st
Daney M Co	Washoe	12	75	Jan 12	Feb 16	G R Spinney	419 California st
El Dorado South Cons M Co	Nevada	5	75	Jan 15	Feb 19	W Willis	419 California st
Empire Mill & M Co	Washoe	17	50	Dec 28	Jan 29	W E Dean	419 California st
Florida S M Co	Washoe	1	100	Dec 18	Feb 16	L Hermann	11 Pine st
Globe Cons M Co	Washoe	4	75	Dec 10	Jan 14	J Maguire	419 California st
Globe M Co	Washoe	9	75	Dec 10	Jan 14	J Maguire	419 California st
Golden Charlot M Co	Idaho	12	50	Jan 4	Feb 8	L Kaplan	419 California st
Hale & Norcross S M Co	Washoe	5	50	Jan 8	Feb 11	J F Lightner	419 California st
Indus G & S M Co	Washoe	25	Dec 30	Jan 30	Feb 18	D Wilder	Merchants' Ex
Iowa M Co	Washoe	2	25	Jan 13	Feb 15	A D Carpenter	605 Clay st
Justice M Co	Washoe	13	50	Dec 23	Mar 2	J S Kennedy	419 California st
Knickerbocker M Co	Washoe	15	100	Dec 28	Jan 30	W F Stone	Stevensons Bldg
Lady Bryan M Co	Washoe	5	100	Jan 11	Feb 12	F Swift	419 California st
Lady Washington M Co	Washoe	2	30	Dec 17	Jan 21	G O Kibbe	419 California st
Manitoway G & S M Co	Idaho	12	20	Jan 15	Feb 11	B Heggins	402 Montgomery st
Mint G & S M Co	Washoe	9	20	Jan 19	Feb 24	D A Jennings	401 California st
Original Gold Hill G & S M Co	Washoe	2	50	Dec 12	Jan 14	W M Helman	Fireman's Fund Bldg
Pago Tunnel Co	Utah	1	5	Dec 12	Jan 20	J Hardy	419 California st
Rampart G & S M Co	Washoe	1	20	Jan 15	Feb 2	W F Townsend	419 California st
Pioche S M Co	Ely District	8	Dec 11	Jan 21	Feb 16	C E Elliott	419 California st
Pioche West Ex M Co	Ely District	6	30	Dec 28	Feb 3	T L Kumball	409 California st
Portman G & S M Co	Idaho	2	100	Jan 19	Feb 26	W Willis	419 California st
Ramond & S M Co	Idaho	3	20	Jan 18	Feb 26	T W Colburn	419 California st
Rock Island G & S M Co	Washoe	6	100	Jan 13	Feb 17	J W Clark	419 California st
Silver Cord M Co	Idaho	7	100	Jan 2	Feb 5	Frank Swift	419 California st
South Charlot M Co	Idaho	12	100	Nov 19	Jan 21	G O Kibbe	402 Montgomery st
Utah S M Co	Washoe	8	200	Jan 22	Feb 24	C D Neire	Stevensons Bldg
Washington & Oreole M Co	Ely Dist	13	50	Dec 8	Jan 11	W E Dean	Merchants' Ex
Yellow Jacket S M Co	Washoe	19	50	Dec 10	Jan 13	G W Hopkins	Gold Hill

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Baltic Cons M Co	Washoe	1	15	Nov 18	Dec 23	B Norris	507 Montgomery st
California and Arizona M Co	Arizona	1	10	Jan 8	Feb 12	T E Jewell	507 Montgomery st
California Cons M & M Co	Cal	3	100	Jan 12	Feb 16	W Tripp	409 California st
Carrie Hale Hydraulic M & W Co	Cal	3	100	Jan 12	Feb 16	H Knapp	Merchants' Ex
Combination G & S M Co	Panamint	1	10	Dec 28	Feb 1	D Wilder	Merchants' Ex
Con Reformula L & S M Co	Lower Cal	2	50	Dec 24	Jan 30	A D Carpenter	605 Clay st
Edith Quicksilver M Co	Cal	1	12 1/2	Dec 26	Feb 6	W Stuart	113 Lincendell st
Empire Cons M Co	Utah	9	25	Jan 12	Feb 17	F F Stone	419 California st
Equitable Tunnel M Co	Humboldt Co Cal	1	10	Dec 5	Jan 8	C S Healy	220 Montgomery st
Fluorence M Co	Idaho	1	100	Dec 16	Jan 21	E F Stone	419 California st
Gold Mountain G M Co	Bear Valley Cal	4	100	Jan 25	Mar 6	J P Cevalier	513 California st
Gold Run M Co	Nevada Co Cal	9	20	Dec 7	Jan 11	C Palmer	41 Market st
Golden Rule S M Co	Utah	3	5	Dec 8	Jan 15	K Wertheimer	520 Clay st
Hale & S M Co	Mariposa Co	6	24	Jan 4	Feb 12	W M Van Bokkelen	419 California st
Hayes G & S M Co	Robinson Dist	6	24	Jan 4	Feb 12	G R Spinney	320 California st
Illinois Central M Co	Idaho	1	30	Dec 24	Jan 30	R H Brown	402 Montgomery st
Independence Cons M Co	Aurora Nev	2	100	Dec 16	Jan 21	F J Hermann	419 California st
Juniata Cons M Co	Cal	1	30	Dec 23	Feb 8	J McAfee	408 California st
Kearse Cons Quicksilver M Co	Cal	1	100	Dec 16	Jan 20	A Wissel	210 California st
Kennedy M Co	Amerdor Co Cal	8	100	Dec 12	Jan 2	W R Townsend	408 California st
Keystone No 1 & 2 M Co	Arizona	4	50	Dec 12	Jan 6	H O Kibbe	419 California st
Mariposa Cons M & M Co	Cal	1	50	Dec 12	Jan 6	I Derby	320 California st
New York M Co	Washoe	11	50	Dec 5	Jan 6	L Kibbe	419 California st
North Bloomfield Gravel M Co	Cal	35	100	Dec 1	Jan 4	J P Cevalier	513 California st
Ophir M Co	Cal	1	100	Dec 1	Jan 4	R H Brown	402 Montgomery st
Plato M Co	White Pine	1	100	Jan 9	Feb 15	A Baird	316 California st
Prussian G & S M Co	Nyc Co Nevada	3	100	Jan 12	Feb 18	A Carrigan	105 Front st
Quicksilver M Co	Cal	2	25	Dec 24	Jan 28	R Bunker	606 Montgomery st
San Jose M Co	Egan Canon	6	500	Jan 27	Mar 8	H Knapp	336 Montgomery st
Silver West Cons M Co	Eureka Nev	3	100	Jan 13	Feb 20	D A Jennings	401 California st
South Fork M & Canal Co	Cal	5	5	Dec 7	Jan 10	A O Taylor	331 Montgomery st
Wetmore M Co	Elko Co Nev	1	25	Jan 23	Mar 3	W F Gunn	410 Montgomery st
Wells, Farizo & Co M Co	Washoe	1	50	Jan 23	Feb 13	E Barry	415 Montgomery st
Wyoming G M Co	Cal	5	50	Jan 23	Feb 13		
Yarrowbrough S M Co	Kern Co Cal	6	30	Dec 23	Jan 30		

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
American Nevada M Co	Nevada	L Hermann	330 Pine st	Annual	Feb 4
Bowery Cons M Co	Cal	Chas E Elliott	419 California st	Annual	Feb 8
Consolidated Amador	Cal	F B Latham	402 California st	Annual	Feb 1
Florida S M Co	Washoe	L Hermann	331 Pine st	Annual	Feb 7
Germania M Co	Cal	J W Tripp	408 California st	Annual	Feb 1
Iowa M Co	Washoe	Called by Trustees	605 Clay st	Special	Feb 15
Justice M Co	Washoe	J S Kennedy	Merchants' Ex	Annual	Feb 15
Lady Bryan M Co	Washoe	Called by Trustees	419 California st	Special	Feb 11
Manitoway G & S M Co	Idaho	M Washington	Merchants' Ex	Annual	Feb 3
Nevada M Co	Cal	L Hermann	330 Pine st	Annual	Feb 4
Omega Table Mountain M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 24
Red Jacket M Co	Idaho	Vm Willis	419 California st	Annual	Feb 1
Saw Flat Cons M Co	Cal	J W Clark	415 California st	Annual	Feb 8
Welch Cons Quicksilver Co	Cal	R J Ryan	330 Pine st	Annual	Feb 9
Zacatero G M Co	Cal	L Hermann	330 Pine st	Annual	Feb 9

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co.	Washoe	H. C. Kibbe,	419 California st	3 00	Jan 11
Barlot M & M Co.	Cal	Fraser & Elliott	419 California st	4 00	Jan 16
Consolidated Virginia M Co	Washoe	D T Bally	401 California st	3 00	Jan 11
Crown Point M Co	Washoe	O E Elliott	414 California st	2 00	Jan 12
Diana M Co.	Cal	G. F. Fassel.	220 Clay st.	1 00	Jan 25
Consolidated M Co	Nev	W W Taylor	419 California st	50	Jan 9
Rye Patch M Co	Nevada	D F Verdenal	409 California st	25	Jan 9

Mining Stocks.

The bottom dropped out of the Stock market and prices of all descriptions went tumbling down farther than they ever went up. The heaviest declines are apparent, of course, in the leading stocks, but the smaller ones followed enit and went to smash with the larger. Of course it was only a question of time when this collapse would occur, for while several of the mines were selling at high figures on their merits, others were only buoyed up by the natural strength of the market. There is no diminution in the prospects of the honanza mines, according to the Virginia papers, and they will probably recover somewhat in price, though it is questionable if they ever rise as high as they were during the late excitement. Reference to our Mining Summary will give our readers an idea of the situation at the mines, and a glance at our Stock tables will show the decline in the values of the stocks. By comparing the prices of last week and those of this, a good idea will be had of the shrinkage in values.

WE ARE informed that a discovery of quicksilver was made about two weeks since, on the land of Hon. J. Mc. Shafter, occupied by Mr. Charles V. Payne. It is said to be a large, well defined vein, and the surrounding indicate that the metal exists there in large quantities. Mr. Payne has secured a report, and will immediately ascertain more about it.—*Marin Journal.*

THEY now want to abolish the office of State mineralogist in Nevada.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., Jan. 26th, 1875.

FOR WEEK ENDING JAN. 12TH, 1875.*

BLIND SLAT ADJUSTER.—David Aaron, Marysville, Cal.

SIGHT FOR FIRE ARMS.—Thomas Dunstone, Santa Cruz, Cal.

WATER WHEEL.—Samuel W. Knight, Sutter Creek, Cal.

CHIMNEY GUARD.—Robert Priseman, Sacramento, Cal.

BLIND STOP.—Alford T. Eford, Oakland, Cal.

STONE CUTTING MACHINE.—Louis Dntertre, S. F., Cal.

BIRD CAGE ATTACHMENT.—George Fliedner, Portland, Oregon.

*The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by Dewey & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible.

A DAILY line of stage will soon be placed on the route between Indian Wells and Panamint.

General News Items.

A CLOSE CALL.—At T. W. Haskins' shingle mill, Pescadero creek, on the 16th inst., Wm. Milliken, while employed in lacing a belt, had his coat caught by a pulley, which wound the garment up in an instant, and Mr. Milliken found himself turning one hundred revolutions per minute, or less. Mr. Haskins, who was working near by, ran and grabbed the flying man by the foot, jerking him loose in a little less than no time. When the man of wonderful velocity viewed himself he found that his condition was one of nudity, excepting pants and boots; many bruises, but no bones broken. Had the coat been of strong material, there would be a dead Milliken, in all probability.

DANGER FEARED.—It is feared that danger may arise if the proposed dam is constructed on Calaveras creek, Santa Clara county. It is proposed to form a reservoir to supply San Francisco with water by erecting a dam 225 feet high, which will flood an area of 225 square miles, provided the reservoir ever became filled. Such a body of water thus reserved would be a constantly threatening danger to all and everything below; but there is no probability of such a dam being constructed. In expectation of it, however, land to be flooded has risen from \$40 to \$100 per acre.

A VALUABLE BRICK.—In the Bank of France they have got a brick for which they paid 1,000 francs in specie. It was taken from the ruins of a burned house, and the image and figures of a note for 1,000 francs are burned on the surface, transferred by the heat from a real note. This brick the bank redeemed on presentation, as if it were the note itself.

PENSIONERS.—There are 54 widows of Generals and 217 of Colonels on the pension rolls. When the pension paid the Brigadier-Generals, \$50 a month, was offered to the widow of General Maude, she very emphatically declined to receive it, because it was less than that paid Mrs. President Lincoln.

A BLACK DAY.—The revelations of the P. S. Co., Investigating Committee have marked up a black day for the American Congress, and, what has heretofore been considered the respectable press of the Union. The lamest duck just now is ex-Congressional Postmaster and Congressman-elect King. He has gone where the woodbine twined.

ALVISO RAILROAD.—This narrow gauge project is again advocated by the San Jose papers; but nobody moves. The company which was formed two years ago, got the right of way and stopped. Somehow it is easier to locate the road on paper than build it and decide on its management. Capital, for some reason, is offish.

ROOVERTING.—Gen. Cobb, of Alameda, who was shot on Washington street in this city a short time ago, by a woman, has so far recovered that he will be able to attend to business in a few days. The hall

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR COUNTY.

ASBESTOS.—Amador Ledger, Jan. 23: C. D. Horn brought to this office a few days ago some very fine specimens of asbestos, taken from a vein recently discovered northeast of Aqueduct city in this county. The vein appears to be narrow at the surface, but may increase downward. The fibers of the mineral before us are very fine, and we should judge from appearances that the article is of excellent quality. The claimants, Mr. Horn and F. M. Brown, intend sinking on the vein to ascertain its extent.

THE ONEIDA MINE.—Under the efficient management of the present superintendent, the above mine is presenting a very flattering appearance. New and substantial hoisting works have just been completed. The new shaft has reached the depth of 1,000 feet, and the mine thoroughly proven to the lowest level. The chimney increases as a greater depths are reached, and at this time presents an unbroken ledge of rich pay ore 500 feet in length. The rock now being taken from the mine, will average \$20 per ton, with enough developed to supply the mill with 100 tons daily for the next two years. The Oneida mine may be ranked as one of the most valuable mines in the county, and from this time on, its returns cannot fail in giving satisfaction to its owners. The present superintendent is not only the right man in the right place, but deserves much credit for the mining knowledge he has displayed in his management of the mine.

THE CALVERAS CITIZEN learns that the bed of coal recently discovered near Lancha Plana, in Amador county, is proving to be of excellent quality. The main shaft is now down to a depth of over 80 feet.

CALVERAS COUNTY.

MINING ITEMS.—Calaveras Chronicle, Jan. 23: A rich deposit of quartz has been struck thirty feet down from the top, which pays from \$60 to \$65 per ton, and the ore is getting better as we go down. The casing pay from \$20 to \$30 per ton. The lode is from fifteen to eighteen inches in width, and is growing wider. It is now by miners as a cross-vein, running north and south, which scientific miners say is better than east and west veins. The lode is situated two and a half miles north of Vallecito, in the head of what is known as Helleye gulch. The claim was formerly known as the Greaser lode, but has since been changed to the Queen of the West. The mine is owned by Hensch & Wene, of Copperopolis, who intend to erect a small mill next spring.

PRINCE has been commenced in the Red Hill hydraulic claim, and operations are to be vigorously pressed from this time forward. A 10-inch iron pipe conveys water from the ditch to the mine, giving a pressure of about 180 feet. In addition to the Red Hill claim proper, there is a good deal of surface ground adjacent that will pay well for washing.

The work of sinking a shaft from the lower tunnel of the San Bruno mine, at Mosquito, is progressing favorably. A sufficient quantity of water has not yet been struck to necessitate the use of the engine and hoisting works. The rock obtained from the shaft is exceedingly rich.

SHUT DOWN.—Calaveras Citizen, Jan. 23: The Anderson Flat mine stopped working last week; the object, we understand, is to enable the company to put up smelting and reduction works, as the ore is inclined to be refractory.

ENTERPRISE.—The new eight-stamp mill works admirably, and the energetic superintendent, Fred Morris, wears a bland smile indicative of an assured satisfaction as to the success of his enterprise.

MILLING.—Henry & Son commenced running their mill on the 13th inst., crushing rock taken from the Madra, of which they are the owners. They will do custom work when the mill is not employed in crushing ore from the Madra.

EL DORADO COUNTY.

MINES.—Placerville Republican, Jan. 21: Peter Gross, after having twice almost effected sale of his mine in Big Canyon, near this city—recent negotiations having been cut short, as the arrangement were about completed, by the sudden death of the principal purchaser—has determined to keep and work it himself, and has purchased a ten-stamp mill for that purpose, and now has most of the machinery on the ground. From the North side we receive flattering reports from both the Taylor and Woodside. Reports from the latter represent that they have struck a five foot ledge which is very rich, and has every appearance of being permanent.

HUMBOLDT COUNTY.

CINNABAR.—Humboldt Times: It is now conceded that discoveries of cinabar lodes have been made in this county. Specimens of the ore have been tested with satisfactory results. The locality of the discoveries is in the vicinity of the Kneeland's Prairie and Round Valley wagon road, and near the boundary line between Humboldt and Trinity counties. Two unred persons are reported as being on the ground locating claims.

NYO COUNTY.

RICH STRIKES AT PANAMINT.—Panamint

News, Jan. 23: We hear of rich strikes in several mines here, made in the last day or two, which have not heretofore occupied much of the public attention, and also of very rich ore in one or two prominent mines much beyond the expectation of the owners.

OUR MINES.—From Capt. Messic, the energetic and competent superintendent of the Surprise Valley mill and water company, we learn the following in regard to a few of the most prominent mines of this company now being worked. His statements are corroborated by those of others, who are not in any way interested in these mines or the business affairs of the company, and who, from scientific knowledge and practical experience, are competent to judge of the value of ores and proper method of working mines.

JACOBS' WONDER.—The main tunnel, running east from Big Canyon, is in splendid ore and looking better than ever. A general improvement is noticeable in all the different openings. In fact, the prospects exceed the expectations of the most sanguine when work was first begun on this mine.

WYOMING.—This mine, in which a vein of black ore was struck two or three weeks ago—assays from which went as high as \$12,820 per ton—is still looking as well as usual, and a large amount of very fine ore is daily being taken out.

HEMLOCK.—The shaft in this splendid mine has cut the ledge at a depth of about 115 feet, which has developed a large, fine body of ore. The shaft being vertical, and the ledge heaving but little pitch, it is difficult to tell how wide this ore vein is until the foot-wall shall have been reached.

STAMP MILLS.—The company are pushing ahead with grading and getting out timber for their mills—the one at the head of the canyon will be a twenty-stamp mill, with a capacity for ten stamps more, while the mill lower down the canyon will be larger, not less than thirty, and probably of forty stamps. The departure of Mr. Henry A. Jones, last Saturday, for Spedra, was for the purpose of hurrying forward the machinery for the mill at the head of the canyon.

BENTON.—Cor. Inyo Independent, Jan: The mines are looking splendidly, and producing ore that will mill from \$250 to \$400 per ton. There is, however, but little ore now being taken out by parties not having facilities for crushing, as it is difficult to get any of our mill men to work ore for individuals or small companies. Per consequence, it is very discouraging to prospectors. A small custom mill would be a paying investment; besides, it would assist more in the development of the mines, and be better for us generally than for a company of any reasonable amount of capital to invest here, unless they should make the working of custom ore a specialty. Madam Rimmer says that Mr. Wetherill has sold his mill and mine to a party Virginia, and that the new proprietors are going to erect extensive reduction works. Pat Forey has sold to J. A. Creaser a one-third interest in the St. Louis mine.

KERN COUNTY.

COSO DISTRICT.—Kern County Courier: Messrs Colby, Jewett and Brundage bring favorable news from New Coso. Several hundred men are on the ground and new discoveries are constantly being made. About two miles from the first locations some leads of milling ore have been found similar to those of Panamint. The specimens shown us by Mr. Brundage look quite as well as any ore we have seen from that place. Judge Colby brought a sack of ore from the Defiance, the lead owned by himself and P. Reddy. Those familiar with the ores of the celebrated Union mine at Cerro Gordo say it is impossible to distinguish it from ore of that mine. The formation in which this mine is found is precisely similar, but is more favorably situated for work and vastly larger. The measurements of the U. S. Deputy Mineral Surveyor give it a width of 196 feet. A cut or tunnel is now being run across it with a view to better ascertain the solidity and continuity of the vein and character of the ore. A town is being built contiguous to the mines, called Darwin. A hotel conducted by Mr. V. G. Thompson is already in operation. Water will be supplied by means of pipes laid from springs, six miles distant from which the grade is downward. As the leads here are richer, larger and more numerous and easily worked than at Panamint, a still greater excitement is sure to spring up. The galena ores may be worked far cheaper than the milling, and the necessary preliminary outlay is not half as much. But it is too early yet for men of prudence to visit this promising locality. The weather, for two months, to come, will continue uncomfortably cold in that quarter. We may expect lively times there this summer.

NAPA COUNTY.

CALISTOGA ITEM.—Calistoga Free Press, Jan. 23: Three tons and a half of ore from the Georgia mine worked in the Missouri retorts yielded seven flasks of metal.

The hydraulic works at the Yellow Jacket are in full operation. Five hundred feet of new sluice boxes are being erected.

The Kellogg furnace at the Knights valley ranch is working tons of ore for the Oakland mine to test the value of the ore.

Recent work on the Mercury adjoining the Geyser shows fine metal, and the appearances of the mine will warrant the erection of a furnace as soon as the weather will permit.

The first cleanings of the Geyser furnace will take place the first of next week. The mine is developing finely, and the quantity of

ore available for the furnace is daily increasing. Sluicing at the Gravel mine, Pine Flat, is progressing finely. The ore gathered in the boxes is very rich, and will be run through the Ida Clayton furnace as soon as it can be hauled.

The Steele tunnel at the Ida Clayton is in 180 feet, and drifts are being run both north and south along the wall of the ledge, ore being taken from both drifts. The Laird tunnel is in 190 feet, and when finished will be 1,180 feet long, and tap the ledge 387 feet from the surface.

Fifty-four flasks of quicksilver were shipped last week by the California Borax Company to Parrott & Co., San Francisco. Eighty-four flasks from the Great Western Quicksilver mine to Virginia, Nevada.

NEVADA COUNTY.

RICH GRAVEL.—Nevada Transcript, Jan. 23: We learn that very rich gravel is being found in the Manzanita mine. The amount we hear a pan prospect is so fabulous, that we refrain from giving the report. We hope to be able to give an authentic report soon.

OMEGA WATER AND MINING COMPANY.—This mine, situated at Omega, in the upper part of the county, is running to its fullest capacity. The company use about 2,200 inches of water in four pipes. Two pipes only were used from the first of November, and were continued for forty-five days, when a scarcity of water compelled shutting them off. There has been nearly a month's run since the late rains. The pipes are now so arranged that there is a much greater fall, and as a consequence an increased amount of dirt is washed daily. Last year this mine paid dividends. This year, with the increased facilities for washing, their profits will be nearly doubled. There is no better mine in the county. The ground is extensive; is rich with gold, and the company own the water used. We should not object to a few shares in it.

THE PLAZA QUARTZ MILL.—The above mill, owned by Jones & Keith, is kept busy most of the time in crushing prospect rock. On Saturday it was running on some rock taken out of a ledge up on Deer Creek, owned by Mr. Erskine, and the plates showed a very good prospect. The roads are now in such a condition that it is difficult to draw an empty wagon off the unheated track, so there will be but little done at the mill for awhile.

PLACER COUNTY.

RATTLESNAKE BAR.—Cor. Placer Argus, Jan. 23: I am happy to be able to report more favorably of our mines than formerly. The Cray Brothers claim is paying exceedingly well, they have struck splendid paying gravel. They really deserve good pay as they have been to over \$2,000 expense on the claim during the last year. They have a splendid apparatus, and are driving the work day and night. It is astonishing to see the large rocks the Little Giant drives into the sluices.

B. W. Houseworth & Co., are also doing good business with their Giant since the rein Other parties are also preparing to wash soon, which looks more favorable for our place.

SAN BERNARDINO COUNTY.

BEAR VALLEY.—Santa Barbara Press, Jan. 16: This rich mining district is attracting the attention of miners and capitalists, and promises that the anticipations of those who predicted a bright future will be more than realized. The 40-stamp mill which is being constructed, will be completed in a few weeks, and furnish employment for several hundred men, besides demonstrating the wealth of that district which is as yet little known. The Panemint and Coso excitement has caused but few to abandon Bear Valley, so great is the confidence which miners have in the district. There will soon be a mail line established from San Bernardino to Holcomb Valley, which is only four miles from Bear Valley. A great advantage which that district has over many others is the great abundance of wood and water contiguous to the mines. Lumber is abundant and cheap, the climate so mild that work is rarely interrupted during the winter, and a more healthy locality cannot be found in any of our mountains.

SAN DIEGO COUNTY.

JULIAN AND BANNER DISTRICTS.—Cor. San Diego World: It is reported in town that the Cheriot mine has struck an immense volume of water in their shaft.

The Reedy Relief is running steadily day and night on good ore. The shaft in the Owen's mine being pushed rapidly.

The Kentuck and several other mines in the section are looking well. The Antelope mine changed hands a few days since. The Antelope has been a good mine, and no doubt with proper management will prove remunerative to its owner.

SIERRA COUNTY.

FOREST CITY.—Mountain Messenger, Jan. 23: Advice from Forest City are to the effect that the North and South Forks were exceedingly high on Tuesday. The lower bridge, on the road leading to Pike City, just below the junction of the two forks, was carried away. We also learn that quite a number of the boxes of the Bald Mountain Company's sluices were carried off. Whether they were near the head or foot of the flume, we did not learn.

The new company, which recently purchased the Pioneer claims, have already received a portion of their freight, and will at once commence getting ready to open them. They will work a Burleigh drill.

THE STORM.—On Tuesday last we were visited by the highest water this section has known since the remarkably wet winter of 1861

and 1862, the water rising to within a foot of high water mark of that winter. It is claimed by some that the water would have been full as high as then had not for the changed condition of the river bed, it being then full of tailings of which it was before this storm remarkably clear, owing to comparatively little river and bank mining done of late years. The water commenced rising rapidly Monday night, and Tuesday morning both rivers which form a junction here were hanks full, the North Fork being the highest, owing to its comparative shortness.

The mining pipe and hose of Shaffer & Garibaldi, on the hillside north of town, were filled up solid with sand, and one of their ditches filled up and the other cut away, so that this storm will do them no good, besides damaging them to a considerable extent otherwise.

Some of the pipe of the Green Mountain Company is reported to be seen at the mouth of Sling osden. We believe they have not yet found their "monitor." This is a rough deal for the boys.

TUOLUMNE COUNTY.

GOLDEN GATE.—Tuolumne Independent, Jan. 22: The Golden Gate mine looks better than ever since being opened. They have come upon a large body of rich sulphuret ore which goes \$1,600 per ton. The mill saves about 20 buckets per day, weighing 50 pounds each, making one-half ton besides free gold.

THE MARKS & DARROW is going ahead very fast in sinking their shaft, in consequence miners are opening their eyes, and locating and re-locating in the vicinity with intent to work the same systematically.

THE ALABAMA.—This mine is near the Rawhide, abutting Table mountain, and was owned and worked to a profit four years ago by a man named Reese. He was killed, and the mine has remained idle until lately, when it passed into the hands of a San Francisco company, and work has now commenced to properly develop the property, with very encouraging indications. An open cut has been run along the vein, and sinking has commenced. The pay shaft is 300 feet long and 100 feet wide, full of rich threads, and the object is to sink down and find the point of concentration. A new water wheel is being constructed and the mill is being re-erected. The mine has always paid expenses and over, and when system and skill is applied, and depth attained, the Alabama will take a high position. Mr. Douglas Browne is Superintendent, and is fully alive to the interests of the company, being opposed to erecting costly improvements until he is thoroughly satisfied the mine will justify the outlay. He is right. Economy and skill should go hand in hand in developing a mine. The reverse system has done more injury to the quartz mining interest of this county than all other causes combined. The value of our most prominent mines of to-day has been proved and their reputation established, by Superintendents who have adopted the system indicated, and who have a desire rather to manage their mines as scientific and business men, than to create an excitement by making a splurge and wasting the means of stockholders in a sham "energy" which leads to ruin and abandonment of valuable property.

Nevada.

WASHOE DISTRICT.

SIERRA NEVADA.—Gold Hill News, Jan. 21: Sinking the new shaft is making good headway, the rock in the bottom blasting out finely. The flow of water is gradually decreasing, and the pump now handles it with ease.

DAYTON.—The ore in the face of the main south drift at the third station level is showing a decided improvement. The south drift on the second level is also improving. The ore breasts are all looking well and yielding the usual amount of good milling ore.

CHOLLAR-POTOG.—The heavy snows having stopped the hauling of ore to the mills, the dumps have all been filled and the extraction of ore suspended until the roads are again cleared.

UTAH.—The face of the south cross-cut, on the 400-ft level, is still in a mixture of quartz, porphyry and clay of a very promising character.

CONS. VIRGINIA.—Daily yield, 420 tons of ore. The ore breasts on the 1200, 1300, 1400 and 1500-ft levels are all yielding splendidly. The ore breasts on the 1300 and 1400-ft levels are extended both north and south, and are of an increased richness. The ore body on the 1100-ft level, which has heretofore been neglected in the haste to prospect the ore developments downward, is now being opened out, and is proving much better than was expected. A large number of men are now employed in the development of that portion of the mine. Cross-cut No. 1, east, on the 1500-ft level, is in 350 feet, the face still in the richest quality of sulphuret and chloride ores. Cross-cut No. 2, on the California lode, is also in the same immensely rich ore. The face of the main north drift on the 1555-ft level, is still, if possible, richer ore than ever. This drift is now 50 feet into the California ground, having passed the entire distance through a solid body of rich sulphuret ore, intermixed with stephanite and native silver. The east cross-cut from this drift 200 feet south of the north line is still pushed vigorously ahead, the face still in the same magnificently rich ore as that found on the levels above. The new mill is running steadily on ore from the mine, and every new prospecting drift run seems only to increase the already fabulous amount of wealth developed.

The Richmond Mine.

A Large Body of Ore.

It is generally known that during the administration of the present managing director of the Richmond mining company, at Eureka, no visitors were allowed access to the mine, and although rumors of important strikes and rich discoveries have at times been circulated, no positive evidence as to the truth could be given, as the rules concerning visitors were rigidly enforced. At the last annual meeting of the directors of the company, the chairman, in the course of his remarks, gave a description of the progress made in the mine, which for the benefit of our readers, we reproduce from the *London Mining World*:

When the present managing director first arrived at the works, in June last, he found that the works of exploration had been most unaccountably stopped; that they had been driving on in a straight line, through a body of very poor ore without testing it, right or left, as usually had been done. It so happened, for the second or third time in the history of the mine, that the lode, which usually dipped at about an angle of 60 degrees, had lifted itself up and gone horizontally. They drove through this horizontal stratum of iron ore and found it too poor to work; it was practically of little value, and it was supposed by some that we had come to the end of the Richmond mine; that we had run into valueless stuff, and should not find any more worth taking away. We had met with just the same accident before—that is, the lode had lifted horizontally and been running partially through this iron ore, which frequently accompanies ore like ours.

As soon as Mr. Probert took charge of the mine, drifts were run in, above and below, sideways and underways, and immediately rich bodies of ore at the left and above were struck. The poor ore had given rise to a rumor of collapse, instead of which we had found a large body of good ore, forty feet thick, extending over the whole of it.

Sinking on the lode began immediately; it resumed its normal dip, and as the sinking progressed the pipe of ore increased in width. The very mass of ore which was supposed to be so poor contained, at a rough estimate, 100,000 tons from which deducting the iron portion, leaves 60,000 tons, which is held as a reserve. At one point, before reaching this low level, thin streaks of ore had been observed coming in. This was another promising feature, and a force of men were put on to explore the spot. In less than three weeks the developments extended down 50 feet. Beginning in narrow streaks, at 70 feet they opened out in a ledge 16 feet in width, and at last accounts the developments were being continued with the most satisfactory results, carrying the same breast of ore, and from which is being daily taken out 40 tons of splendid carbonates.

The continuation of the exploratory works were commenced right and left, further discoveries were made and the language of the Superintendent best expresses the extent of the vast ore body: "There is ore in every direction I come to." At the bottom of the great hoisting shaft, which was sunk a long way beyond the inclines, a drift of one hundred feet had been run, and in sinking a winze 50 feet down a body of ore was struck which was thought to be too good to be in the Richmond lode. A splendid lot of carbonates was opened; at the depth of 70 feet the ledge was 30 feet wide, and they have raised upon it and it is forty feet above, and there they still find it; and the last report from the managing director is to the effect that it is unquestionably the Richmond lode, discovered 300 or 400 feet beyond the point at which it had previously been traced down. The ores at this depth assays \$100 a ton and proves the correctness of the theory, that as a mine gains in depth it increases in richness.

The chairman of the meeting stated that the full information in regard to the mine would not be published for the reason that it was not deemed advisable to do so, or to let the exact direction of the works be known to the public, because it must have to be known to the other side, in which case there might be trouble with "jumpers" who might have gone ahead of the company, and if they had not got positive indications might have attempted to anticipate.

EXCEEDINGLY RICH.—The new mill of the Consolidated Virginia company is now running on ore from the bonanza. The ore is working kindly and is proving immensely rich. Where a change of pulp is placed in the pans the quicksilver at once begins to thicken with the silver it is taking up. The richness of the ore necessitates very frequent straining of the quicksilver. Only a portion of the mill is running as yet, but it is already seen that the facilities for retorting the amalgam must be enlarged fully two thirds when the whole mill goes into operation. Millmen who have been watching the working of the ore say that it is going to pay at the rate of \$300 per ton.—*Enterprise*.

The hydraulic works at the Yellow Jacket quicksilver mines are in full operation. Mr. Stuart is superintending the matter in person. The dirt is washed by means of an immense pressure and a "Little Giant" into a ground sluice, and from thence through rifle boxes. Mr. Cross, the local superintendent, confidently expects to concentrate the fine cinabar to an average of two per cent.

The Denver smelting works, Colorado, are for sale.

Miners' Chances.

The *Virginia Chronicle* says: "If absence of care is happiness the population of Virginia City ought to be the happiest in the world. There is a feeling of indispensance here scarcely ever experienced elsewhere, and a freedom from the artificial trammels of society which in older communities are based on wealth, birth and position. In other words, every man is a man in his boots. Many of the miners are worth from \$5,000 to \$50,000, and work for occupation rather than from necessity. When they are engaged in a mine, they are always on the lookout for developments, of which they are quick to take advantage. They have friends in other mines with whom they compare notes, and they often in this manner succeed in accumulating large fortunes. The recent discoveries at the north end of the Comstock were known to the miners long before the public were made acquainted with the existence of the bonanza, and many of them realized handsomely from the rise in stock. In most other communities a working man has no means of getting rich, except from the proceeds of his own labor. It is a dead open and shut with him, and a fortune is so difficult to acquire that an undue respect is paid to the possessor of money. Here everybody is a speculator, in fact. There are but few who do not own stock in some mine, which they hope will turn out well, and they do not know what moving they may get up and find themselves rich. Their daily labor is very well as far as it goes, but the ground upon which they base their expectations is their stocks. The late developments, and the assured prosperity of the country for years to come, with the hope of new discoveries, has strengthened this feeling, and it is hard to find anywhere a more hopeful, sanguine and independent population than that of Virginia City."

COLORADO GRAVEL MINES.—The Canyon City (Col) *Times* learn that extensive plans are being laid for systematic mining in California gulch the coming season. The Oro ditch and mining company have completed a large ditch from the Arkansas river to Iowa and California gulches, and a large force of men will be put on in the spring. A Mr. Wells has constructed a ditch from which water can be obtained for working the immense gravel deposit on the summit of Printer Boy mountain. The *Times'* account adds that upwards of a ton of gold has already been extracted from the Printer Boy lode, and appearances indicate an increasing yield in the future.

THE GOLD HILL CHASM.—The crack or fissure in the ground situated a short distance east of Gold Hill is still opening out laterally and longitudinally. Starting from a point a short distance north of Fort Homestead it has already extended a distance of half a mile in a southeasterly direction. The ground on the west side of the fissure has settled about two feet. The phenomenon is accounted for in various ways, some being under the impression that the ground in that locality has cracked open from being undermined, others claim that the chasm was occasioned by an earthquake.—*Virginia Enterprise*.

ISAAC LONG has shown the *Healdsburg Flag* specimens of bituminous coal from a deposit found on his farm, four miles and a half above Healdsburg. There are many narrow veins within a width of twenty-five feet, but the ground has not been prospected enough to indicate the extent of the deposit. The coal is of inferior quality, though it burns with a bright flame when put into a hot fire, and it may be the croppings of a valuable coal bed.

MILL AT TYBO.—From Mr. Trowbridge, who arrived in town last Saturday, we learn that the Tybo consolidated mining company has purchased the Highland 20-stamp mill, of Pioche. Part of the machinery is already on the ground and laborers are at work grading a site for the building. The company owns several mines which will yield nothing but milling ore, and about two thirds of the ore from the 2 G mine is of that character.—*Eureka Sentinel*.

ENGINES FOR THE RIVER MILLS.—In case of no snow falling in the Sierras this winter to furnish water for driving the mills on the Carson river, steam engines will be set up in them. For the largest among them, as the Eureka and others, condensing engines, similar to that now running in the big mill of the Consolidated Virginia company, will be used. It will be cheaper to put up engines here than to lose a single month's run of the mills.

MILL.—The Black Warrior mining company, near Wadsworth, are preparing for a mill, which they expect to erect on their mill site during the next sixty days. Considerable interest is felt by our Wadsworth friends in the Black Warrior mine, and six new claims have been located during the past week in that vicinity.—*Keno Journal*.

ROUGH ON THE AGENTS.—The Arizona *Miner* says: Show specimens of Arizona quartz to the heathens of New Jersey and other foreign countries, but don't, oh, don't show your ledge to an Indian agent, or he'll be sure to have it taken into a reservation.

A good deal of attention is attracted lately to the new mining camp called the Lewis district. It is thirteen miles, in a southerly direction, from Battle mountain.

Naval Machinists.

The following recent order from the Navy Department will probably be of interest to many of our readers:

NAVY DEPARTMENT.

WASHINGTON, November 17, 1874.

A candidate for the position of Machinist, Boiler maker, or Coppersmith, must not be less than twenty nor more than forty years of age. He must pass an examination in the presence of the Commanding Officer of the rendezvous, by at least one Naval Engineer, as to his qualifications as a Machinist, Boiler maker, or Coppersmith, and must also undergo the usual medical examination touching his physical fitness for the Naval service.

He must be able to read, and to write with sufficient correctness to keep the steam log of his watch. He must know the names of the various parts of a marine engine; understand the uses and management of the various gauges, cocks and valves; how to raise steam, start a marine engine, regulate its action and modify its action.

He must know how to ascertain the height and density of the water in the boilers, how to check foaming, and to guard against other danger from the boiler; how and when to regulate the quantity of the injection water, to guard against danger from water in the cylinders, and the measures to be taken in the event of a journal becoming heated; and, in short, how to act upon the occurrence of any of the ordinary casualties of the engine room.

He must understand how to do the ordinary overhauling and repairing of steam machinery, the packing of the various joints and rods, the grinding in of valves, putting on hard and soft patches, taking out, putting in and plugging tubes, and all other similar work required in the management of marine steam engines.

The monthly pay of a Machinist will be \$75; of a Boiler maker, \$40; and of a Coppersmith, \$40; besides the usual ration, and exclusive of the \$1.50 per month added to the pay of all enlisted men by the President's order of July 1, 1870.

Five machinists will be allowed to first rates, and four to second and third rate steamships in commission for sea service.

Boiler makers and coppersmiths will not be examined, except as to their qualifications as boiler makers and coppersmiths.

One boiler maker and one coppersmith, if obtainable, will be allowed to each first, second and third rate steamships in commission for sea service. They will be required to keep watch in the engine-room or fire-room while the ship is steaming, and at other times, as may be requisite, and will thus be enabled to make themselves proficient for the rate of machinists.

Machinists, coppersmiths and boiler makers will mess with the master-at-arms.

GEORGE M. ROBESON, Secretary of the Navy.

The South Yuba canal company, says the Nevada *Transcript*, are running a tunnel, about 1,200 feet long, under the hill beyond the Manzanita mine, for the purpose of conveying the water of the Snow mountain ditch through it to the town and adjacent mines. The work was considered necessary from the fact that the Manzanita company have washed away the hill nearly up to where the present ditch runs, and there is a liability of there being a cave which will carry away the ditch at any time, and shut off, not only the mine, but the town from water. The tunnel is eight feet wide and six feet high. Men are at work on both ends, and they have about 650 feet completed. The tunnel was commenced in October, and will be completed in about two months more.

The Inyo *Independent* learns that the Cerro Gordo Water company's pipes have burst, from the effects of frost. In consequence of this misfortune the furnace will have to be shut down for a short time, if not for the remainder of the winter. Since the accident, water for domestic purposes is being packed in upon pack animals.

ARRANGEMENTS have been made by the company recently organized at Winnemucca to work the Antelope and Mountain Sheep ledges, in Piute Queen district. An outfit will start for the mines, with tools and provisions, as soon as the weather will permit.

The South mountain people are making preparations to smelt and ship 30,000 pounds of bullion daily, next spring and summer. They have the ore to do it with in sight, and are putting up more furnaces.

The men in the Savage mine have made up a purse of \$385 for the widow of John Kelly, killed in the mine last month.

POTTER valley, Mendocino county, is having its share of mining excitement. Prospecting for silver is lively.

The mines in Rye Patch are said to be looking better than ever, and the prospects for a flourishing season are extremely good.

FROM the 1st of January to the 1st of October, 1874, 1,624 miners, bound to Cassiar, landed at Fort Wrangle.

The Eureka furnaces have produced, in the last two weeks, 541,805 pounds of bullion.

The Ukiah mining district, Mendocino county, was organized on the 7th inst., S. Wertimberg was chosen Recorder.

Our Iron Mines and Lincoln Coal.

If iron can be freighted from Shasta county, coal from Lincoln and limestone from Auburn to Sacramento and then smelted, and pig iron produced at a cost of \$24 75 per ton as estimated by the *Post*, thus supplying this California market with this great staple at less than half the present rates—for it costs at least \$15 a ton to freight iron here from the East—all will agree that the gain to California will be great. Two and a half millions saved net, or five millions of a gross saving yearly to California industry is a desideratum devoutly to be sought. Now while we are hardly prepared to accept the figures of the *Post*, for they are based on assumed freight rates for Shasta ore and limestone, which we do not believe can be obtained, we do believe that a splendid article of pig iron can be laid on the shipping wharf at Sacramento for less than \$25 per ton.

In the first number of the *Tidings* issued a little over a year ago, we took occasion to call attention to our foot-hill iron ore deposits and made the assertion that by erecting furnaces at or near some of these great deposits, say those ten or fifteen miles below this town and near the Placer county line, pig iron could be made at a cost not to exceed \$20 per ton. This was before the discovery of the Lincoln coal fields and based on the use of charcoal. If Lincoln coal should prove as well adapted to smelting as it is now thought it will, pig iron may be turned out at the furnace for \$15 or less per ton.

It has been a favorite idea of ours ever since the discovery of Lincoln coal, and hence when we have published in reference thereto has generally been in the local department, that that coal field and our iron fields or deposits were destined some day to be brought together and produce astonishing results. If the two great crude products iron ore and coal, and the lesser one lime stone, should not be found more closely contiguous than they have already shown themselves in inexhaustible quantities along the lower line of our county and Lincoln—and they are not likely to be so far as can be judged by a glance at the lay of the land in California—rolled iron can be produced after nailing these two points by rail—always supposing this coal to be what is claimed for it, as good as charcoal for smelting and forging—cheaper than anywhere else on the coast, and perhaps in the world.

Figure the cost of a railroad from Lincoln to Bear river, then of smelting works at the upper and rolling mills at the lower end of this road—as it takes two tons of ore, two of coal and half a ton of limestone to make the ton of pig iron, the coal had better be taken to the ore and lime and load back with pigs; then place the cost of mining and delivering the ore and limestone in the furnace at \$2 per ton, and the cost of the coal in the ear at Lincoln at the same, and these rates will be borne out in practice if the furnace is put at the right point and see what the cost will be for rolled iron.—*Foot-hill Tidings*.

BLACK JACK.—A correspondent of the Salt Lake *Tribune* writing from Black canyon says: The developments in the camp have not been so extensive as they would have been, if we had any facilities for reducing our ores. The ores consist mostly of chlorides and sulphurets of silver, carrying some gold, and are classed among the best milling ores in the territory; and I assure you, that if some capitalists would erect a ten or twenty stamp mill, for octom work, in the vicinity of this camp, say, at or near the Jordan river, or at Sandy station, they would be amply rewarded for their enterprise, from the profits arising therefrom. It is to be hoped that some one in possession of means enough, will embrace the opportunity yet open, at an early day, and erect suitable machinery in the way of a stamp mill for the reduction of these ores, and when once accomplished, I unhesitatingly say, that this camp will furnish as much of the precious metals as any camp in Utah, and will encourage the opening of other mines which have been idle for some time.

NEVADA COAL MINES.—The *Virginia Chronicle* says: "The Virginia Coal Company, whose property is situated in El Dorado cañon, about eight miles from Dayton, are developing their mine as quickly as possible. They have a large bed of coal in sight, and are at present engaged in putting in cages, preparatory to taking it out for the market. A new superintendent, who is an old coal miner, and has had an enlarged experience, has been appointed. The company expect to commence furnishing coal in quantities to suit in a few weeks. It has been submitted to trial, and is found to be a splendid article of fuel for ordinary purposes. The bed is of sufficient extent to supply the demand in this city, and if the enterprise turns out as there is every reason to expect, the property will prove of great value to the owners."

WINNEMUCCA mountain is getting the most tremendous scratching these days that an old gray hill ever underwent. Prospecting parties are starting out from town every day, and hardly one comes in without reporting a good strike. Uncle John Robins and Bill Powers struck a twelve foot ledge Monday, full of some sort of mineral.—*Humboldt Register*.

The Fiske lode at Central, Colorado, yielded during the year 1874, in bullion, \$44,941.99. The product has increased from month to month. The yield of the first eight months was \$22,349.36. In November it was \$5,737.69, and in December, \$9,595.86.

GOOD HEALTH.

Consumption of the Lungs.

EDITORS PRESS:—The more important labor of revitalization of the blood, taking place in the lungs—if that organ be implicated—it is essential to recuperation that no unnecessary labor be given it. Therefore the air inhaled should be pure, and the food that is used, also; consequently but few localities are well adapted to the recovery of persons afflicted with any predisposition to diseases of the liver or lungs. Breathing being both mechanical and chemical in its operation, and the force required being a draft on the vitality, all methods must be contrived to husband that force. The first step is to place the sufferer in proper climatic surroundings, which should be an altitude of from 1,200 to 1,500 feet above sea level, with the temperature as near 70 degrees (Fahrenheit) as practicable. The hygrometer should indicate less than an average of moisture. These conditions attained, the next in importance is the food. Partial indigestion usually preceding, the stomach must be attended to. Most of the mistakes in nutriment begin in the mouth. To have digestion, thorough mastication is an absolute necessity, and the food must be selected with a view to compel the performance of that operation. Parched grain, or hard bread, made from the whole of the grain is good; vegetables and fruit next, as containing the required moisture.

The corrosive qualities of food differ widely in giving a stated or definite amount of power to the engineer, so with the food in the human locomotive, and hence it should be chosen with this fact in view. Those classes of foods which rapidly decompose when introduced into the stomach should be avoided. Among these are milk, beer, wine, etc. Grapes are excellent diet for the consumptive, as they contain all the elements required to form good limpid blood. This quantity of limpidity is as essential as a freedom from the excess of carbon in the blood, when it enters the lungs, thus lightening the labor of the weakened organ. The operation carried on may be likened to that of generating power in a furnace, the throat and lungs answering to the furnace; hence if there be a defect in the furnace the whole operation must be governed with a view to lessen the wear and tear until such time as the grate bars can be renewed. The custom of administering oils and alcoholic liquors in this class of diseases can only be likened to using coal oil or kerosene to extinguish a fire. By living in the open air, where that air is naturally pure and free from excessive moisture, by the use of electricity passed by moist sponges through the relaxed portions of the body; by the sun bath and by general cleanings, the disease can be arrested in nearly every stage—still much depends upon the skill of the manipulator. All that it is required to know to treat successfully this usually fatal malady can be gathered from the above.

R. M. SHAW,

Los Angeles, January 1, 1875.

IMPURITIES IN THE ATMOSPHERE.—Few persons are aware of the large amount of dust, fibrous substances, etc., that are constantly floating in the atmosphere, aside from the deleterious gases also present. The air which ventilates the English House of Parliament passes through filters of cotton. The appearance of the filters after having been used is startling, indeed; they are of a heavy, murky brown color, thick with dust and organic impurities. The sieves through which the air is first passed have also deposited near them quite a heap of larger intercepted particles. By allowing a sunbeam to enter a slightly darkened room, no matter how free we strive to keep it from dust, we shall always find the path of the beam illuminated with an infinitude of floating particles of organic matter. If we could see the impurities in the air we are constantly breathing as clearly as we see them in the path of a sunbeam through a darkened room, we should utterly revolt at being compelled to breathe such an atmosphere. The air of our various manufacturing and our machine shops, with the ventilation usually given them, is really unfit for a human being to take into his lungs. Careful examination has proved that the air in our railroad cars, as we go whirling along the track, is filled with invisible particles of iron and wood, to say nothing of other matters, to an extent which seems almost incredible. A better system of ventilation is one of the most important needs of the day.

THE HEAT OF THE BODY.—In olden times, when a physician wished to determine the character of a disease, he had to rely on his sense of touch to tell whether his patient was feverish or not; if the physician's hand was hot, then his patient felt but moderately warm; but, if it happened that his hand was cold, then a moderately warm patient seemed to be hot and feverish. This difficulty is now quite solved by the use of a thermometer. The heat of the human body is about 98 degrees Fahr., and, by placing under the armpit the bulb of one of these instruments, it is readily seen whether the temperature of the body is higher than that. It has been suggested that if mothers were to use the instrument, much anxiety might be saved, for, if it indicated a temperature higher than normal, then the medical man's aid might be very fitly sought, while, if it showed no excess, unnecessary fears would be allayed.

RISKS HIS LIFE ON HIS FAITH.—Professor White, a champion swimmer, recently consented to drown himself, in order that his theory of resuscitation might be tested for the benefit of the London Humane Society, who were present to witness the experiment. After lying down certain rules for holding a drowning person in the water, he plunged into the river—the Serpentine, probably in Hyde Park—and remained long enough under water to be partially drowned. His son then dived over him and brought him to the surface in an apparently lifeless condition, adhering strictly to the principles laid down by his parent. The breathless body was then turned over to one of the Humane Society's officers and put through the course of treatment recommended. The society had the satisfaction of seeing Mr. White revive, and in a short time return to the water without apparent unpleasant consequences, thus proving his theory by illustration at the risk of death.

SOMETHING NEW FOR THE SICK ROOM.—Under the name of pulmonary candles, Field & Co., English chandlers, have introduced candles containing in their substance some of those gum resins, and balsams, especially benzoin and storax, which from time immemorial have proved useful in chronic bronchitis and allied maladies. When burnt, the candles yield by the combustion of these drugs, a pleasing fragrance, and at the same time, give a good light. Candles are not much used in this country, but the idea might be adapted by the medication of kerosene. The aromatic odor alone would be an improvement of the fragrant combustible.

DIABETIC BREAD.—M. Danneby proposes the use of bread made from roasted flour for diabetic patients, instead of gluten biscuit. He asserts that roasted starch cannot be converted into glucose, and that bread made out of the various farinaceous torrefied is greedily eaten by patients who have been restricted to the ordinary preparation of gluten until they have become thoroughly disgusted. Moreover, under its use the thirst lessens, and the digestive derangements are remarkably ameliorated.

USEFUL INFORMATION.

WHAT BECOMES OF OLD LEATHER.—In addition to the answers given to this question in previous issues, we now add an improved process of utilization, invented in France and Denmark. At the late exhibition in Vienna, leather was shown suitable for heels, toe-caps, and inner soles prepared from leather clippings, by simply mixing them with some adhesive substance, forming the mass into rectangular plates on top of each other, subjecting them to hydraulic pressure, and then drying and rolling them. This article was restricted in use because it could not withstand moisture. A Copenhagen firm, however, exhibited for the first time an article made upon an entirely different plan. The leather scraps were first converted, in a suitable machine, into a sort of leather wool, which was mixed with caoutchouc and different chemical reagents, kneaded by machinery into a thick pasty mass, and then formed in metal molds, and dried and subjected to a gradually increasing pressure until it was finished under 6,000 to 10,000 pounds to the square inch. The appearance of leather is imparted to it by a light coating. Articles manufactured from this material are said to be 50 per cent. cheaper than those made from leather, and can be made in the same manner, while at the same time they are perfectly water-proof. It consists of about 41 per cent. of caoutchouc and 60 per cent. of leather.

FOR CEMENTING IRON-RAILING TOPS, ETC.—A correspondent of the *English Mechanic* states that he has found the following composition completely successful for cementing iron-railing tops, iron gratings to stoves and other similar applications, and with such effect as to resist the blows of the sledge-hammer, namely: Equal parts of sulphur and white lead with about a sixth of borax, these being thoroughly incorporated together so as to form one homogeneous mass. In applying this substance to either of the purposes named it is moistened with strong sulphuric acid, and a thin layer of it placed between the two pieces of iron, and these are then firmly pressed together to form a perfect union. In about five days it becomes perfectly dry, all traces of the cementing compound having vanished, and the iron exhibits the appearance simply of having been welded together.

An absolutely indelible ink—one that cannot be removed for the purpose of substitution—is a desideratum greatly needed. Galignani states that the French Stamp office has just purchased a secret of the composition of such an ink, and which resists the strength of all known reagents. Owing to that discovery, it is thought that it will be able to put an end to the numerous frauds which are constantly committed to the prejudice of the Treasury, and which consist in restoring to stamped paper already used, its original purity. The annual loss to the revenue on that head is calculated at 600,000f. in the Department of the Seine alone.

SOFTENING FILES.—Cover them with oil and hold them over the fire till the oil blazes; as soon as the flame runs all over the file, plunge it in water; or put them in a moderate hot oven for half an hour, if large files; but, if small, the first plan is the best.

THE DELUSION OF SMELL.—The sense of smell, like the others, has its aberrations and hallucinations. The delusions of smell are hardly ever isolated; they accompany those of hearing, sight, taste and touch, and are also less frequent than the latter. Insane people who are affected by their complaint of being haunted by fetid emanations, or congratulate themselves on inhaling the most delicious perfumes. Lelant mentions the case of a woman, an inmate of La Salpêtrière, who fancied that she constantly perceived a frightful stench proceeding from the decay of bodies she imagined buried in the courts of the institution. Impressions of the kind are usually very annoying. Pierre de Beismont relates the account of a woman, affected by disorder of her senses. Whenever she saw a well dressed lady passing she smelt the odor of musk, which was intolerable to her. If it were a man, she was distressingly affected by the smell of tobacco, though she was quite aware that these scents existed only in her imagination. Copelin mentions that a woman who declared that she could not hear the smell of a rose, was quite ill when one of her friends came in wearing one, though the unlucky flower was only artificial. Such facts might be multiplied, but as they are all alike, it is not worth while to mention them. The latest observations made in insane asylums—among others those of M. Prevost, at La Salpêtrière—have shown also that delusions and perversions of the sense of smell are more common than had hitherto been supposed among such invalids, and that if they usually pass unnoticed, it arises from the fact that nothing spontaneous denotes their existence. —*Popular Science Monthly.*

EARLY USE OF COAL.—A contemporary says: Coal is not, as is generally imagined, a modern form of fuel. The Chinese, forefathers in most discoveries, knew its value centuries ago. It is known to have been in use in the days of Julius Cæsar and the Roman Empire, and from the twelfth century to the present day the trade in coal has undergone progressive development. As long ago as Edward the Sixth's reign, toward the middle of the sixteenth century, coal was shipped from England to France, a letter of that date speaks of "that thing that France can live no more without, than the fische without water; that is to say, Newcastle coals; which without that they can neither make steel work nor metal work, nor wyre work, nor goldsmiths work, nor gonges, nor no manner of things that passeth the fier."

TO PREVENT RUBBED SHOES FROM LOOKING DINGY.—This is a difficult thing to accomplish in any other way than by a daily application of means for removing the dirt. The action of sun, heat, dirt and water, attacking the coating of rubber, and impair its coloring matter. Heat softens the rubber to a certain extent, and allows the dust to fix itself not only on but in the rubber. The dust particles, to whatever extent they are present, contribute a dingy appearance, which cannot be permanently removed. We know of no better plan than to wash the foot frequently with warm water and castile soap; after which rub the top with a flannel rag moistened with sweet oil, going over the top a second time with a dry rag in order to remove the oil. The remedy is only a temporary one, and therefore must be repeated whenever the rubber is soiled.

PURIFYING LINSEED OIL.—It is requisite that artists should have the linseed oil they use perfectly colorless, or otherwise they would spoil the more delicate tints. To purify it is extremely easy. Even putting a bottle in the sun for some days will accomplish the object; but as this process is somewhat tedious, it is better to put in a 2 oz. vial, three-quarters full of good common linseed oil, a piece of whiting as big as a nut, previously powdered, and shake them together and put the vial in an oven. In two days, and sometimes in a few hours, the whiting will have carried down to the bottom all color and impurity, and the refined oil floating at the top may be poured off for use.

REGULATING A COAL STOVE.—Never fill a stove more than half or two-thirds full of coal, even in the coldest weather. When the fire is low, never shake the grate or disturb the ashes, but add from ten to fifteen bunches of coal and turn the draft on. When these are heated through and somewhat ignited, add the amount necessary for a new fire, but do not disturb the ashes yet. Let the draft be open a half an hour. Then shake out the ashes. The coal has thoroughly ignited and will keep the stove at a high heat from six to twelve hours, according to the coldness of the weather. In very cold weather after the fire is made, add coal every hour. —*Coal Gazette.*

GLUE.—Glue loses much of its strength by being often melted; that glue, therefore, which is newly made is much preferable to that which has been used. When done with, add some of the boiling water from the outer vessel to the glue, so as to make it too thin for use. Put it away till wanted again, and by the time the water in the outer vessel is boiled, the glue in the inner is ready melted, and the proper thickness for use. Powdered chalk, brickdust, or sawdust added to glue, will make it hold with more than ordinary firmness.

The odor of a phial that has contained medicine may be removed by filling it with cold water and letting it stand in an airy place, uncorked, for three days, changing the water every day.

DOMESTIC ECONOMY.

The Products of Gelatine.

The interesting and singular fact appears that millions of dollars cover the value of the gelatine industry in this country, and this value is said to be still greater in Europe. The purest form of commercial gelatine is known as isinglass, the best being prepared from the air-bladders and sounds of three or four species of sturgeon. These tissues are cleansed, dried and scraped, forming what is termed leaf isinglass, or they are twisted into various forms called long and short stople, or folded into packages called book isinglass.

The Russian isinglass has always held the highest rank in the market, but its manufacture is very simple. The swimming bladders of the fish are first placed in hot water, carefully deprived of adhering blood, cut open longitudinally and exposed to the air, with the inner delicate, silvery membrane upward; when dried, this fine membrane is removed by beating and rubbing, and the swimming bladder is then made into the forms desired.

Machinery is employed to cut isinglass into the delicate filaments in which it is usually sold. A solid gelatine, in thin plates and strings, is manufactured in large quantities in France, to answer the purpose of isinglass. The best is transparent, and is prepared from the gelatine of bones, by digestion in dilute hydrochloric acid and long boiling in water. It is much cheaper than the first described article, as well as decidedly inferior. The same may be said of another variety, known as opaque gelatine, which is prepared from the cottings of skins.

A GOOD BED.—A most soft, comfortable, and wholesome filling for beds or for mattresses, can be procured in most country places by getting a farmer, when threshing to allow oat chaff to be saved. It is soft, light and elastic, and when new and clean is very sweet. The cost is very light, only the cost paid by the farmer for the men saving and sifting it. As oat chaff is rarely used for cattle food it is easily obtainable. It is so very light that a slighter kind of bed-tick than is necessary for other kinds of filling is quite sufficient for oat chaff. Another advantage is that it can be changed every year at so little cost that it is within the reach of many if not all. For children's beds it is perfectly satisfactory. It is only necessary to keep a sack or two stuffed full of oat chaff in a dry place, and then new and fresh filling is at hand to make a sweet bed whatever accident may have befallen the cot mattress. Next to the chaff is clean oat straw for bedding. Indeed, we would make this our first choice, after the more cleanly met for all adults. It should be changed frequently and always be kept sweet and clean.

GLYCERINE FOR PRESERVING FRUIT.—We learn through a German journal, says the *Journal of Applied Chemistry*, that in order to preserve fresh fruits it is only necessary to heat them, if not perfectly ripe, in water almost to boiling, drain nearly dry and cover with warm, concentrated glycerine. If the fruit is perfectly ripe heating the water is unnecessary. It is also advised to pour off the glycerine after standing for some time, and add fresh concentrated glycerine on a water bath and use a second time. Ordinary glycerine is often impure, but only that which is perfectly pure and colorless, with a clean, sweet taste and a specific gravity of 1.25 should be employed.

VIENNESE MEERSCHAUM.—The product known as Viennese Meerscham is prepared by mixing 100 parts silicate of soda with 60 parts of carbonate of magnesia and 90 parts of the native meerscham or pure alumina. This mixture is then pulverized with the greatest care, and passed through a sieve of very fine silk or horsehair; add water, and boil it for ten minutes; then pour the whole into moulds, placed so that the water may separate easily.

GLUE TO RESIST FIRE.—The *London Furniture Gazette* gives this recipe: Mix a handful of quick lime in 4 oz. of linseed oil; boil to a good thickness, then spread on plates in the shade and it will become exceedingly hard, but may be easily dissolved over the fire, and used as ordinary glue. It resists fire after being used for gluing substances together.

CRAYONS FOR DRAWING ON GLASS.—Melt together equal quantities of asphaltum and yellow wax; add lampblack, and pour the mixture into moulds for crayons. The glass should be well wiped with leather, and in drawing be careful not to soil the glass with the fingers. In trimming these crayons, the point may easily be rendered very fine.

OYSTER OMELET.—Whisk four eggs to a thick froth, then add by degrees, one gill of cream; beat them well together; season the egg with pepper and salt to taste. Have ready one dozen fine oysters; cut them in half and pour the egg into a pan of hot butter and drop the oysters over it as early as possible. Fry a light brown and serve hot.

RESTORING IVORY.—Discolored ivory may be restored to its original whiteness by cleaning it with a paste, composed simply of burnt pumice stone and water. After cleansing, place the article under the glass in the sun's rays.



W. B. EWER.....SENIOR EDITOR.

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Concentrating.

It is stated that a company of California capitalists intend putting up works in the vicinity of Helena, Montana, the coming season, and will purchase and ship quartz. Perhaps if some concentrating works were put up in different localities on this coast our bullion yield would be larger. Many camps which ship ore for reduction, paying enormous sums per ton, can scarcely be kept running on account of high freight charges. It costs no more to ship rock worth \$1,000 per ton than it does rock worth \$100 per ton. If ten tons could be concentrated into one, at half the cost of the freight on a ton, it would pay then 50 per cent. more than now.

We ship each year thousands of tons of ore out of the country paying so much per ton freight, a large percentage of which could be saved to us, besides giving employment to home workmen. In other countries much more attention is given to concentration than here, and with good results. We still go on shipping hundreds of tons of worthless gangue, and paying heavy freight on it, which could be avoided by concentrating the ores before shipping. The farmers ship the grain and throw away the stalks; the miner ships the metal and the dirt with it, paying an equal freight on both. The circumstances are not exactly parallel, but are similar enough for illustration.

We trust it will not be long before steps are taken in the right direction in this matter of concentration. Arizona, for instance, would make a much better showing to-day if she had commenced concentrating a few years ago. She ships rich ores to this city which pay all the heavy freights and a fair profit. With ten tons in one, or even five in one, the profits would be much greater, as the freight per ton would be twice as heavy as the concentrating expenses per ton. Not only Arizona, however, but many places in our own and neighboring States would do well to pay some little attention to this subject. We feel confident that in a few years the subject will become even more important than now.

CALISTOGA shipped 138 flasks of quicksilver last week.

PRODUCTION OF QUICKSILVER AT NEW ALMADEN, FOR 22 YEARS AND THREE MONTHS.

DATES.	CLASS AND QUANTITY OF ORE.			Total Pounds.	Flasks from Furnaces.	Flasks from Washings.	Flasks Total.	Average Amount per Month, Flasks.	Per Centage, including all.	Per Centage, Tierras.	True Per Cent. of ore, ex'd Tier. & Wngs.	No. of Mths.			
	Grueso, Pounds.	Granza, Pounds.	Tierras, Pounds.												
July 1850 to June 1851				4,970,717	23,876		23,876	1,989½	36.74			12			
July 1851 to June 1852				4,643,290	19,921		19,921	1,660	32.82			12			
July 1852 to June 1853				4,839,520	18,036		18,036	1,603	28.50			12			
July 1853 to June 1854				7,448,000	26,326		26,326	2,193¾	27.03			12			
July 1854 to June 1855				9,109,300	31,880		31,880	2,656	26.76			12			
July 1855 to June 1856				10,368,200	36,083		36,083	3,040	20.74			12			
July 1856 to June 1857				10,299,900	26,002		26,002	2,167	19.31			12			
July 1857 to June 1858				10,997,170	20,747		20,747	2,446½	20.41			12			
July 1858 to Oct. 1858				8,873,085	10,688		10,688	2,647	20.91			4			
Nov. 1858 to Jan. 1861	Closed	by Injunc	tion.	13,323,200	32,402	2,363	34,765	2,897	19.96		18.64	12			
Feb. 1861 to Jan. 1862				16,281,400	39,262	1,129	40,391	3,366	20.22		19.65	12			
Feb. 1862 to Jan. 1863				7,172,600	17,316	2,248	19,664	2,795	20.86		18.46	7			
Feb. 1863 to Aug. 1863				2,846,000	4,820	700	6,620	2,760	18.00		15.67	2			
Sep. 1863 to Oct. 1863															
Nov. 1863 to Dec. 1863				54,800	1,586,600	718,000	2,859,300	4,040	407	4,447	2,223¾	18.65	3	17.52	2
Jan. 1864 to Dec. 1864				1,259,400	18,730,300	3,287,900	23,277,600	42,176	313	42,489	3,640¾	13.96	3	16.64	12
Jan. 1865 to Dec. 1865				2,288,900	25,749,000	3,910,600	31,948,500	47,078	116	47,194	3,933	11.30	3	12.42	12
Jan. 1866 to Dec. 1866				1,606,000	19,939,100	6,440,200	26,885,300	34,726	424	35,150	2,920	10.00	3	11.82	12
Jan. 1867 to Dec. 1867				781,500	15,689,288	9,603,145	26,073,933	23,990	471	24,461	2,038½	7.19	3	9.42	12
Jan. 1868 to Dec. 1868	2,274,208	14,566,600	12,564,722	29,405,630	26,677	61	26,738	2,135½	6.66	2	10.12	12			
Jan. 1869 to Dec. 1869	150,000	11,942,175	13,366,000	25,458,175	16,898		16,898	1,408	6.07	2	8.48	12			
Jan. 1870 to Dec. 1870	30,000	12,531,900	8,638,800	21,097,700	14,423		14,423	1,202	6.23	2	7.42	12			
Jan. 1871 to Dec. 1871		13,661,700	8,873,000	22,534,700	18,663	6	18,669	1,647½	6.44	2	9.16	12			
Jan. 1872 to Dec. 1872	142,000	12,777,000	8,497,600	21,416,600	18,391	183	18,574	1,548	6.63	2	9.57	12			
Jan. 1873 to Dec. 1873		8,492,375	8,838,000	17,330,375	11,042		11,042	920	4.87	1	7.88	12			
Jan. 1874 to Dec. 1874		11,294,000	12,160,000	23,464,000	8,867	127	8,994	817	2.96	1.62½	4.39	12			
Totals.....	8,436,808	166,950,438	96,294,867	376,351,055	678,607	8,537	687,054	2,183	11.83	2.38	14.80	267			

Product of Enriqueta from 1860 to 1863.....10,871
 Total product of all the Mines on the Company's Property.....688,525 flasks; of 76½ lbs. each, or 46,787.162½.

The New Almaden Mine.

We give in the accompanying table a synopsis of the result of operations at the New Almaden mine, Santa Clara county, California, for twenty-two years and three months, kindly furnished by J. B. Randol, Superintendent. This is one of the principal quicksilver mines of the world, as its record shows, and is the most productive mine in the United States. Within the past few years the product has fallen off somewhat, but it still retains its position at the head of the quicksilver mines of America. It will be noticed that the product of the mine during 1874, was lower than during any previous year while being worked continuously, and also that the percentage in the ore was smaller. The falling off in production of this mine is one of the chief reasons of the present scarcity of quicksilver, and all of the other mines discovered in California have yet been unable to make up for the deficiency of the New Almaden. The demand for the article has also increased very materially, and for the past two years the mining interests have been burdened by the very high price of quicksilver.

In our annual mining record last week we stated that the supposed product of the Redington mine, in Napa county was 1,000 flasks per month during 1874 which, if true, would have made the product larger than that of the New Almaden. This was merely supposition, however, based on rumor, and we have since learned that the product of the Redington was correct as given in the *Commercial Herald*—7200 flasks. This makes the product of the New Almaden still remain, as it always has been heretofore, greater than any mine in America.

In some part of our review we stated that there were six Almaden furnaces, meaning, of course, "New Almaden" furnaces. Those, however, inexperienced with metallurgy of quicksilver, might suppose that these furnaces are similar to those so well known and for so long a time in use at Almaden in Spain. But they are essentially different in their charging, firing and condensation. The furnaces we referred to were "New Almaden furnace," such as are also in use at many other mines on this coast. The new furnace being built and which will soon be in operation at New Almaden, is not of the old style but is a continuous furnace modeled after the latest iron-clad furnace in most successful operation at Idria, Austria, with many improvements, some of which have been kindly furnished to the New Almaden company by the engineer of that mine.

A glance at the table given above shows a carefully kept record of the operations of the mine. If other Superintendents of leading mines were to follow the example of Mr. Randol in this respect we might have more valuable data with respect to the operations of the gold and silver mines of the coast.

DEATH OF PROFESSOR DURANT.—Henry Durant, Mayor of the city of Oakland, and ex-President of the University of California, died suddenly on Saturday last. The funeral services were performed on Monday at the First Congregational Church, and were largely attended. Many of the stores were closed, and the occasion was one of the largest gatherings in honor of the dead that has ever taken place in Oakland. The cortege moved to the burial ground in the following order: The Faculty of the University of California, Alumni of the College of California and of the University, the Berkeley Club, pall-bearers with coffin, City Council, Board of Education, Board of Health, police force, officers of the Fire Department and other city officials, University Battalion, Cadets of Military Academy of California, (McClure's), students of the Golden Gate Academy, and citizens. Professor Durant was an honored and highly respected man, and his loss is deeply felt.

AUSTIN, Nev., shipped 994 bars of bullion during 1874, weighing 91,914 pounds, and valued at \$1,165,594. The bullion was almost entirely the production of the Manhattan 20-stamp mill.

Mining Decisions.

The Secretary of the Interior has decided, in the case of the City Rock and Utah claimants vs. W. H. Pitts, et als., applicants for patents for the King of the West lode, Utah, that: "A mining claim, so far as the surface ground is concerned, must conform to the location notice and record. The law of May 10, 1872, expressly declares the rights of parties owning lodes which meet or unite. The question of how far the General Land Office may extend its examination into the sufficiency of an adverse claim considered. An adverse claimant must positively allege ownership. An adverse claim which is bad on general demurrer should be rejected."

"The appeal from the decision of the Commissioner of the General Land Office, regarding the survey of the California land claim, Los Prietos y Najalayegua, has been withdrawn by the attorneys for appellants, in consequence of a private agreement or compromise between the grant claimants, represented by W. W. Stow, and the mining interests, championed by Harvey Brown."

In our issue of January 9th we expressed the opinion, in answer to a correspondent, that a miner could only locate 1500 feet, on one ledge. Our correspondent stated that he had located 1500 feet and then moved 10 feet away from the end of his claim, sunk a shaft and claimed 1500 feet more. The mining law of May 10, 1872, says that a mining claim located after the passage of the Act whether located by one or more persons may equal, but not exceed, 1500 feet along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. It was understood that this special provision was intended to prevent one party from locating four or five miles of croppings to the exclusion of others; and that, in connection with the Government requiring annual expenditure, indicates that Congress intended to confine claims to smaller boundaries.

The *Silver State*, a Nevada journal which pays a great deal of intelligent attention to the mining interests, called our attention to this matter, stating that we were probably mistaken in our opinion that a miner could not locate more than 1500 feet on one ledge. In looking over the rulings of the Commissioner of the General Land Office we find the following ruling by W. W. Curtis, Acting Commissioner of the Land Office, in answer to an inquiry: "Referring to your letter of the 13th ult., I have to state that the Mining Act of May 10, 1872, declares that a mining claim located after the passage of this Act, whether located by one or more persons, may equal, but shall not exceed one thousand five hundred feet in length along the vein or lode."

"But there is no provision of law to prevent parties from locating other claims upon the same lode, outside of the first location made on the lode or vein."

"If a lode or vein three thousand feet in length is discovered, two locations may be made each of 1500 feet thereon."

Although the rulings of the Commissioner are not law, they are authority until legally reversed; so that the opinion previously expressed by us was incorrect.

Lodes carrying rich ore in small quantities and scattered veins, in Colorado, are now made to pay well by means of concentration works; and veins carrying only thirty ounces of silver per ton and running forty per cent. lead, find a ready market at prices that afford a good margin of profit where the veins are strong.

Times are said to be rather dull in White Pine at present but the future is promising. The English company keeps its mill steadily at work, some 50 tons of \$60 ore being taken from the mines daily.

Hydraulic Mining in California.
No. 10.

In Fig. 12, twelve electric fuses are inserted in the different drifts. These fuses are marked in the circuit of the leading wire, A A, and are buried equidistantly in the powder. The main drift, from the point where the first cross-drifts intersect, that is, for a distance of 65 feet from the mouth, is safely closed by first making a barrier of timbers across the main drifts, where the intersection takes place, and then filling the main drift with sand and fine gravel tightly to its very mouth. The blast is now ready for explosion.

The blasting apparatus, B, being established at a safe distance, and the two leading wires attached to it, the crank of the frictional apparatus is turned in this instance 22 times to the right, and then reversed for about six inches, when the discharges of all the fuses take place at the same moment. It is laid down as a rule that ten turns are taken for the first fuse and one for every additional one.

When greater areas of ground than that mentioned above are to be blown up the main drift must be extended, and additional and longer cross-drifts must be made. The powder must always be distributed with regard to the work it will have to perform; a little experience and better acquaintance with the deposit to be blasted will soon lead to the proper treatment of the ground.

However, as a general rule, it may be said that a strong charge of powder should be employed. The extra expense for powder is easily repaid by the thorough breaking up of the ground, securing not only a greater yield of gold, but lessening also the manual labor to such an extent that the cost of an additional 100 kegs of powder, or any proportion thereof, becomes insignificant.

Shafts with a J in the bottom are excellent for high banks, and have all the effect of drift-blasts. Besides this, it is much easier to fill or tamp them than a level drift, as the material extracted from them is deposited round their mouths, and can readily be thrown back as tamping.

To secure from injury the insulated wire, which is to be connected with the blasting apparatus, it is advisable to cut a little groove for each wire, leading from each arm of the cross-drift to the mouth of the shaft or main drift.

In case water should be found in the drifts or shafts it is necessary to use for the powder boxes made water tight with the help of tar. The lids are perforated with gimlet holes for the admission of the fuse. After the fuse is inserted the lids are placed firmly on the boxes, either with screws or wooden wedges, and the gimlet holes are closed either with wax, soap, putty, or even clay, leaving everything well protected.

To blow up patches of bottom gravel 10 to 20 feet deep, bottled shaped shafts are used. These are sunk from four to five feet in diameter to the necessary depth, say 18 feet, and their bottom is widened all round from two to three feet beyond the original periphery of the shaft.

The powder is placed in the lower excavation all round. In the center a layer of heavy rocks is placed, to be the basis for the filling or tamping material, and to prevent the latter from entering the excavated part. The shaft is tamped and the explosion takes place with generally an excellent result. The ground will be crushed from 15 to 20 feet in every direction from the shaft and will yield readily to the hydraulic jet.

Giant powder blasts have been tried in several hydraulic mines with great success, according to the published reports. Giant powder No. 2 is used for this purpose.

In all blasting operations, from the simple hand-drill blast, removing only a few hundred pounds of rock, to the bank-blast, removing thousands of tons, a careful calculation of the strong and weak points in the material attacked should precede the placing of the blasts.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

Economic Botany.

Lecture Delivered before the University of California College of Agriculture on Monday, Jan. 14, by Prof. C. E. Bessey, M. S., of the Iowa College, Ames, Iowa.

[Reported expressly for the Press.]

I must first make a little correction of the definition of "economic botany," given in the circular describing this course of lectures. This definition should include plants which are harmful to man; so, in putting down your definition of it please include the two terms, useful and harmful. And when we speak of useful plants, of course we mean those which furnish food for man and the domestic animals, which furnish medicine for both; and covering for both, and after having taken into consideration these two things there are a good many extras, things which we may lamp; for instance a great many ornamental plants that must necessarily come in. On the other hand, harmful plants would include all of our weeds, all that are poisonous and the plants that we take up specially to-day.

The Parasitic Fungus Growths.

Now in this course of lectures we shall take up only a few, because, if we looked over the fifty or sixty thousand different species, it would be more than a dozen lectures could possibly compass. We will, therefore, run through the groups from the lower to the higher. I want to call your attention to the cryptogams, which are of economic value; seaweeds, lichens; fungus plants, the liverworts, mosses, ferns, and their allies. Indeed, we can lamp these off in a very short time. We have here some of the very lowest forms of seaweed made up of single cells. Here we find frog spittle (conferia). Here, also, we have some forms that are found along your coast. This is found on the rocks. This little herbet is the little microscopic plant which dodges about as can be seen under the microscope, with amazing velocity. These are more or less inclined to be green in color, though, of course, some found in salt water have other colors. Of substances practically asexual to man they furnish only iodine, which is pretty largely derived from them and Irish moss. Of lichens I have put down here the two more important products, Litmus, which is obtained from a little plant belonging to this group, and Reindeer moss, found in Lapland, covering the ground, as does grass. In the northern region it is used as food for reindeer. The Liverwort, or the *Hepatica*, you may put down as of no use whatever or their only use being to cover the ground and by their dying to furnish food for other plants. The same may be said of the mosses and ferns, if we except the utility of beauty. The one exception in mosses is the *asphagnum*—possibly found here—which is used for packing. To that excepting

The Fungals.

The Cryptogams are of no economic interest. First, as to what a Fungal is? The common idea is incorrect. The Fungal is always a plant growing more or less under ground, or under some surface, made up of white threads growing in every direction under this surface, whether it be the surface of live wood, earth, or what not, growing in every direction through this surface and finally fruiting in some form. The true plant then we must consider the part which grows under the surface or under the ground. The puff ball as we find it is one of the fruiting forms.

A little more as to what this growth is beneath the surface. All cryptogams grow from spools. The spool falls upon the ground and is then only a little round cell. It begins its growth by multiplying and so has the form of elongated threads. These form the true plant. After a time, and this time may be likened to the time required by any ordinary plant, it sends up fruiting portions which we ordinarily observe. This may be taken as the usual manner of the re-production of Fungals.

Classification.

Fungals are divided into six groups, or orders, with the following characteristics. Spores in sacs. In sacs which are usually aggregated. Order I. *Helvellaceae*. In sporangia. Order II. *Mucoraceae*. Spores naked. On ends of conspicuous threads. Order III. *Bolrylaceae*. On inconspicuous threads. Order IV. *Uredinaceae*. On threads, enclosed in a peridium. Order V. *Lycoperdaceae*. On an hymenium. Order VI. *Agaricaceae*.

Under the first order are quite a number of injurious plants and a few valuable ones. First we have pea mould, which in its manner of growth is about like this. (See figure 1.) Probably you have all noticed that a great many leaves, not only of the pea but of other plants, are covered with a white mouldiness. Take one of these leaves and place it under the microscope and you will find over the whole surface myriads of threads now and then passing into a stomate, and of course sucking the sap from the interior of the leaf. These little threads form the *mycelium*, the proper fungous growth. It covers the leaves, stops up the breathing pores, and in fact chokes the plant upon which it is living. After the plants become fully grown, then it produces these little spore cases. (See figure 1).

By the use of a microscope of perhaps one

hundred diameters, you will find the leaf dotted over with little black dots. I have noticed on some of the plants on these grounds quite a number of remains of allied species. They are of quite considerable importance. Allied forms affect the rose, peach, pear and a great many other plants.

In many parts of the country plum, peach and frequently cherry trees are troubled with black excrescences, which are called

Black Knot.

This is the *spharia Miroloso*. We test fungous growths by finding the fruiting. For a long time people were at a loss to know what was until finally some man found the spores borne in this way. Standing at right angles to the surface, we find elongated sacs in which are the spores. You need not think to succeed in finding them with an ordinary lens. It requires a very good section and a good microscope in order to find them.

The only remedy for black knot is to cut off the knots as they appear. It is the only remedy that is available. Your only safety is to cut down the tree, or to cut away the branches. The branches effected by the knot must be cut off a considerable distance below these excrescences, as the *mycelium* extends far below them. If a tree is found to be thoroughly infested, cut the whole tree down, and burn it up as soon as possible. All applications recommended are not much to be relied upon. I will notice a few hereafter. Now, as a sort of offset to this species of *Spharia*, in all

parts of the world we have some which infest larvae of the beetle and many other insects, very many of which are killed by the *mycelium* growing through them, the larvae, and destroying them. That offset is again offset by another which takes hold of the silkworm occasionally.

The rye plant is very frequently known to grow into and take on a peculiar growth; that is, the grain instead of development into the rye grain, develops into a dark-colored elongated mass known as ergot, (the scientific name of which is *Claviceps purpurea*.) Two species of this order are used for food, and where they are used furnish the best edible from the Fungal group. In England, truffles—an under

ground growth—furnish a food of exceeding excellence. As it is not found here, we pass it by. The morel, however, is found here and throughout all the world in general appearance, about like this little sketch I have here, and is covered over with little pits. These are gathered when they are full grown, and are used very largely in eating. Its scientific name is *Morchella esculenta*.

Mucoraceae derives its name from its principal genus, *Mucor*, the mould which is found very largely upon bread, fruits, paste and such things. *Mucor musco*, the bread mould, consists of under-surface growth, made up of filamentous threads running in every direction, and finally sending up a little blue mould (as we call it); [see Fig. 2.] The general appearance is well shown in the figure.

Under the next division the spores are naked, and we have first this little *Aspergillus*, [Fig. 3.] It is sometimes found in the summer time on

bread and pie. It first grows under the surface. At the top, instead of bearing spores, it bears strings of spores. In *Aspergillus*, one of our common plants, this thread terminates in a very large bell, and upon this are little threads, while in *Penicillium*, these strings or threads pass off without having any of these large bells. These two, as I said before, are very common.

Penicillium Crustaceum

Is what is known as the vinegar plant. You will know that vinegar is the result of fermentation, and has in it always a stringy, peculiar substance, called this "mother of vinegar." It consists of long, thready masses. You have simply these fungus threads, corresponding to the ordinary mycelium of fungus plants.

what is called the "mother of vinegar." We have these three proper fungus plants.

The Potato Rot Plant

Belongs also to this group, and I have shown in Fig. 4 its general character as seen under the microscope. One of these spores falling upon the leaf of the potato begins growing, grows just the same as this one. [See a, Fig. 4.] The production of this growth is mycelium. It passes down through the leaf-stalk to the stem; in fact, infests the whole plant. The result of this taking nourishment is, the cells of the potato plant are injured and rot sets in, and the whole plant in a very few days is destroyed. The potato may in the meantime be green, seeming healthy; the plants may have a strong and apparently vigorous growth, but in a very few hours they wilt down, blacken and decay, with a most fetid odor. We account for it in just this way: This mycelium has rotted all parts of the plant; by acting upon all parts of it, the plant is destroyed in this rapid way. Now, when you come to examine Taking any fermented substance, by the aid of a microscope you will find a multitude of little cells which resemble these. They take on an elongated form, and produce what we call the "mother" in vinegar; or, the mycelium.

now *Oidium Tuckerii*. It attacks leaves largely. Of course you are prepared to expect mycelium penetrating the plant also. Now, this form of fruiting will refer to group No. III.

We have these spores produced, and then again spores are blown to other plants. After a while it produces a second kind of fruit, similar to fig. 1. We consider the second kind as entitled to the preference. They are *Erysiphe*. The discovery was made within the last few years. This discovery carries it back to *Erysiphe*. In one of its forms it belongs to this genus *Oidium*, and we refer it then to *Erysiphe Tuckerii*. This will show the need of studying a plant's whole history.

In group No. IV, *Uredinaceae*, we have what are called cluster cups and I find myself embarrassed without specimens and will have to rely on the rude sketches upon the board. You will find occasionally this under surface of leaves covered over with little yellow appearances, which under an ordinary lens, will show themselves to be little cups. Take one of these little cups and cut it through, forming a vertical section, and its appearance will be similar to Fig. 5. This cup is found to be filled with myriads of little spores. We have here in the figure, the species *Berberidis*, the Barberry cluster cups. Now there is

A History Connected with this Rust.

In France, for a great many years, farmers complained that wherever barberry was grown it produced wheat rust. The railroad had run lines of barberry hedge along the sides of the track. The farmers complained, and did not want that barberry there. Wherever it was grown, wheat and other grains were found to be covered with rust. Botanists said it could not be barberry rust, because the two were so different. The farmers still complained, and finally the railroads concluded they would make an experiment and cut out a mile of the hedge; and after a while another mile; and so on, taking into consideration the direction of the prevailing winds. After examination, they came to the conclusion that the farmers were right and the botanists wrong. The cluster cup *Oidium* finally develops *Puccinia* just as the *Oidium* finally develops into *Erysiphe*. It is possible that De Bary may be wrong yet. There are some botanists who will not give in yet. Evidence seems to be very strong in his favor. Fig. 6 represents simply one form of its fruiting.

The fact is, there is another fruit also midway between these two—[Fig. 7]—first, *Oidium* is produced on the barberry; second, round spores (*Uredo*); finally, elongated spores (*Puccinia*). That brings us to the elongated spores which produce

Wheat Rust.

Take a bit of stricken wheat, or heads of rye that are covered with rust, and you will find the stem having elongated, brownish patches; put a little of this brownish dust under the microscope, and you will find that it is made up of spores, with bodies elongated, having the shape of Fig. 6.

This is the *Puccinia graminis*; one of the most injurious we have; not because of the breaking out into the fruiting state—that does not do very much damage—but it is because of the mycelium. Notice whenever wheat is "struck with rust," as we call it, the heads do not fill well. Those little patches can not do much damage; the damage is done by this mycelium; this filamentous growth, probably all coming from a single spore, germinating and pervading the whole plant. You can very often tell just how far it went and how far down, by the patches of rust from bottom to top. It is this internal growth that does the most injury. It is not this "breaking out," as we call it.

I have been asked: "If you have watched this rust how is it that after certain hot, damp days, wheat and other grains are more likely to be affected by it?" The common opinion is that this rust is directly due to this dampness in the air. I have known a very good agriculturist to refer it to a morbid condition of the sap; the sap exuding and turning brown. There is nothing in it. These damp, hot days develop rust in just the same way that such days develop grass or any vegetable. That accounts for the fact, that always after such days we may look for a greater amount of this *Puccinia* upon the plants than at any other time.

NOTE.—All of the accompanying illustrations, with the exception of the toadstool, are highly magnified.

The "Evening Post" Party.

On Saturday, of last week, a large party of invited guests assembled at the head-quarters of the *Evening Post* to witness the workings of their new press, stereotyping process and mechanical appliances recently introduced there. Everything worked satisfactorily, and there was but one opinion expressed by the throng of visitors, which was, that the proprietors of the *Post* might well be proud of the exhibit. There was much in this display that was entirely novel to many of the guests, and expressions of extreme surprise and satisfaction were quite common. The editorial and composing rooms were also visited, and found to be of the highest order; and in a side room a luncheon in perfect keeping with the other departments, was spread before the visitors, who repaired thither occasionally to partake of the good things there provided. The occasion was a pleasant one in every respect. The guests were in excellent humor, while all connected with the establishment were fully up to the occasion in attention and courtesy.



Fig. 1.

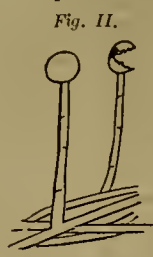


Fig. II.



Fig. V.



Fig. VII.

Erysiphe Martii.

Mucor.

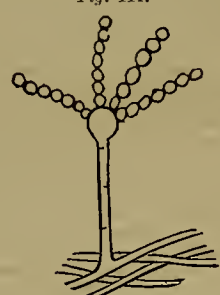


Fig. III.

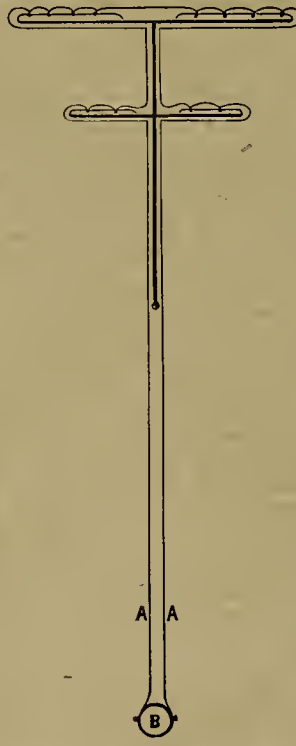


Fig. VI.



Fig. IV.



Fig. V.

Peronospora.

Puccinia.

San Francisco Iron Works and the Bonanza.

While examining the complete and splendid machinery of the Consolidated Virginia new quartz mill, one cannot help coming to the conclusion that the iron works, foundries and machine shops of California depend largely for their prosperity, and in a measure for their very existence upon the Comstock lode. Were the lode to give out as it was feared might be the case in 1865-6, and no more mills or hoisting works be erected, upon what would the iron manufacturing establishments of San Francisco rely for support? They would be compelled to discharge their hands, shut down work, and in many instances abandon business. Disastrous as the failure of our mines would be to Virginia, it would be felt scarcely less severely at the metropolis of the Pacific coast. But with increasing developments and fresh discoveries of ore bodies of fabulous richness, spring up additional

Demands for Machinery

With which to work them. Beside the other immense quartz mill which has been ordered by the California company, and which will be a duplicate of that just started into operation by the Consolidated Virginia, and the machinery which must be employed at the new hoisting works on the new shaft on the line between the property of the two companies, the Bonanza will furnish material

To many other mills, which will be hereafter leased or erected. In addition to this, mining all along the lead, but especially at the north and south ends, has received a new stimulus, which will lead to further and deeper prospecting in the old mines and the sinking of shafts in the new. The machinery for all these will have to be drawn from the iron works in San Francisco and Sacramento. As the wealthiest owners of our mines reside in California the direct effect of our prosperity is felt there in the payments of dividends and the rise of stocks, but the indirect effects are scarcely inferior. The construction of machinery, the supplies of nearly all kinds required along the line of the Comstock come from San Francisco, and the recent unparalleled discoveries here will give a new stimulus there to all kinds of business with which we are even remotely connected.—*Enterprise*.

QUARTZ JUMPING.—Since New Year's day, prospecting for veins of gold, silver and other precious metals has been an active business. The County Recorder has been filing pre-emptions of newly-discovered lodes in the mineral resources of the Territory. Snow and cold weather did not deter the bold fortune-hunters, who did not sleep, but watched and prayed for the true fissure in the numerous mining districts of the county. A party proceeded to a certain lead to re-locate the same, with all its dips, spurs and angles, at one o'clock in the morning, and found that other persons had performed this labor at fifteen minutes after midnight. The early bird catches the quartz. Many patient prospectors think that they are richer than they were in 1874, and some residents, who have lost the property which has been pre-empted by honest and energetic miners, do not act as if they had lost anything. We predict that the bullion product of this county will be increased materially by the development and working of these ledges during the present and future years. At least \$100,000 will be added to the circulating medium of this section during 1875, by the wise policy of Congress in refusing to grant another extension of time to the owners of quartz lodes.—*Montanian*.

LOS ANGELES CINNABAR MINES.—Mr. Herrick showed us a lot of cinnabar ore, which he brought from claims recently discovered in the Sierra Madre range, opposite San Fernando. He says he traced the peculiar stratum for over seven miles, and the croppings denote the presence of a lead of cinnabar the entire length. To satisfy us that the yellow, rotten-looking rock was really charged with quicksilver, he reduced a piece of it to powder, and laying it on a copper sheet saturated it with muriatic acid. In a short time the powder was reduced to a fine pulp. Then washing it off with water, the face of the copper plate was covered with an infinite number of quicksilver globules, which, under a magnifier, were brought out very strong. A species of black earth procured at the same time was subjected to the same process, and gave quicksilver results. This earth is very plentiful, and can be shoveled up by the cart-load, at points near the base of the range. If the Sierra Madre is a cinnabar-bearing range, it will, with the transportation facilities so near it, become the objective point of a vast industrial population.—*Los Angeles Express*.

A few days ago a wood-chopper discovered ore in the vicinity of Carlin. He took pieces of the ore to Carlin, and by melting in a blacksmith's forge, they proved to contain silver. The discovery created the wildest excitement at the railroad shops, and nearly all hands hastened to the mines to secure claims, about sixty ledges of which have been located. The principal ledges are named the Keystone, Argenta and Snsie.

The settlers on Puget Sound have the coal fever, and prospectors are upon every hill in the valley. Several new discoveries have been reported recently at Olympia.

Property in the Mining Counties.

For a number of years past, says the *Stockton Independent*, property in the mining counties has been greatly depreciated in value by enormously high rates of taxation. The burden has been as heavy as the people could possibly bear, and in some instances absolutely crushing. Many persons who accumulated fortunes during the flush days of placer mining by trading in the towns and villages stuck firmly to the spot where fortune smiled upon them, until at length they found themselves bankrupt. Others found their way to San Francisco, where they invested advantageously and are now rich. As a rule, those who retained the cash they had accumulated, invested in mountain canals, roads, brick and other buildings, have been thus far disappointed in realizing their expectations. When miners were flourishing, money was accumulated very rapidly by the local traders. The money was sent off, however, instead of being retained for the work of future development. The minees built up San Francisco with a rapidity that has no parallel in the growth of cities. Had one-half or one-sixth of the capital which has found its way from the mountains to the metropolis of our own State and to other States and countries been retained, no foreign capital would have been required to place machinery on every gold-bearing quartz vein in the interior. To those early settlers in the mountain towns and mining districts who have held their grip, struggled along without faltering and retained their foothold in a region where the work of development is only in a measure begun, the country owes a debt of gratitude. During the long season of slow change in the system of mining, the residents of the mining districts have been under a cloud which is at length beginning to vanish, but how rapidly it will wholly disappear, time and events can alone determine.

Happily, the prospect is gradually brightening, thanks to the tenacity and industry and energy of the courageous band who have not deserted the field which yet contains millions of hidden gold. Additional value will be given to property and new life infused into business generally in the mountain districts by the settlers procuring titles to their farms, orchards, gardens and minees. This will give a feeling of security which has not hitherto existed, and will lead to renewed activity, more extended labor and venture, and soon change the condition of affairs from chronic dullness to a sense of life and vigor in both old and new industries. We believe that the mining counties of California have passed through their severest ordeal, and that a prolonged period of prosperity is opening up before them. Property is appreciating in value, satisfactory exhibits continue to be made in heavy mining enterprises, and there is evidence of more hopeful anticipations and earnestness in productive pursuits generally. The extraordinary determination and unflagging vigor shown by the residents of Mokelumne Hill in their unconquerable struggle against adversity, may be alone accepted as a type of the general spirit and temper which animate and actuate the people of the mining counties at the present time.

ANOTHER BIO GRAVEL OPERATION.—Mr. A. J. Gould informs us that during the week he has purchased from Mr. L. V. Tefft one-half of his gravel claims near the Middle Fork, known as the Rock Creek claims. The claims were formerly owned by Tefft & Herbert but for several years have been owned by Mr. Tefft, and have been lying idle. Mr. Gould informs us that by concentrating all the water available, by a system of ditches, they will have a good head of water for about five months in the year. The bank of gravel is a splendid one, and cannot be worked out in a life time. Mr. Gould got some fine prospects and is satisfied that with proper machinery for working, that the claim will prove immensely valuable. Work will commence in the spring, but it will take the coming summer to get the claims in running order. We hope that the new company will be as successful as they anticipate.—*Plumas National*.

The Rippon mine, in Alpine county, was re-located January 2d, in accordance with the mining law of May 10, 1872, and will hereafter be known as Occident No. 1 and No. 2. It has been re-located in the interest of San Francisco capitalists, who intend to commence work on it next spring. The Rippon belonged to a San Francisco company that had expended over \$30,000 on it.

The ditches which conduct water from the mountains to the towns and mines on their line, over on the San Juan ridge, says the *Nevada Transcript*, are being utilized in floating flume-blocks from the saw mill above to the mines below. These blocks are sawed above Columbia Hill, and floated down the ditch to the points above and near San Juan, thereby saving several miles of hauling with teams.

The following is a statement of the bullion shipment of Austin for the year 1874: Bare shipped, 931; weight of bars, 91,914 pounds; value, \$1,165,594.80. No bullion was shipped in January.

The ledge discovered within a few hundred yards of the town of Unionville, Nev., is creating considerable excitement in that camp.

Edward Clark has been appointed Superintendent of the Great Western quicksilver mine, in Lake county.

The Shallowest Draught Steamer in the World.

The increasing necessity for effecting communication between distant places in foreign countries by means of water transit has, where such means of transit exists, led to a demand for vessels of a light draught in order to navigate very shallow rivers. Builders have gone on reducing the draught from two feet to one and even less, but as civilization spreads the navigation of still shallower streams and the supplying of still lighter draught boats become necessities. It thus happens that Messrs. Yarrow & Hendley, of Poplar, have been engaged to design and construct some steamers of exceptionally light draught for the navigation of the upper waters of one of the rivers in Brazil. These boats are intended chiefly for the conveyance of passengers, and the first of them has just been launched, and made a satisfactory trial trip on Saturday last. In all probability she is the shallowest draught steamer ever built, her draught, with steam up and fully equipped, being only seven inches. This formed one of the conditions imposed upon her builders. The others were that she would not draw more than nine inches of water with 20 persons on board, and that she should be of such a size as to be capable of being carried whole on a ship's deck to the Brazils. The steamer has, therefore, been built with a flat bottom, and has a length of 45 feet, and a beam of eight feet, with a depth of two feet. She is propelled by a pair of paddles 54 inches in diameter, two feet nine inches breast, and each having eight floats. Her paddles are driven by a pair of inclined direct-acting engines, with cylinders five and a half inches in diameter and ten inch stroke. She is roomy and comfortable both fore and aft of her engines, there being accommodation for about 40 persons in all. Upon her trial trip on Saturday, with 18 persons on board, she drew eight and a half inches of water. Her engines ran at an average rate of 80 revolutions per minute, which gave her a speed of about eight miles per hour. On her first contractor's trial she made the same speed with the same number of revolutions, and with 130 pounds of steam, the stated consumption of fuel being 40 pounds of coal per hour. The run made with the little craft from the Temple to Greenwich and back on Saturday was thoroughly satisfactory and demonstrated both her speed and handiness. Now that it has been satisfactorily shown that such a light draught is perfectly practicable, it will probably follow that districts hitherto unexplored and lying up rivers previously deemed unnavigable will be opened up and new sources of commerce developed.—*London Times*, November 5, 1874.

CHROME IRON MINES IN CALIFORNIA.—With all the excitement of the past year concerning the development of our silver and quicksilver mines, but little attention has been paid to the development of our chrome iron mines. This metal, which is of as much intrinsic value as gold or silver, is to be found in abundance in our State, and nowhere more so than in our immediate neighborhood. We also have the advantage over any other part of the State in which it is found, on account of our nearness to San Francisco, and the cheap transportation afforded by railroad facilities. It only needs some few of the many capitalists of the Bay City to be assured of its great abundance here, in order to induce them to erect smelting works at that place, or what would be better still, near our own settlement and build up a business which cannot fail to return great wealth to those engaging in it. This metal is also found in great abundance in some of the northern counties of our State, but owing to the want of railroad facilities for freight it is not a source of revenue to the owners of the claims in which it is found. The owners of one mine of this character in Del Norte county reside in one of the Eastern cities (Baltimore we think) and cannot give their mine the attention it demands. The same deposit near our own town (and there are many more valuable) would yield immense wealth if worked, and they could be developed at much less cost. Rich leads of chrome iron have recently been discovered and located by Dr. Michel and Mr. Dickenson of St. Helena, which, when worked, and the immense quantity of ore fully brought out will astonish those who have not given this matter the attention its importance demands. The mine is situated about half way between Santa Rosa and St. Helena. Deposits of this metal are also found near our town, and the day is not far distant when oborne iron mining will be as extensively carried on as is now the labor of getting out silver and quicksilver. We would invite the attention of capitalists who wish to embark in some profitable investment, to this subject. Millions of dollars of wealth lie hidden in the hills adjacent to our town, which only await the money of the capitalist and the strong arm of the laborer to bring to the surface.—*Calistoga Free Press*.

Two car loads of new machinery arrived in Virginia City on Saturday morning, for the American Flat mining company. This machinery is of the most powerful description and of the approved pattern. There will be little delay in setting it up, as the foundations for its reception were being built while it was being constructed in the workshop at San Francisco.

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Gold.

The second of the course of popular lectures given by the Professors of the University of California, in connection with the Mechanics' Institute, was delivered by Dr. Becker, on Saturday night last. The subject of the first lecture, a synopsis of which is given on another page, was "Silver." The subject of this lecture, also delivered by Dr. Becker, is "Gold." We append a synopsis of his remarks as follows:

I took occasion in my lecture last week to explain that all matter is built up of a limited number of uncombined simple substances or elements, and that a chemical compound is the result of the union of two or more of these elements, in such a manner that the resulting substance, or compound, exhibits properties essentially different from those which characterize any of its constituents. The tendency which the different elements show to unite with one another in chemical combination is very different. Some of them, iron, for example, unite with many others with great readiness, and consequently we are acquainted with a great many compounds of iron. Thus this element combines in no less than three different proportions with oxygen alone. One of these compounds gives the green color to bottle-glass; we are familiar with the second as iron-rust, and the third as the chief ingredient of the black scales which fly off heated iron when it is being forged. Other elements again show very little tendency to enter into combination, and form but few compounds, while even these few are very unstable, i. e., are very readily decomposed into their constituent parts. Pre-eminent among the chemically indifferent elements with which ordinary life brings us in contact is gold. Scarcely any substances attack it, and the few compounds into which it enters are destroyed, the metal being liberated, by the simple action of heat. As a consequence of its feeble chemical affinities, gold is generally found in nature in a native or metallic state. A single compound rarely occurs, and this is the telluride; tellurium being a very rare element somewhat resembling sulphur. Silver always accompanies the gold, and frequently there are traces of other metals associated with it, especially platinum. Native gold is sometimes separated from the minerals with which it is mixed in the deposits by simple washing, or by crushing and washing. With these operations metallurgy has nothing to do, since they are purely mechanical.

The Treatment of Auriferous Ores.

As we saw was the case with silver, gold never occurs in sufficient quantities, relatively to the accompanying "dead" rock, to be efficiently separated by treatment of the kind to which ores of the base metals are submitted—liquefaction by heat and separation by gravity—and we are therefore forced to complement the necessary volume by the addition of some other metal. When gold occurs with lead ores, the treatment is precisely the same as that I described in speaking of silver, and the product of the cupellation process is simply auriferous silver instead of fine silver. Before I describe the methods of separating the two, however, I will explain the process in which quicksilver serves to supply the requisite amount of metal—the amalgamation process. In amalgamation, as in all metallurgical processes, we must get our metals into a metallic form before accumulating them in a fluid state, in fact, reduce them. Gold, indeed, is usually already metallic in the ore, but it is frequently coated with firmly adhering substances, and thus does not present a metallic surface, so that, regarded from a strictly external point of view, a grain of the coated metal may be said not to be metallic. Silver, on the other hand, is comparatively rarely metallic, being most commonly united with sulphur, often with antimony, and sometimes with chlorine. These compounds, therefore, require to be decomposed before metallic silver can be presented to the quicksilver. As you have probably inferred from the company in which it is found, silver, too, is to be classed among the metals whose chemical affinities are weak, though much stronger than those of gold; and, in fact, silver will readily part with either sulphur or chlorine, if any substance possessing a greater affinity for them, be intimately enough mixed with the argentiferous compounds. Lead, mercury, copper, iron, and others, could be made to effect this decomposition, becoming chlorides or sulphides in the operation, and isolating metallic silver; but in order that a sufficiently intimate mixture may take place, it is indispensable that either the silver compound or the metal should be in a fluid state. Now the sulphide of silver is insoluble, and therefore only quicksilver is in a position to decompose it at ordinary temperatures. Above its melting point, lead, as we have seen, decomposes it very effectually. The chloride of silver, on the other hand, is soluble in a solution of common salt, or, more exactly, the chloride of silver and common salt form a compound soluble in water; and that compound can, therefore, readily be mixed with and decomposed by, for instance, mercury, copper, or iron. The compounds of silver and antimony, however, are not decomposed by the metals at ordinary temperatures, but we are able to turn them into chlorides. We thus have a choice of several ways in treating silver ore for the separation of metallic silver, preparatory to amalgamation. The chloride may be decom-

posed by iron, copper, or mercury; the sulphide by mercury only, and the antimonides only by a process of chloridizing, followed by treatment as a chloride. Sufficient quantities of the antimonides very often occur in silver ores to render chloridizing imperative, and the operation is thus one of such importance that I must endeavor to explain it, although it depends on a somewhat complicated series of facts. Two methods are applicable:

Dry Chloridation and Wet Chloridation.

If ores containing sulphur and antimony in combination with silver are well mixed with salt and green vitriol (a compound of iron and sulphuric acid) and heated together, the first action which takes place is the decomposition of the green vitriol into oxide of iron and sulphuric anhydride, a compound of oxygen and sulphur. This body attacks the salt, which is a compound of chlorine and sodium. In attacking the salt, the sulphuric anhydride is decomposed, part of it taking oxygen from the remainder and instantly uniting with the sodium of the salt to a solid compound, the sulphate of sodium or glauber salts, while the remainder of the anhydride forms sulphurous acid, the ill-smelling gas which is produced by the ordinary combustion of sulphur. The sodium being extracted from the compound of chlorine and sodium we call salt, the chlorine is set free. This free chlorine now attacks the sulphur and antimonides of silver, and forms a separate compound with each of the three substances—sulphur, antimony and silver—so that we get our silver as chloride, which was the object of the whole process, while the compound of chlorine with sulphur and antimony, being volatile, pass out of the furnace up the chimney.

We have now got our silver into the form in which it is soluble in brine and in which it can therefore be brought into such intimate contact with other quicksilver, copper or iron, as to be separated by them in the metallic state ready to alloy or amalgamate itself with the needful bulk of fluid quicksilver, and thus separate from the lighter and worthless gangue or "dead rock."

The apparatus used to effect the chloridation in this dry way is generally a reverberatory furnace, i. e., a furnace heated by the flame from an outlying fireplace. The chief peculiarity of reverberatory furnaces used for chloridizing is the comparatively small size of the grate. The material is spread out over the hearth in thin layer and very gradually heated, for fear of melting any portion of the ore. If fusion were to take place, the melted matter would form a varnish on the particles of ore and effectually protect them from the action of the oxidizing and chloridizing gases. During the roasting the material is thoroughly raked over at short intervals, to insure the exposure of every particle of the ore to the prevailing influences of the furnace. A vast number of modifications of the simple roasting furnace exist, constructed mostly with a view to diminishing the amount of labor necessary.

Chloridizing in the wet way, although in outward appearance utterly dissimilar to the dry process, is governed by nearly the same laws. If we mix the ores with salt and the sulphate of copper (blue vitriol or bluestone) instead of sulphate of iron, and add water, the sulphuric acid of the bluestone unites with the sodium of the salt to glauber salt, just as in the dry process. The copper of the bluestone at the same time unites with the chlorine of salt. This interchange of elements occurs because sulphuric acid has a much stronger affinity for sodium than chlorine has, or than it has for copper, and the copper and chlorine being thus set free, necessarily combine. The copper chloride now attacks the silver ores, giving up its chlorine to them and taking the sulphur or antimony. This seems strange at first sight, since as we know, copper will rob chloride of silver of its chlorine. The reason why it can be made to chloridize the silver in this case, is that it gets sulphur or antimony in exchange, for which substance it has a much stronger affinity than for chlorine.

Amalgamation.

Two species of apparatus are in common use for amalgamating—the European barrel and the Washoe pan. The European apparatus is a large, wooden barrel, or pair of barrels, provided with suitable openings for charging and discharging the material, and hung on horizontal axes, by means of which they can be slowly rotated. The barrels are generally provided with a movable, wooden lining, which can be replaced when needful. The ore intended for treatment in this machine is always chloridized in the dry way, and finely pulverized. It is charged into the barrels with pieces of wrought iron or copper and a certain amount of water and salt is added. The barrels are then closed and allowed to rotate until the mass is thoroughly smooth, and of about the consistency of honey, so that when a stick is thrust into it and afterward turned end for end, the mud will run down slowly without any tendency to separate into more solid and more liquid portions.

What the chemical action is during this period, we already know. The dissolved silver chloride, coming into the most intimate contact with the copper or iron is decomposed; metallic silver is formed, and the chlorine unites with the baser metal. Which metal is chosen depends on the nature of the ore, for not only will either iron, copper or quicksilver decompose chloride of silver, but iron or copper will decompose chloride of quicksilver, and iron will decompose chloride of copper. If, therefore, as is not infrequently the case, the

silver ores contain copper, and this comes into the barrel as soluble chloride, iron will separate it out, in a metallic state with the silver which is very undesirable, as it, too, must then be accumulated by quicksilver, rendering a much greater consumption of that metal unavoidable. When the ores are auriferous, therefore, copper is best employed to separate metallic silver in the barrel, for of course copper cannot decompose its own chlorides. From the watery solution which remains after the amalgamation is completed, the copper employed and the copper in the ore can be recovered by simply throwing iron into it. The copper used to precipitate the silver is also frequently argentiferous, and when this is the case, of course the silver it contains is separated out in the barrel.

We now have, then, a pasty mixture in the barrel, in which the silver exists in fine metallic particles. To this paste quicksilver is added, and the barrel is again set in rotation in order that the fluid metal may be brought in contact with each particle of the solid silver and dissolve it. In this way, we get a large amount of liquid and very heavy metal, which can sink in the practically fluid mud if allowed to do so, and accumulate in a separate mass at the bottom, precisely as in the last lecture we found that the argentiferous lead separates in the furnace from the fluid slag.

You probably observed just now that I was particular in describing the exact consistency to which the mass of pulverized ore is brought in the barrel before adding mercury. This is a very important point, and its neglect would dangerously impair the efficacy of the process, by preventing a thorough mixture between the quicksilver and the material. Quicksilver is 13.6 times as heavy as water and five times as heavy as quartz, which is the most important of all the minerals occurring in the dead rock. It is therefore quite plain that if our mud, consisting in the main of quartz and water, were thin, the quicksilver would simply remain at the lowest portion of the barrel, the mud floating upon it, unless the rotation of the barrel were exceedingly rapid; while, if the mixture were too thick, the particles could not move with sufficient freedom to insure a contact of each of them with the quicksilver.

When the silver has thoroughly united with the mercury, the mass in the barrels is thinned down with water, and the apparatus again set in motion for a short time, to facilitate the union of distributed globules of amalgam with the mass of metal. The contents of the barrel is then tapped from the bottom, and the amalgam is allowed to run into vessels prepared for it. As soon as mind makes its appearance, which is, of course, not until almost all the heavy amalgam has run out, the stream is diverted into settling apparatus, where nearly all the amalgam not tapped out in a mass is recovered. We have thus got out of the ore about ninety per cent. of the silver it contained, though the exact proportion varies with the character of the ores, etc.

The gold was amalgamated at the same time with the silver; but, while the gold has generally been in a metallic state for ages, and has therefore had every opportunity to coat itself with non-metallic substances, such, for example, as sulphur or iron rust, the silver was separated out as a metal just before the amalgamation proper, and was therefore as clean as possible. Hence, we do not get anything like the same proportion of the gold as of the silver into the amalgam, commonly only about half, and hence this method of working is applicable principally to ores the smaller proportion of the value of which is in gold.

Dr. Becker here described the process, as accomplished in the Washoe pan. He continued:

Gold and Silver in a Native State.

Where the gold and silver are nearly or wholly in a native state, as is frequently the case in quartz lodes, amalgamation rests on very simple principles. In the first place, gold is much heavier than quicksilver; consequently, if heavy gold and light rock are passed over a pool of quicksilver, the gold will sink through the mercury to the bottom, while the rock will float on the top, and may be carried off by a stream of water. If, as is always the case, the native gold contains native silver, the action of this law will depend upon the proportion of the two metals, for silver is lighter than quicksilver. A mixture of seven parts silver to four of gold would have just about the specific gravity of mercury; but this would be an unusually large proportion of silver. The separation by gravity is also affected by the physical condition of the gold. Not unfrequently gold has been deposited with minerals which are decomposed by the action of air and water, thus leaving the gold, though nearly pure, porous. In this case it may float on the quicksilver, in consequence of the air it contains, as a dry sponge does upon water. The mercury also acts by strict amalgamation. It will absolutely dissolve only a very small amount of gold; but, spread on a surface of that metal, it will reduce it superficially to a pasty, sticky condition; and, properly taken advantage of, this fact is of great use.

When Gold Occurs in Gravel

It is washed down sluice boxes, in which, at short intervals, there are small transverse troughs, or their equivalent, called "riffles," filled with quicksilver. In the riffles the mercury seems to act principally as a liquid of medium specific gravity between the gold and the gangue—the gold sinks to the bottom of the riffle and the rock passes on. In crushing batteries, on the other hand, the cementing property of the fluid metal seems to be the more

important. When quartz is stamped in a crushing mill the particles of gold are separated from the rock mostly in a state of very fine division. Now, of course, the smaller any object is, the greater the amount of surface in comparison to its volume; and the greater the surface the greater the resistance offered to its passage through any medium. Hence, very fine gold, though very heavy, will sink very slowly in water; or, what amounts to the same thing, it will be very easily carried away by a stream of water. If, however, we introduce quicksilver into the mortar where the gold-bearing quartz is being stamped, at least a portion of this fine gold will acquire a sticky surface, and when sticky particles come together they will unite to a large lump. These aggregated morsels of gold will readily sink, and will be saved. Thus we can, to a certain extent, remedy the blunder of Nature in not depositing all the gold in nuggets.

Amalgam.

All the processes of amalgamation have given us amalgam. There are really two sorts of amalgam—one solid and one liquid. The liquid amalgam is silver and gold dissolved in mercury, and there is undoubtedly a chemical union, though a weak one, between the substances. The solid amalgam some excellent authorities hold to be no chemical compound, but only particles of gold or silver, stuck together with fluid amalgam. The two can be separated by straining through buckskin or close cloth, and in practice the fluid amalgam is disregarded; at least, no attempt is made to extract the metal from it, both because the amount is small, and because it is found that the fluid amalgam collects clear gold more effectually. This is probably because it wets the gold more easily, pure mercury having more attraction for itself than for most other substances.

The precious metals are extracted from the thick amalgam by the very simple process of retorting. Cakes of the amalgam are placed in a horizontal cast-iron cylinder, closed at both ends, but provided at one end with a long, small iron tube, which has an elbow in it, so that the end can be placed over a receiver, and is cooled by wet cloths or running water. The retort stands over a fire-place, and when it is heated the quicksilver volatilizes, passes through the tube, in which it condenses, and leaves the bullion behind. The quicksilver collects in the receiver, and, of course, is used over again.

The lecturer then described the various processes by which gold and silver are separated, and in particular the method adopted on a large scale by sulphuric acid, and the wet process, by which gold is extracted without silver from ores.

A FIGHTFUL CHORUS.—Nothing strikes so unpleasantly upon the ear of an affectionate parent as the wheezing, snuffling, snoring, and hoarse voices of a family of children laboring under bad colds. A chorus of this dismal kind is kept up in some households the winter through, simply because the father and mother are either ignorant of the means of cure or are guilty of gross neglect. *Hale's Honey of Horehound and Tar* will establish quiet in three days. No cough or cold can resist its soothing influence.

Fike's Tooth-Ache Drops—Cure in one minute.

TO LUMBERMEN—\$100 in Gold.—Messrs. Emerson, Ford & Co., of Beaver Falls, Pa., whose advertisement may be found in another column, won the above prize; also the first prize silver medal for the best circular saw, and the first prize silver medal for the best cross-cut saw, and the two first prize medals for the best saw sawage and cross-cut saw attachment.

A GOOD PAPER.—The MINING AND SCIENTIFIC PRESS has entered its 30th volume. It grows better as the years roll, and is, without exception, the best paper published for California miners and artisans. If such papers were more generally circulated to the exclusion of the sensation trash of the cities, the State would be the gainer in wealth, morals and general intelligence. —*Tuolumne Independent.*

ERNEST L. RANSOME,
Artificial Stone Manufacturer,
No. 10 Bush Street, San Francisco,
Office Hours 1 to 2 Daily.

GRINDSTONES at 3, 2½ and 1 cent per pound according to quality. In ordering state for what purpose the stone is needed.

"I have used one of your grindstones for some time, and it is the best I ever had." F. J. CURREY, November 20, 1874. Prop. S. F. Boiler Works.

EMERY STONES,
VASES AND FOUNTAINS,
GRAVESTONES AND CEMETERY WORK,
STONE DRESSINGS GENERALLY,
NATURAL STONE hardened and pressed,
SILICATE OF SODA for Soap Makers and Nurserymen, &c.
Send for Price-List. eow:hp

Bronze Turkeys
Gohblers, 30 to 40 pounds. Hens 15 to 20 pounds.
BRAHMAS, GAMES
BOUDANS,
EGGS, fresh, pure, packed so as to hatch after arrival on any part of the Coast. For illustrated circular and Price-List, address
M. EYRE, Napa, Cal.
[Please state where you saw this advertisement.]

NONPAREIL OIL.
140 Degrees Fire Test, for Family Use
OWNERS OF MILLS AND MANUFACTORIES, your attention is particularly called to this beautiful and safe LAMP-BURNING OIL. Its use is urgently recommended by the New York Fire Commissioners and Insurance Companies. For sale to the trade in lots to suit.
A. HAYWARD, 224 California St., 19728-3m

N. W. SPAULDING,
Saw Smithing and Repairing
ESTABLISHMENT.
Nos. 17 and 19 Fremont Street, near Market.



MANUFACTURER OF
SPAULDING'S
Patent Tooth Circular Saws.
They have proved to be the most durable and economical Saws in the World.
Each Saw is Warranted in every respect.
Particular attention paid to construction of
Portable & Stationary Saw Mills.
MILLS FURNISHED AT SHORT NOTICE
At the lowest Market Prices
874. A GRAND SILVER MEDAL. 1874



**HASKIN'S
ENGINE**
SEMI-PORTABLE.
The highest and only prize of its class given to any Vertical Engine was awarded to the
HASKINS ENGINES AND BOILERS,
BY THE
MASS. CHARITABLE MECHANICS' ASSOCIATION,
at their Fair in Boston, in competition with the
Baxter, New York Safety Steam Power
and the Sharpley Engines.

PARKE & LACY, Sole Agents,
310 California Street,
SAN FRANCISCO.

Diamond Drill Co.
The undersigned, owners of LESCHOT'S PATENT for DIAMOND-POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.
A. J. SEVERANCE & CO.
Office, No. 815 California street, Rooms 16 and 17.
24-26-bf

Banking and Financial.
Gold, Legal Tenders, Exchange, Etc.
Corrected Weekly by CHARLES SUTRO & Co.
SAN FRANCISCO, THURSDAY, JAN. 27, 1875.
LEGAL TENDERS IN S. F., 11 A. M., 89 1/2 to 89 3/4.
U. S. BARS, 89 1/2. SILVER BARS, 89 1/2.
EXCHANGE ON N. Y., 1/2 per cent. premium for gold; Mexican Dollars, 1 1/2 and 2 per cent. discount.
Currency, 1 1/2 per cent. On London—Bankers, 4 1/4; Commercial, 4 1/2. Paris, 5 francs per dollar.
London—Consols, 92 1/2 to 92 3/4; Bonds, 90 1/2; Liverpool Wheat, 3d. to 9 1/2 d. 8d. to 10s; Clnk 8s. 3d. to 10s. 3d.
QUICKSILVER IN S. F., by the flask, per lb, \$1.55

DIVIDEND NOTICE.
California Savings and Loan Society,
512 California Street, San Francisco, have declared a dividend of nine and six-tenths (9 5/10) per cent. per annum on Term Deposits and eight (8) per cent. per annum on Ordinary Deposits, for the half year ending 31st December, 1874, free from Federal Tax, and payable on and after Wednesday, 6th January, 1875. By order,
3-v29-1m
D. B. CHISHOLM, Secretary.

DIVIDEND NOTICE.
San Francisco Savings Union, 532
California Street, Cor. Webb, for the half year ending with December 31st, 1874, a dividend has been declared at the rate of nine (9) per cent. per annum on Term

**Deposits, and seven and one-half (7 1/2) per cent. on Ordinary Deposits, free of Federal Tax, payable on and after January 13th, 1875. By order,
3-v29-1m
LOVELL WHITE, Cashier.**

DIVIDEND NOTICE.
Bank of the Western Savings and Trust Co., San Francisco, Jan. 4th, 1875. Depositors' Dividend.—The Directors of this Corporation have this day declared the semi-annual dividend, at the rate of ten (10) per cent. per annum on Term Deposits and eight (8) per cent. on Ordinary Deposits, payable on and after January 10th, 1875, at the office of the Bank northeast corner of Post and Kearny streets.
F. CLAY,
Vice-President and Cashier.
H. J. BOUTH, President.
3-v29-1m

DIVIDEND NOTICE.
The Farmers' and Mechanics' Bank of SAVINGS have declared a dividend for the half year ending December 31, 1874, at the rate of ten per cent. per annum on term, eight per cent. per annum on class one ordinary, and six per cent. per annum on class two ordinary deposits, payable on and after January 15th, 1875. By order
G. M. CONDER, Cashier.
3-v29-1m-bp

DIVIDEND NOTICE.
Savings and Loan Society, 619 Clay Street. The Board of Directors have declared a dividend for the six months ending December 31, 1874, of Nine per cent. per annum on all deposits free of Federal tax, and payable on and after January 15, 1875. By order
CYRUS W. CARMANY, Cashier.

DIVIDEND NOTICE.
Masonic Savings and Loan Bank, No. 6 Post street, Masonic Temple, San Francisco. At a meeting of the Board of Directors of this Bank, held January 18th, 1875, a dividend was declared at the rate of nine and one-half (9 1/2) per cent. per annum on Term Deposits, and seven and one-half (7 1/2) per cent. per annum on Ordinary Deposits, for the semi-annual term ending January 21st, 1875, payable on and after January 28th, 1875, free of all taxes.
H. T. GHAVES, Secretary.

The Pacific Mutual Life Insurance Company of California.
No. 41 Second street, - - - Sacramento
ACCUMULATED FUND, NEARLY
\$1,250,000.00.
\$100,000 Approved Securities, deposited with the California State Department as security for Policy holders everywhere.
LELAND STANFORD, President
J. H. CARROLL, Vice-President
JOS. CROAKBON, Secretary
All Policies issued by this Company, and the proceeds thereof, are exempt from execution by the laws of California. THE ONLY STATE IN THE UNION that provides for this exemption.
Policies issued by this Company are non-forfeitable, and all profits are divided among the insured. Policies may be made payable in Gold or Currency, as the applicant may elect, to pay his premium.
Executive Committee:
LELAND STANFORD, J. H. CARROLL, SAMUEL LAYSONSON,
ROBT. HAMILTON, JAS. CAROLAN.
SCHREIBER & HOWELL,
11-29-cow-hp-3m General Agents, Sacramento.

Anglo-Californian Bank.
LIMITED.
Succesors to J. Seligman & Co.
London Office,.....No. 3 Angel Court
San Francisco Office,.....No. 412 California street.
Authorized Capital Stock, \$6,000,000.
Subscribed, \$3,000,000. Paid in, \$1,500,000.
Remainder subject to call.
DIRECTORS IN LONDON.—Hon. Hugh McCulloch, Ruben D. Sassoon, William F. Schofield, Isaac Seligman, Julius Sington.
MANAGERS:
F. F. LOW and IGNATZ STEINHART,
SAN FRANCISCO.
The Bank is now prepared to open accounts, receive deposits, make collections, buy and sell Exchange, and issue Letters of Credit available throughout the world, and to loan money on proper securities.
2-v27-cow-bp

The Merchants' Exchange Bank OF SAN FRANCISCO.
Capital, One Million Dollars.
C. W. KELLOGG, President.
H. F. HASTINGS, Manager.
G. N. VAN BRUNT, Cashier.
BANKING HOUSE,
No. 423 California street, San Francisco.
KOUNTZE BROTHERS, BANKERS,
12 WALL STREET, NEW YORK,
Allow interest at the rate of Four per cent. upon daily balances of Gold and Currency.
Receive consignments of Gold, Silver and Lead Bullion, and make Cash advances thereon.
Invite Correspondence from Bankers, Mining Companies, Merchants and Smelting Works.
French Savings and Loan Society,
411 Bush street, above Kearny..... SAN FRANCISCO
4-v27-tf
G. MAHE, Director.

Mining and Other Companies.
Calaveras Hydraulic Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Central Hill, Calaveras County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of January, 1875, an assessment of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 321 Battery street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 8th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
Office, 321 Battery street, San Francisco, California, (office of U. S. Internal Revenue Collector.)
ABRAM SHEAR, Secretary.
POSTPONEMENT.—By order of the Board of Directors of the Calaveras Hydraulic Mining Company, the above advertised sale is postponed to Tuesday, February 23, 1875, at 12 o'clock m., and will take place at the office of the Secretary, No. 321 Battery street.
130-4t
By order, ABRAM SHEAR, Secretary.

California Beet Sugar Company.—Location of principal place of business, San Francisco, California. Location of works, Soquel, Santa Cruz County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of January, 1875, an assessment of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 314 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 8th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
Office, No. 314 California street, San Francisco, Cal.
LOUIS FRANCONI, Secretary.

California Consolidated Mill and Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Nashville, El Dorado county, California.
Notice is hereby given, that at a meeting of the Directors, held on the 14th day of January, 1875, an assessment of \$1.00 dollar per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 408 California street, room 15, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 8th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
Office, room 15, 408 California street, San Francisco, California.
J. W. TRIPP, Secretary.

Confidence Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Tuolumne County, State of California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the sixteenth day of January, 1875, an assessment of thirty (30) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 210 Battery street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on Tuesday, the twenty-third day of February, A. D. 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the seventeenth day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
Office, 210 Battery street, San Francisco, Cal.
S. ANDERSON, Secretary.

Electric Mining Company.—Location of Principal place of business, San Francisco, Cal.
Notice.—There are delinquent upon the following described stock, on account of assessment, levied on the twenty-eighth day of November, 1874, the several amounts set opposite the names of the respective shareholders, as follows:
Names. No. Certificate. No. Shares. Amount.
Geo. Hasen.....301 300 15 00
C. J. Rader.....302 150 7 50
O. J. Rader.....324 1000 50 00
O. J. Rader.....330 300 15 00
C. J. Rader.....331 100 5 00
C. J. Rader.....332 1200 60 00
T. B. Wingard Trustee.....334 50 2 50
T. B. Wingard Trustee.....335 100 5 00
T. B. Wingard Trustee.....347 2825 141 25
J. B. Houghton.....90 50 2 50
J. B. Houghton.....91 25 1 25
J. B. Houghton.....392 41 2 05
J. B. Houghton.....202 5 2 1/2
J. B. Houghton.....344 475 23 75
Wm. R. McCarty.....150 150 7 50
John Mullen.....153 750 37 50
G. W. Malone.....56 50 2 50
G. W. Malone.....57 50 2 50
G. W. Malone.....58 50 2 50
G. W. Malone.....59 50 2 50
G. W. Malone.....60 50 2 50
G. W. Malone.....177 1000 50 00
G. W. Malone.....206 187 9 35
G. W. Terrill.....51 500 25 00
M. Ellsworth.....178 50 2 50
G. W. Mullin Trustee.....04 100 5 00
G. W. Mullin Trustee.....64 150 7 50
Mrs. Annie Woods.....76 500 25 00
Mrs. Annie Woods.....136 500 25 00
Mrs. Annie Woods.....380 550 27 50
Mrs. Annie Woods.....303 147 7 35
Mrs. Annie Woods.....318 300 15 00
Mrs. Annie Woods.....346 500 30 00
Herbert Eastwood.....102 50 2 50
Herbert Eastwood.....224 7 35
E. Wolle, Trustee.....105 25 1 25
E. Wolle, Trustee.....113 100 5 00
E. Wolle, Trustee.....114 100 5 00
E. Wolle, Trustee.....115 100 5 00
E. Wolle, Trustee.....116 100 5 00
E. Wolle, Trustee.....117 100 5 00
E. Wolle, Trustee.....118 100 5 00
E. Wolle, Trustee.....119 100 5 00
E. Wolle, Trustee.....121 50 2 50
E. Wolle, Trustee.....122 100 5 00
E. Wolle, Trustee.....123 100 5 00
E. Wolle, Trustee.....124 50 2 50
E. Wolle, Trustee.....294 138 6 90
G. W. Clara Trustee.....241 15 7 50
Joseph White.....154 250 12 50
Joseph White.....155 250 12 50
Joseph White.....255 75 3 75
Louis Thompson.....239 60 3 00
Henrietta Grant.....240 60 3 00
Wm. H. Sharp.....153 100 5 00
Wm. H. Sharp.....241 15 7 50
M. G. Rader.....317 1700 85 00
J. B. Weston.....183 75 3 75
J. B. Weston.....308 25 1 25

Names. No. Certificate. No. Shares. Amount.
J. W. Weeson.....237 175 8 75
J. W. Weeson.....313 125 6 25
And in accordance with the order of the Board of Directors, made on the 25th day of November, 1874, so many shares of each parcel of said Stock as may be necessary, will be sold at public auction at the salesroom of Maurice Dore & Co., No. 324 Pine street, San Francisco, on the 25th day of January, 1875, at the hour of 12 o'clock, M. of said day, to pay said delinquent assessment, together with costs of advertising and expenses of the sale.
T. R. WINGARD, Secretary.
Office.—Room 13, No. 318 Montgomery street, S. F.

POSTPONEMENT.—The above sale is hereby postponed until Monday, Feb. 23rd, 1875, at the same hour and place. By order of the Board of Directors,
3-10-11
T. R. WINGARD, Secretary.

Geneva Consolidated Silver Mining Company.—Principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, Nevada.
Notice is hereby given that at a meeting of the Board of Directors, held on the 14th day of January, 1875, an assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 14, 302 Montgomery street, San Francisco. Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the 8th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
I. T. MILLIKIN, Secretary.
Office.—Room 14, No. 302 Montgomery street, S. F.

Gold Mountain Mining Company.—Location of works, Lower Rancheria, Amador County, Cal.
Notice is hereby given, that at a meeting of the Board of Trustees of said Company held on the 14th day of January, 1875, an assessment of twenty-five cents per share was levied upon the capital stock of said Company, payable immediately in United States gold coin, to the Secretary, at 16 Leidesdorff street. Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, shall be deemed delinquent, and will be duly advertised for sale at public auction, and unless payment shall be made before, will be sold on Saturday, the 21st day of February, 1875, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Trustees.
W. AUGS. KNAPP, Secretary.
Office.—116 Leidesdorff street, San Francisco.

Germania Mining Company.—The Annual Meeting of the stockholders of the Germania Mining Company, for the purpose of electing a Board of Directors, and such other business as shall properly come before the meeting, will be held at the office of the company, room 16, 408 California street, San Francisco, California, on the 1st day of February, 1875, at the hour of 1 o'clock P. M.
J. W. TRIPP, Secretary.

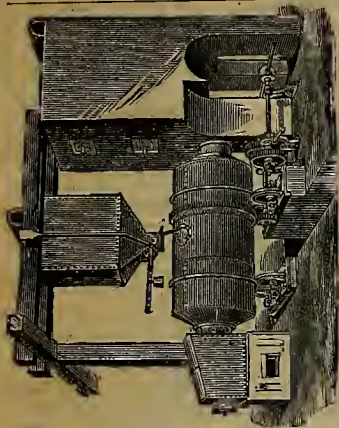
"Golden Rule" Silver Mining Company.—Location of principal place of business, San Francisco, Cal.
Notice.—There are delinquent upon the following described stock, on account of assessment, levied on the 8th day of December, 1874, the several amounts set opposite the names of the respective shareholders, as follows:
Names. No. Certificate. No. Shares. Amount.
J. Wertheimer, Trustee.....1 25 \$1 25
J. Wertheimer, Trustee.....2 25 1 25
J. Wertheimer, Trustee.....3 25 1 25
J. Wertheimer, Trustee.....4 25 1 25
John P. Sanders, Trustee.....8 50 2 50
A. Meyer, Trustee.....16 50 2 50
F. A. Borel, Trustee.....17 25 1 25
John P. Sanders, Trustee.....22 100 5 00
John P. Sanders, Trustee.....23 100 5 00
Jacob Sunstatt, Trustee.....31 20 1 00
Jacob Sunstatt, Trustee.....40 20 1 00
Wm. Small, Trustee.....42 100 5 00
A. Meyer, Trustee.....58 100 5 00
A. Meyer, Trustee.....59 100 5 00
A. Meyer, Trustee.....60 100 5 00
A. Meyer, Trustee.....61 100 5 00
A. Meyer, Trustee.....62 100 5 00
A. Meyer, Trustee.....63 100 5 00
A. Meyer, Trustee.....64 100 5 00
A. Meyer, Trustee.....65 100 5 00
A. Meyer, Trustee.....66 100 5 00
A. Meyer, Trustee.....67 100 5 00
A. Meyer, Trustee.....unissued 11625 581 25
F. Uri, Trustee.....unissued 3375 168 75
And in accordance with the order of the Board of Directors, made on the 15th day of December, 1874, so many shares of each parcel of said stock as may be necessary, will be sold at public auction in front of the office of said Company, 530 Clay street, San Francisco, on the 15th day of February, 1875, at the hour of 2 o'clock, P. M., of said day, to pay delinquent assessments and expenses, together with costs of advertising and expenses of sale.
R. WERTHEIMER, Secretary.
Office, 530 Clay street, San Francisco, Cal.

Kearsarge Consolidated Quicksilver Mining Company.—Notice is hereby given that at a meeting of the Board of Directors, held on the 28th day of December, 1874, an assessment, No. 1, of 30 cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold and silver coin to the Secretary, No. 408 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the eighth day of February, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 22nd day of February, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
JAMES McHAFFEE, Secretary.
Office Rooms, 10 & 11—No. 408 California street, San Francisco, Cal.

Manhattan Marble Company of California.
Location of principal place of business, San Francisco California. Location of works, Leland, Alameda County, State of California.
Notice is hereby given, that at a meeting of the Directors, held on the 8th day of January, 1875, an assessment, No. 5, of two dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary of the company, at his office, Nos. 13 and 15 Fremont street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 2d day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
L. L. ALEXANDER, Sec'y.
Office.—Nos 13 and 15 Fremont street, San Francisco, California.

Orleans Mining Company.—Location of principal place of business, San Francisco, Cal. Location of works, Grass Valley Township, Nevada County, Cal.
Notice is hereby given, that at a meeting of the Trustees held on the 4th day of January, 1875, an assessment (No. 2) of one dollar (\$1) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 8, 315 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 9th day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 2d day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
F. NESBIT, Secretary.
Office.—Room 8, No. 315 California street, S. F.

Mining Machinery.



TEATS' PATENT FURNACE.

TEATS' PATENT FURNACE

For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces; controls them with ease; adding heat or air; stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, heating the water for amalgamation and the boilers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln," for drying ores direct from the mine or breaker, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874. For particulars address

D. B. MILLER & CO.,

No. 12 West Eighth Street, Cincinnati, Ohio

Circulars, &c., will be furnished, if required.
18v29-3m

STEEL SHOES AND DIES

FOR QUARTZ MILLS.

Made by our improved process. After many years of patient research and experiment we have succeeded in producing STEEL SHOES AND DIES for QUARTZ MILLS, which are unequalled for

Strength,
Durability,
and
Economy

Die.

Shoe.

Will wear three times longer than any iron shoes

BUILDERS AND CONTRACTORS

Of Quartz Mills, Pans, Separators, Concentrators, Jigs, Hydraulic Rock Breakers, Furnaces, Engines, Boilers and Shafting, and general Mining Machinery in all its details and furnishers of Mining Supplies.

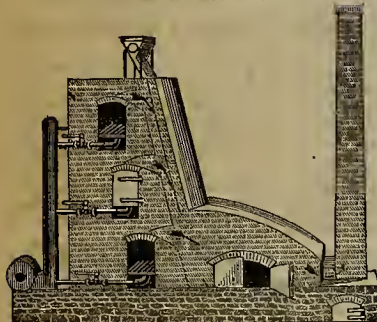
All orders promptly filled.

MOREY & SPERRY,

68 Liberty street, N. Y. 9v28-1y

EAGLE IMPROVED CHLORINIZING AND DESULPHURIZING FURNACE.

(Patented July, 1873.)



The Cheapest and Most effective Furnace now in use. Parties desirous of building above furnace, or for any information on same, address,

I. T. MILLIKEN,

No. 302 Montgomery St., room No. 14, S. F.

CROCKER'S PATENT

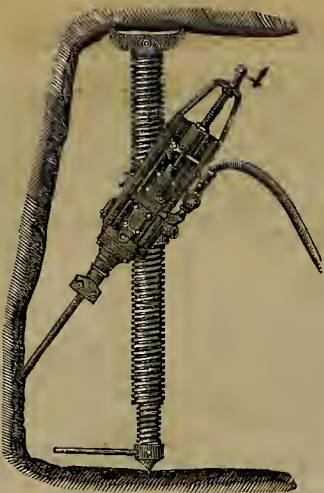
TRIP HAMMER QUARTZ BATTERY.



This machine, complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 2,000 blows per minute, in a mortar provided with screens on both sides, and crushes FINE 600 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$900.

G. D. CROCKER,

17v28-1f 815 California street, San Francisco.



PARKE & LACY,

SOLE AGENTS FOR THE

Burleigh Rock Drill Company.

—MANUFACTURERS OF—

PNEUMATIC DRILLING MACHINES,
AIR COMPRESSORS AND OTHER MACHINERY.

Also, Farmers' Dynamic Electric Machine and
Hill's Exploders for Blasting, Putnam Ma-
chine Company's Tools, Wright's Steam
Pumps and Haskin's Engine.

Address

PARKE & LACY,

21v28-3m-hd

310 California St., S. F.

DATA OF CAMERON'S PATENT STEAM PUMPS, REGULAR SIZES.		DAVID STODART, Agent, 114 BEALE ST., SAN FRANCISCO.	
NUMBERS.			
Diameter of Steam Cylinder, in inches.	0	1	2
Diameter of Pump Cylinder, in inches.	4	5	6
Stroke of Piston, in inches.	6	8	10
Capacity per double Stroke, in gallons.	1-6	2-0	2-6
Capacity at ordinary Speed, per minute.	30	40	50
Return in hours per day, they will supply.	25	40	50
Size of Steam Pipe, in inches.	1 1/2	2	2 1/2
Size of Exhaust Pipe, in inches.	1 1/2	2	2 1/2
Size of Discharge Pipe, in inches.	1 1/2	2	2 1/2
Weight of Pump, in pounds.	186	235	300
Length over all, in feet and inches.	1-4	1-6	1-8
Height over all, in feet and inches.	1-4	1-6	1-8
Width over all, in feet and inches.	1-4	1-6	1-8
PRICE.	\$ 9	\$ 10	\$ 11

The above data apply to the regular sizes only. All these pumps have Brass Valve Seats and Brass Water Pistons. Pumps when lined with brass cost extra. We have many supplementary sizes.

LONG STROKE PUMPS. No. 4, 24-in. Stroke, \$ No. 6, 30-in. Stroke, \$ No. 7, 30-in. Stroke, \$ No. 8, 36-in. Stroke, \$

Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

(PATENTED MAY 20TH, 1874.)

Price Reduced to 16 Cents Per Pound.

SAN FRANCISCO, November 10th, 1874.

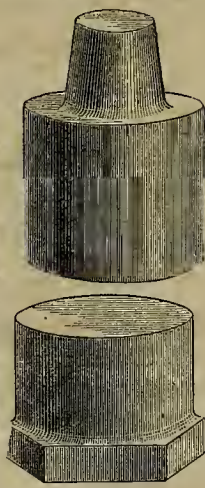
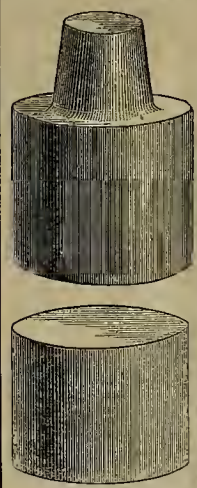
To Supts. of Quartz Mills and Mining Men generally:

We take pleasure in stating that owing to the rapid increase in our orders, our Pittsburgh Manufacturers have been compelled to add largely to their works—a new gas furnace and heavier trip hammer—and are thus enabled to reduce the cost of steel and at the same time produce SHOES AND DIES superior to any yet manufactured. We have consequently reduced the price to 16 cents per pound and solicit a trial order, guaranteeing that you will find them at least 10 per cent cheaper than the best iron. There are no STEEL SHOES AND DIES made excepting under our patent and sold at this office, or by our authorized agents, though certain Eastern manufacturers advertise STEEL SHOES AND DIES which are only cast iron hardened by the addition of a composition. They will not outwear two sets of common iron, though called steel. They are very brittle and are not capable of being tempered, flying from under the hammer like cast iron. Our STEEL SHOES AND DIES are in use in many of the largest mills on the Pacific Coast, and all who have tried them pronounce them cheaper and far superior to iron in every respect, even at the old price of 20 cents per pound. Their advantages over iron are cheapness of first cost, increased crushing capacity, time saved in changing and in setting tappets, increased value of amalgam by absence of iron dust and chippings, and a saving of 75 per cent. in freight. It takes 60 days to fill orders from the manufactory East. Price 16 cents per pound shipped at San Francisco. Terms liberal.

Address all orders, with dimensions, to

1v29-3m

CAST STEEL SHOE & DIE CO., Room 1, Academy Building, S. F.



Stamp Mill For Sale at Ophir Canon, Nye County, Nevada. Midway between Austin and Belmont, belonging to the Twin River Consolidated Mining Co. A complete mill, comprising twenty (20) 800lb stamps, (dry-crushing) with Rock Breaker, Pans, Settlers, and entire outfit of milling appliances; together with an excellent engine (18x42), two tubular boilers and all requisite shafting, gearing, belting, &c.; valuable lot of Sierra Nevada timber in Battery frames and building. The whole is offered cheap. For further information apply to JAS. D. HAGUE, 17v28-3m 240 Montgomery St., S. F.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

10v27-1f

J. HENDY, No. 32 Fremont Street.

NIMROD DAULSER.

RICHARD C. HANSON

RICHARD C. HANSON & Co.,
Block and Pump Makers,

IMPORTERS OF ALL KINDS OF

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STEEL FRICTION ROLLERS,

MINING BLOCKS OF ALL DESCRIPTIONS,

PRESSED LEATHER FOR PUMPS,

Lignum Vitae for Mill Purposes.

NO. 9 SPEAR STREET.

Near Market,

SAN FRANCISCO

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS OF AND DEALERS IN

ASSAYERS' MATERIALS

Chemical Apparatus and Chemicals,

Druggists' Glassware and Sundries,

PHOTOGRAPHIC GOODS, ETC.,

512 and 514 Washington street, SAN FRANCISCO

We would call the special attention of Assayers Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our large and well adapted stock

ASSAYERS' MATERIALS

—AND—

Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grams, Grammes, will be sent free upon application.

7v25-1f

JOHN TAYLOR & CO.

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.

Ores sampled.

Assaying in all its branches.

Analysis of Ores, Minerals, Waters, etc.

Plans furnished for the most suitable process for working Ores.

Special attention paid to the Mining and Metallurgy of Quicksilver.

E. HUHN,

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Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS,

ADVANCES MADE

On all kinds of Ores, and particular attention

PAID TO

CONSIGNMENTS OF 6000 LB.

4v15-3m

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Assayer and Metallurgical

CHEMIST.

No. 611 Commercial Street.

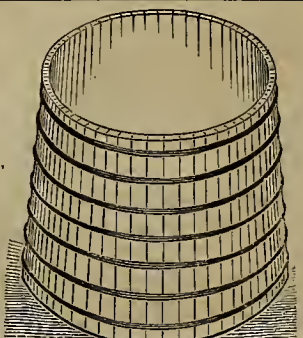
(Opposite the U. S. Branch Mint

SAN FRANCISCO CAL.

7v21-3m

California Assay Office—J. A. Mars &

Wm. Ireland, Jr., Chemists and Assayers, Rooms 47 and 48 Merchants' Exchange, San Francisco. Analyses of Ores, Mineral Waters, Etc. 8v28-3m



WATER TANKS of any capacity, made entire by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Ores less than elsewhere.

WELLS, RUSSELL & CO.,

Mechanics' Mills, Cor. Mission & Fremont Streets, 8v28-3m-2a

California Planers and Matchers, and Wood Working Machinery of all Kinds,

For Sale at TREADWELL & Co. Machinery Depot, San Francisco.



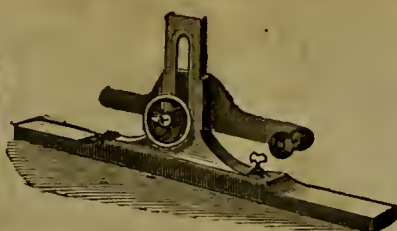
The CALIFORNIA PLANKER AND MATCHER is gotten up from new patterns specially for this Coast. It has Cast Steel Slotted Cylinder Head, running in patent self oiling boxes; Matcher Spindles also of the best cast steel. The Gears are all protected with iron covers. Will plane 14 in. wide and 6 in. thick, and tongue and groove 14 in. wide. Will make rustic and stick gutters, or heavy mouldings, etc., and the best Job Machine ever built.

We have always on hand a large assortment of Planing Mill Machinery, all of the latest improvements, including Planers, Moulding, Mortising and Tenoning Machines, Band and Jig Saws, &c. Send for Catalogues and prices.

TREADWELL & CO.,

San Francisco

SV19-cow-11



Adjustable Saw Gauge.

Foot Power



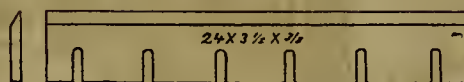
Jig Saws.



Improved Band Saws.



Improved Saw Arbors.

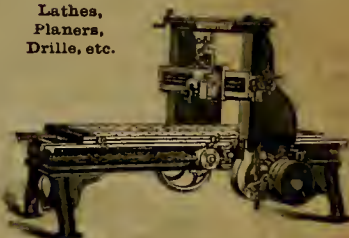


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Iron Working Machinery.

Lathes,
Planers,
Drills, etc.



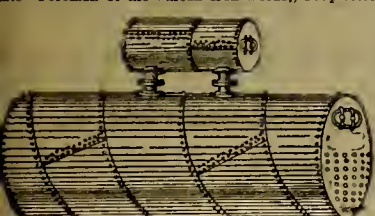
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23 and 125 Beale Street,.....SAN FRANCISCO

F. I. CURRY,

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High and Low Pressure Boilers of all Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED SPIRAL BOILER.

SHEET IRON WORK of every description done at the Shortest Notice.

All kinds of JOBBING and REPAIRING promptly attended to. 17v25-3m

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Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868.

CAPITAL.....\$1,000,000.

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Corner of Beale and Howard Streets, SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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24v11-13

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Junbar's Patent Self-Adjusting Steam Piston

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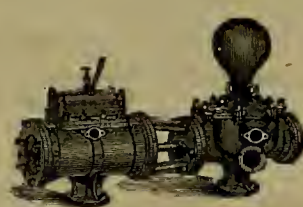
ENGINES.



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AND
Hot or Cold
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The CENTENNIAL is composed of the finest Hemp, made in strands or sections, of different sizes, each being saturated in a composition of pure German Black Lead and Tallow and covered with a braiding of the best Italian Hemp to be found in the market. It is manufactured in a shape the most convenient to use and handle, and gives from 50 to 100 per cent. more length compared with an equal weight of other makes. It runs with less friction on the rod than any other Packing made, from the fact of its being so perfectly soft and pliable, and so well lubricated so to require a minimum pressure on the rod. It cuts off smooth and makes perfect joints, is easily adjusted to any size rod, and only requires occasionally a new ring to keep the stuffing box full. ENGINEERS, TRY IT. For sale in any quantity by TREADWELL & CO., San Francisco.

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STEAM PUMPS, INDEPENDENT BOILER FEED PUMPS, AND COMBINED COLD AND HOT WATER ENGINE PUMPS.

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Hamilton, Ohio.

Branch Offices, Cincinnati, O., Chicago, Ill.



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Iron Castings and Machinery

OF ALL KINDS.

Stevenson's Patent Mould-Board Pan

THE BEST IN USE.

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Having much experience in the business of the Reduction of Ores, we are prepared to advise, understandingly, parties about to erect Reduction Works as to the better plans, with regard to economy and utility.

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Heavy and light Castings of every description. House Fronts, Mining and General Machinery estimated and constructed at shortest notice. On hand the celebrated Occident and French Ranges, Burial Caskets, Grates and Fenders, Road-Scrapers, Hydrants, Tugger Irons, Ploughwork, Bash Weights, Ventilators, Dumb Bells, Gipsies, Ship Castings, SOIL PIPE of all sizes, Fittings and Cauldron Kettles in stock at Eastern rates. SHOES and DIES a specialty. Ornamental Fences in large variety. 4v30-1yr.

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Machinery and Castings of all kinds.

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ALL KINDS of Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Belts and Gears of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. B. WEED. V. KINGWELL.

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Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STONES,
And General Machinists. 25v28-3m

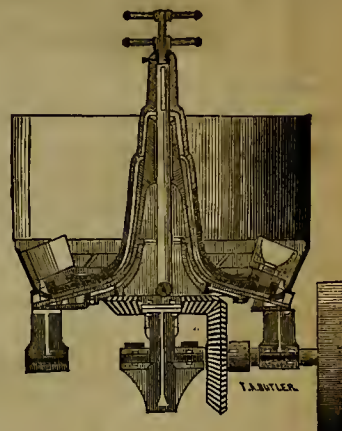
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Repairing done on very Reasonable Terms and in the best manner. No. 32 Fremont street, S. F. 19v23-3m

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MACHINERY AND CASTINGS
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Heavy Forging Boilers, Stationary and Marine.

JOBGING AND REPAIRING WORK OF EVERY KIND. SPECIAL ATTENTION GIVEN TO MINING AND HOISTING MACHINERY.

Sole Manufacturers and Agents of

PRATT'S PATENT STEAM PUMP.
GODDARD & CO., Props.

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SAN FRANCISCO, CAL.

Established for the Manufacture of
RAILROAD AND OTHER IRON

Every Variety of Shafting,

Embracing ALL SIZES of Steamboat Shafts, Cranks, Piston and Connecting Rods, Car and Locomotive Axles and Frames

— ALSO —
HAMMERED IRON

Of every description and size

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. box 2032, San Francisco, Cal., will receive prompt attention.

The highest price paid for Scrap Iron.

Vallejo Foundry and Machine Works,
VALLEJO, CAL.

JOHN L. HEALD, Proprietor.

Manufacturer of Flour and Saw Mills, Stationary and Portable Steam Engines, Pumps, etc. Boilers built and repaired, and all kinds of Iron and Brass Castings furnished at short notice.

THOMPSON BROTHERS,
EUREKA FOUNDRY,

129 and 131 Beale street, between Mission and Howard,
San Francisco.

LIGHT AND HEAVY CASTINGS,
of every description, manufactured, 24v16gr

TREADWELL & CO.'S

(IMPROVED)

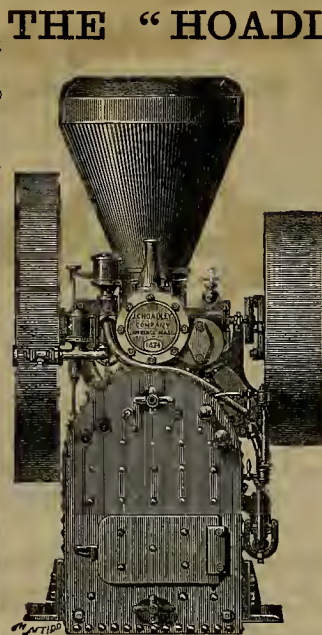
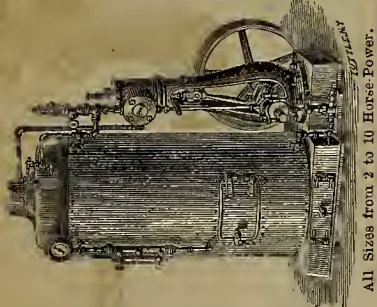
Upright Safety Engines and Boilers.

(MADE BY THE NEW YORK SAFETY STEAM-POWER COMPANY.)

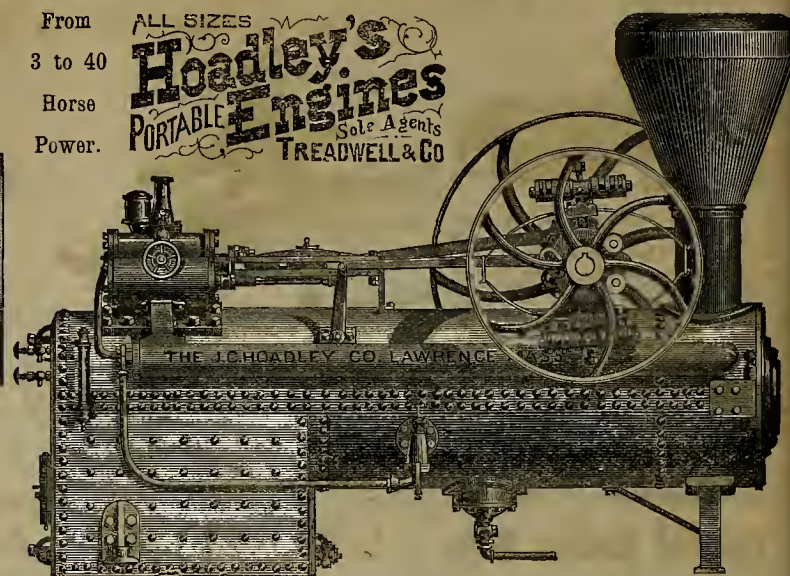
We would call particular attention to the graceful design and simple mechanism of this Engine Boiler, the form in not pleasing to the eye, but is also, that which secures the greatest strength and rigidity with a given amount of material. The Boilers, which are of the Upright Tubular style, with internal fire box, are of the best material and workmanship, and are all tested to 150 pounds per inch. The Boilers are of great strength, and it is therefore unnecessary to purchase a greater power than is actually required, while in cases of emergency these Boilers can be depended on for more than their rated power. The Engine is not fastened to or upon the boiler, and is therefore not affected by expansion, nor are the bearings over-heated by conduction, or the heat from the boiler. The high speed which is necessary for economy of fuel, is easily accessible—a great advantage. In complete in itself as a Portable Engine and Boiler, or the Engine can be detached from the boiler and run independently, if required. Its main points are simplicity, safety and economy. For printing offices, laundries, tanneries, ranches, small repair or machine shops, or for hoisting, wherever a small portable engine is required, they are peculiarly adapted. Over 500 already in use!

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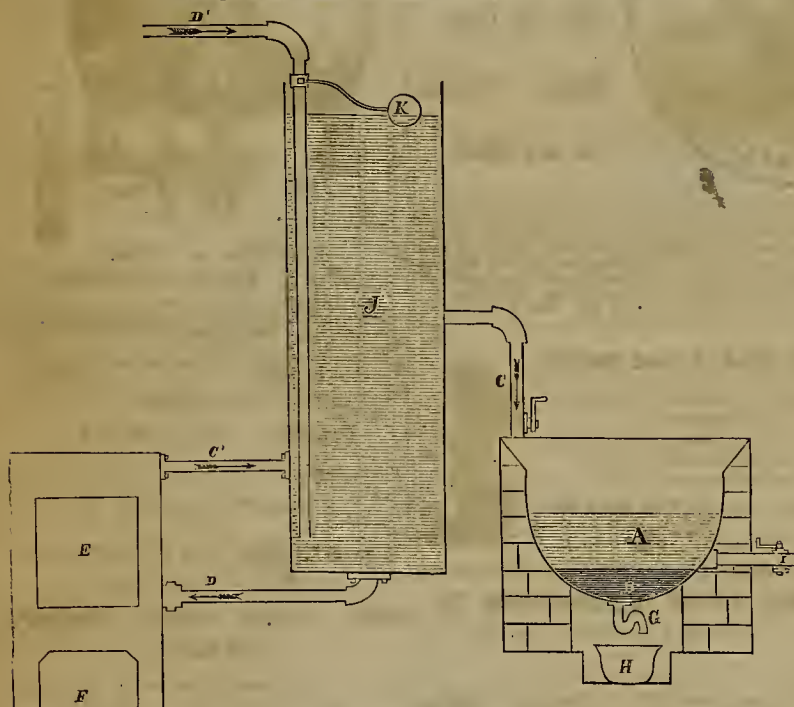
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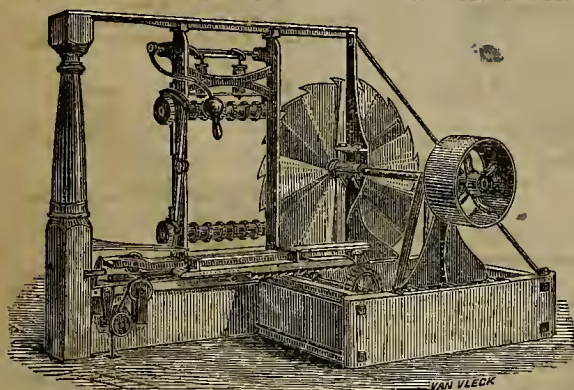
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

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SAN FRANCISCO, SATURDAY, FEBRUARY 6, 1875.

VOLUME XXX
Number 6.

The Protracting Sextant—A New Instrument for Hydrographic Surveying.

At the last meeting of the California Academy of Sciences, T. J. Lowry, of the United States Coast Survey read a paper on the Protracting Sextant (a new instrument for hydrographic surveying), which he lately invented; and having received the favorable opinions of Prof. Geo. Davidson and other distinguished scientists, geometers and hydrographers, as enabling one observer to do that for which two sextants and one protractor and two observers are now required, it is now given to the scientific world.

We have represented here in the annexed figure "The Protracting Sextant," consisting of a circle *D*, graduated to degrees and minutes from the zero point around by the right and left each way to one hundred and eighty degrees, and three radiating protractor arms, *f*, *g* and *h*. The arm *g*, is fixed with its true edge at the zero point of graduation, and the other two *f* and *h*, are capable of being revolved around the hollow cylindrical axis of the circle. Between this fixed, and each of these moveable protractor arms, we have an index arm—and each of these indices *m* and *n*, also fixed in the center of the circle a common center of motion, and carries an index-mirror mounted perpendicular to its plane of motion but slightly eccentrically so that the hollow axis of the instrument can be readily gotten at. Along these index arms *m* and *n*, are cut rectangular slots (whose longitudinal axes are radii of the circle), in which slide the projecting ends of the pivots which rivet the equal rectangular bars, *o*, *s*, and *u*, together. And these indices and protractor arms are so connected by means of jointed parallelograms that the right hand index-arm always bisects the angle included between the fixed and right hand protractor arms, and the left hand index always bisects the angle contained by the fixed and left protractor arms.

Now by a well known optical principle we know that the angular distance moved over by a mirror while measuring an angle is only one-half of the actual angle measured, and since each of the moveable protractor arms of this instrument is by means of this jointed parallelogramic gearing, driven along its arc simultaneously with and twice as fast as its corresponding index-arm (and mirror), we hence see that the angles included between the fixed and moveable protractor arms are the actual angles which the indices (and their mirrors) have measured.

The index mirrors *y* and *z*, may be mounted to move either in the same or in parallel planes, as shown in the forms of the writer's two-angle sextante described in the proceedings of the Academy, February 16th, 1874, and in the MINING AND SCIENTIFIC PRESS of February 21st, 1874. A horizon glass, *x*, half-silvered to admit of direct and reflected vision is attached to the frame of the instrument nearly opposite the index-mirrors, with its plane perpendicular to the plane of the instrument. The arms *f* and *h*, are clamped and adjusted with the ordinary clamp and tangent screws, *l* and *k*.

The requisite adjustments of the "Protracting Sextant" are the same as those of the ordinary sextant. When observing with the new Protracting Sextant, the hydrographer holds it lightly in his right hand and moves it until its face is in the plane passing through his eye, *i*, and the three objects *A*, *B*, *C*, whose angular distances are required, and then sets and clamps his index arm so that the reflected and direct images of the objects (say left hand and middle) of one of the angles which he is to measure, are not coincident yet approaching on account of the progress of the boat, then with the second index glass he makes the direct and reflected images of the middle and right hand objects coincident, and keeps them coincident with tangent screw until the first two objects become coincident, then clamps,

and he has the two angles observed at the same instant—and also has them set off on the proper limbs of the instrument simultaneously with, and by the same effort that measured the angles. And hence after measuring two connected angles with this instrument we have only to lay it down on the "Field Sheet" (which should always be spread on a board before the observer in the boat), and shift it until the fiducial edges of the three protractor arms traverse the three points, (representing the signals observed upon), and the center of the instrument will then occupy the relative place of the observer; now dot the center and the position is plotted, without any of those tedious transfers of angles from the limbs of sextants to the limbs of the protractor which are unavoidably incident to the execution of practical hydrography with the forms of sextants and protractors now in general use.

However, with the hydrographer, it is necessary to read the angles off of the instrument

jects very close should not be observed on account of the parallax of the instrument.

The Protracting Sextant should have supplementary attachments, (such as were described by the writer before the Academy, February 16th, 1874), so that angles between one hundred and forty, and one hundred and eighty degrees may be measured with equal facility with those of smaller magnitude. But these larger angles cannot be plotted in the usual way, for they are too great to be set off at the same time on the limbs of the instrument because of the jamming of the moveable protractor arms—now under this contingency if we have no tracing paper and don't wish to sweep the circles of position, then we may use the following easy and accurate method of plotting by supplementary angles, viz:—Suppose *A*, *B* and *C*, the left, middle and right hand objects on which are measured two angles, too large to be set off on the limbs of the protractor at the same time—then set off the supplement

problem), as shown by the writer at page 18 of Vol. 2, of "The Analyst." And, in fact, with one piece of tracing paper and the Alidade, the topographer can plot his position, by the three point problem—and with two pieces of tracing paper and the Alidade, he can plot his position by either the two or four point problems shown by the writer at page 146, volume 1, of "The Analyst."

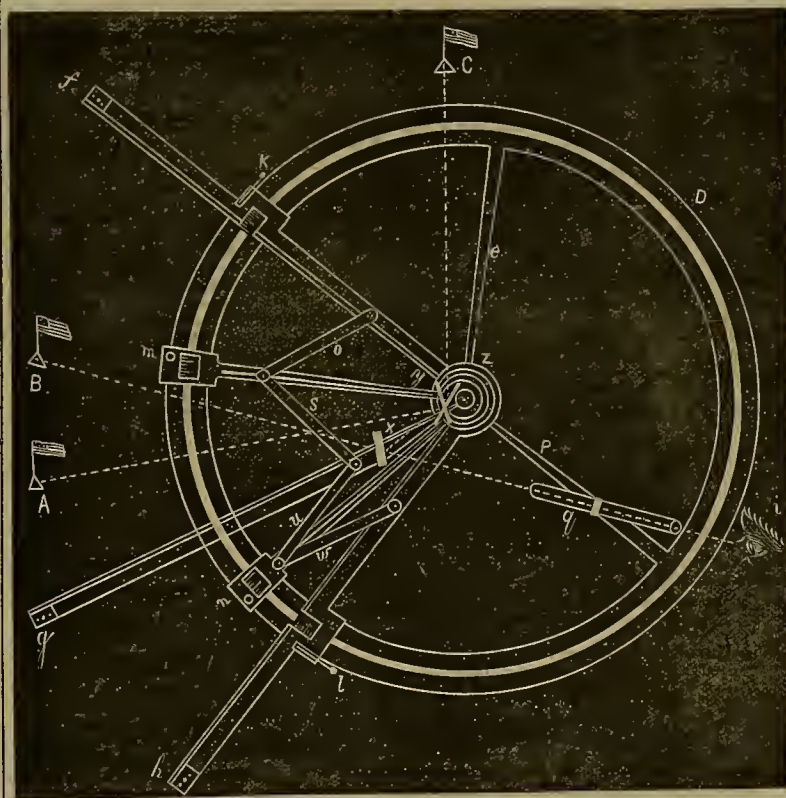
This instrument also furnishes the ready means of orienting the sounding boat. If out in a bay, lake or river, or along near the sea coast and your compass functions badly, and you have while nudgeing or plotting, or for some other reason lost your bearings, and hence wish to catch some fixed object ahead or astern on the general direction of the line you wish to run—then take from the sheet, with the Protracting Sextant, the angle between some visible signal and the general direction on which you desire to continue your line of soundings, and then lifting the instrument to your eye, shift it until you bring the image of this signal into the horizon glass, and whatever fixed object this image then covers will be a point on the desired course. By this means, the hydrographer, even if out on a large expanse of water and swept about by winds and currents, with his compass creased by local attraction or the heaving of the waves, may "orient himself" and thus ply the helm more intelligently. And, in fact, by this maneuver, and by observing (and plotting as you go) twice or thrice as many angles as must necessarily be recorded, the boat can be steered without the aid of the compass. These practical hints will be found to come most opportunely to the relief of the distressed Hydrographer when surveying close in shore along much of the Pacific coast, with its beaches of ferruginous sand, or along the iron bound shores of lake Champlain, where the magnetic needle often becomes worse than useless.

In nothing will the skill and dexterity of the Hydrographer be more advantageously displayed than in deciding at once upon the line his boat is to pursue, and with the glance of intuition grasping all the conceivable combinations of visible points that will determine his position. But in practical hydrography no less necessary than this skill and dexterity, is rapidity of execution in determining positions; and, to this end, with two observers the requisite promptness and evenness of action are often found deplorably deficient, and that too, at moments the most critical. A sunken rock or reef is to be determined, and on it a sounding gotten. The rock is found, the "cast" is taken—the word "stand by for an angle" is given—and at length comes the response, *r-a-d-y*; by which time perhaps a tangent screw is jammed (hard up,) or the boat has drifted from over the rock, and thus the reward, for hours, or it may be for days, of persistent and arduous exertions is lost. And such mishaps must ever continue to recur where two observers are called upon to act quickly and simultaneously under exciting circumstances.

But if in the boat there is only one observer, with a Protracting Sextant, then we may confidently expect that promptness and evenness of action, in observing, under every contingency, which are so essential to the rapid and successful execution of a hydrographic survey.

Although we do not presume to say that the theory of this instrument is so obvious or its manipulations so simple, that "the simpleton, though he run may understand," or that the smatterer and blind routiner (who could not look a quadrilateral in the face without blushing) may manipulate it with ease and accuracy, yet we do not assert without the fear of a contradiction, that to the eye of the ingenious geometer, its theory is most clear, and that in the hands of the hydrographer, who is a master of his profession, this Protracting Sextant will be found the ready and efficient means of determining and plotting, (unassisted and alone) his position, with a facility, ease and accuracy not now attained with two ordinary sextants and one protractor in the hands of two observers and one plotter.

The Santa Barbara Index learns that a movement is on foot there which may lead to the organization of a company for the purpose of building a narrow gauge railroad from Santa Barbara to Panamint and Cerro Gordo, via. San Buenaventura and Elizabeth lake.



LOWRY'S PROTRACTING SEXTANT.

and record them for future reference and closer plotting on the "Office Sheet."

The angles observed with the Protracting Sextant or any other reflecting instrument are measured in the plane of the objects. If this plane be inclined to the horizon and a result rigorously accurate be sought, the angles of elevation of each station above the horizon should at the same time be observed to afford data for reducing the hypsotheneal to the horizontal angle. But this reduction may be neglected in all cases where the difference of elevation of the objects does not exceed two or three degrees and when the observed angle is larger than (the minimum angles allowed in determining a boat's position by observations from the boat), twenty or twenty-five degrees—for, the reduction to the horizon would, in such cases, deal with quantities more minute than the amount of error to which the measures of all angles observed at an unstable station are liable. When the difference of the objects is considerable, an ideal vertical line may be drawn from the highest object downward to an elevation corresponding to that of the lower object, and the angle measured between this vertical line and the lower object—this with some experience and correctness of eye will give results sufficiently near the truth, i. e. within the limit of the errors of plotting. Ob-

of the left hand angle on the right hand limb and the supplement of the right hand angle on the left hand limb—cause the right and left arms of the instrument to traverse points *A* and *C* respectively, and draw a line along the middle arm, then shift the center of protractor, (taking care to keep the points *A* and *C* bisected by the true edges of right and left arms) and draw another line along middle arm and the intersection *J*, of the two lines thus drawn, will be a point on the right line through point *B*, and the required place of observation—draw this line through *B* and *J*, and with the center of the instrument on this line cause the fiducial edges of the right and left arms to traverse *A* and *C*, respectively dot the center and this is the place of observation.

Another method of plotting a position by supplementary angles is to set off the right hand angle on the left hand limb, and the sum of the supplements of the observed angles on the right hand limb of the protractor—cause the left, middle and right arms to traverse the middle, right and left signals respectively—dot the center and it is the required position.

And this instrument also enables the hydrographer and topographer to determine and plot their positions by the two point problem, (in a manner equal in accuracy and second only in point of simplicity to that by the three point

CORRESPONDENCE.

Chrome Ore in Napa County.

EDITORS PRESS:—In Chiles' valley, fifteen miles from Yountville, has been discovered chrome iron containing a very large percentage of chromate of iron. The discoverer brought the ore to Napa, not knowing what it was, or its value. Dr. Boynton, with another party, examined the ore and made a contract with the man for all he could take out, at \$15 per ton delivered at Rutherford station. The cost of hauling is about \$3 per ton. Offers of \$25 and \$30 per ton have since been made, but the contract binds.

With two men he took out some 1,000 tons in a month. The ore would widen out and then as they went down on the ledge would shelve down again becoming narrower until it disappeared entirely. Locations have been made adjoining the discovery. Near the surface some four or six tons will be picked out when the deposit seems exhausted. On going deeper, a small streak will appear, widen out and then narrow down again to nothing.

The discoverer has taken out some fifteen hundred tons, and now the streak of ore is narrowing and disappearing again. Since this discovery several prospectors have brought in specimens of chrome iron from the hills near Napa, having very much the same appearance as this ore from Chiles' valley. I believe that such ore is worth little unless it contains over 60 per cent. of chromate of iron. But even with a higher percentage than that, would the market be unlimited. M. E., Jr.

Napa, Jan. 20, 1875.

Colusa County Quicksilver Mines.

EDITORS PRESS:—Having been a resident of this place for four months, and not having seen a communication from this mining district, I give you a few personal observations. At present we are engaged entirely in cinnabar mining. The old sulphur works have been lying idle since the war prices, as they say the present price of sulphur is not remunerative. Sulphur Creek mining district is situated in Colusa county, upon its extreme west side, and the eastern side of Lake county, thirty-five miles from Colusa. To reach it from your city you can come by rail to Marysville and stage to Colusa; or by rail to Knight's Landing, and boat from there to Colusa. A tri-weekly stage runs from thence to this place. We have also the celebrated Wilbur hot sulphur springs, visited by many and generally found beneficial.

The mines have been operated for years, but principally by men of limited means. During the last year, however, more energy and some capital has given a new start to the district, and capital is looking around for investments. There are at present about 250 miners at work. As you ascend the creek the first croppings that attract attention are those of the Amazon mine, owned by Whitman & Co., of this place. But very little work has been done upon the vein. A quarter of a mile above is the hot sulphur spring and Wilbur hotel. A short distance above is the Oriental mine. One half is owned by Mr. Mahan, of your city, and the other half by parties here. Considerable work has been done upon the mine, showing good ore, and in paying quantities. Next above, and on the same side of the creek, is the Maazanita, owned by Dr. Hughes & Cherry, of this place, but hounded for quite a sum. Considerable work has been done, and good ore is found. It will no doubt change hands. Adjoining above are the Eureka and Montezuma, both showing good ore and owned here.

Further up the creek quite a number of locations have been made, all of which are but little worked until you arrive at the Elgin, three miles above. This is one of the most promising mines of the district. It is owned by Smith, Milburn, and Mrs. Wilbur, all of this place, and Chapin, of Colusa (incorporated). They have a large and well developed vein of cinnabar, and with one retort, 500 pounds capacity, they keep the mine out of debt and work quite a number of miners, making improvements in roads, buildings, etc., and opening the mine. But few mines can show so good a record. Several other locations above show but little work. However, one of our experts, Andy Johnson, has decided upon the richness of that locality and located where promises big results. The Stockton Q. M. Co. have their headquarters there also.

Some three miles to the south of the Elgin is the Abbott mine, located by "Uncle Dick Abbott," a pioneer in the district. It is at present owned by Good, Ingram, Brim, Biddle and others of this county. This is one of the best developed mines in the district. They have a Knox & Osborne ten-ton furnace, and are shipping 20 to 25 flasks per week, and are pushing ahead with the opening of the mine, having good roads, shops, boarding house, and all necessary out-buildings. This is a dividend paying mine, and when depth is attained must be a fine investment.

To the south and on the same vein we have the Excelsior, owned by the Desternell Bros. It has bold croppings and good ore, and is a No. 1 prospect. The next on the same vein south is the General Jackson, owned by Catlin, Msnoh and others here. They are hauling ore preparatory to reducing. The owners look happy and hold "feet" high.

Returning to the creek the first mine on our right is the celebrated Buckeye. Superintendent Casswell who has worked the mine up with flasks for retorts, to small retorts and then to a Knox & Osborne ten-ton furnace, with all necessary improvements. The mine is paying and is incorporated. It is owned Casswell, Smith, Craoston and others here, by Judge Hatch, of Colusa, and Belcher of Marysville. Like all other mines here as they go down the ore body increases in quantity and quality.

Next down the creek is the Empire with fine prospects, and no doubt one of the first-class mines of Sulphur creek. Owned by Van Winklo, Perdue, Furth, Seube, Sr., Belton and others all of this county.

The district is at present shipping 50 to 75 flasks mercury per week. This is certainly one of the rich cinnabar districts of the coast and ere long must attract capital to it. With that, in a very short time, the shipments of mercury would astonish the outside world. There are many other locations in the district that I may notice at another time.

RAMBLER.

Sulphur Creek, Colusa county, Jan. 20, 1875.

The California Blue Lead in Oregon and Washington Territory.

EDITORS PRESS:—In the early days of "forty-nine and fifty," the miners were of the opinion that when the rivers, creeks and ravines were worked out that the placer mines of California would be exhausted, but such is not the case, for since that time there has been another class of mines discovered, commonly called the deep gravel mines, of which the "Blue Lead" is the most extensive and profitable. This lead was discovered first at Minersota, in Sierra county and was traced north across the entire county to Feather river, where the miners lost all trace of it. The reason of their not finding the lead farther north was this: As far as the miners traced the lead its course was due north and south, but at Feather river it takes a turn and runs northwest through the mountains, close to Lassen's Butte, thence to Shasta Butte, thence to Cottonwood and Jacksonville in Oregon.

In 1857, accompanied by four others, I left Yreka, Siskiyou county, to see if we could find any traces of that famous Blue Lead. We were all aware, however, of the existence of a gravel lead between Cottonwood and Jacksonville, but the lead, on the surface, was so unlike that of Sierra county, that we were of opinion that it was a different lead. But in the course of our travels we came across a gravel lead in all appearance the same as that at Cottonwood. We then turned south and followed it through the mountains, until we reached Feather river traveling due southeast, and to our surprise we found the identical lead connected with the Blue Lead, leaving a space from Cottonwood to Feather river unprospected for that famous Blue Lead.

Various are the opinions pertaining to the gravel, it being found so high, even on the tops of the highest mountains. The prevailing opinion is that it is from a river that flowed from north to south. Such is also my opinion from the fact that it has a rim to it. The rim is the bedrock projecting out on the side of the mountain, and then pitching back into the mountain or deep channel, commonly termed the pitch of the rock. The miners have to tunnel through it to drain their mine. In some places the miners have tunneled 2,000 feet before striking pay ore.

This lead has been found in Sierra county, and extends north and south the entire length of the county. In Nevada county it has not been so extensively worked or identified, but the miners have worked several other beds of quartz gravel, all the off shoots of the Blue Lead. This lead is about 1,000 feet wide and must be tunneled and drifted. Those in Nevada county are principally worked by hydraulic washing.

In 1870, I again resolved to extend my explorations for the Blue lead into the State of Oregon, so in the month of June in that year, I crossed Rogue river, about seven miles above Jacksonville and ascended the Cascade mountains on the east side, and when to within 500 or 700 feet of the summit, I could see here and there some smooth quartz gravel. I then started north on that level, parallel with the mountain, and when about 30 miles from Rogue river I found a quartz gravel bed, in all appearance the same as that I traced through California.

I continued my travel parallel with the mountains until I reached Mount Hood, finding the gravel the entire distance, and when near Mount Hood, I looked through my glass off into Washington territory, and I could see the same class of land marks that have guided me through California and Oregon.

I then resolved to explore Washington Territory the following summer, so again in 1871, I crossed the Columbia river at Umatilla and started on an Indian trail for the head of the

Yaquina river, where I had no trouble to find the gravel bed, I then started north to follow it, until I reached the British Columbia line, and not wanting to explore any other than Uncle Sam's domain, I then turned back designing at some future time to write out the foregoing.

Since writing the above my mind has wandered back to my several explorations, and I have come to the conclusion that the discovery of the Blue lead, or ancient river bed, to the extent as above stated will be, or will lead to the grandest geological discovery that ever will be made in the mountain ranges of the Pacific coast, and I here state, that I am ready at any time to be the "Kit Carson" should there be any party of scientific gentlemen who desire to explore and investigate the above statement.

ANDREW CASSEIDY, "Mountaineer."

Virginia, Nevada, January 22d, 1875.

STRUCK PAY.—The Mountain Messenger (Sierra county Cal.) Says: It gives us great pleasure to record the fact that the owners of the Iowa gravel claim, located near Mt. Pleasant ranch, on the road from Port Wine to Seales Diggings have, after many years of patient labor, struck a fine bed of blue gravel which prospects exceedingly well. Several years ago, just how many we do not remember, the company commenced sinking a shaft on their claim, said shaft being put down 180 feet, but not without several stoppages, owing to want of means. Gravel was at last reached, and it was thought of sufficient richness to warrant the running of a long tunnel which tapped the shaft at the depth it had then reached. When the tunnel was completed it was found that the gravel, though fine looking, would not pay for drifting. The owners, from lack of means, being all poor men, were compelled to quit work, and the claim was allowed to lie idle for a year or more. Last spring work was again resumed. In the bottom of the shaft the bedrock was found pitching away under the hill, which proved they were on the rim of the channel. A tunnel was started from the bottom of the shaft, and pushed a distance of 300 feet with a grade of two feet. At that distance they thought they must be over the channel, and sinking a shaft to the depth of 55 feet struck rock and found excellent pay. The perpendicular depth below the engine house at the mouth of the shaft, at which pay was reached, 233 feet, and still, judging by a diagram sent us by our old friend, John P. Lloyd, Secretary of the company, the bottom of the channel has not yet been reached, the bedrock still pitching away from them into the ridge. The character of the deposit is the genuine blue gravel, and every indication is that an immense channel has been tapped, and one that will equal in richness any of the blue gravel leads of California. We sincerely hope that the Iowa boys have secured their fortune. If the lead develops as well as it prospects, it will stimulate prospecting in that section, and prove that it is one of the richest portions of the country.

WEBB'S FLANGERS.—Yesterday afternoon we accepted an invitation to ride on one of the flat cars to which was attached a flanger, an invention which clears the ice and snow from the rails in a neat effective manner. This invention is due to Mr. Nate Webb, who has won a well deserved fame as the chief of the snow plough department of the Central Pacific railroad company, and it promises to work a revolution in the manner of keeping the rails free from ice and snow.

The flanger cuts and clears away the ice and snow to the depth of two inches on the inside of the track, and about three-quarters of an inch on the outside, thus giving a perfect rail to drive wheels on the outside as well as on the inside. It does the work very satisfactorily and it promises to take the place of the pick and shovel as instruments for flanging the railroad track. It will do the work of a thousand men with pick and shovel and has this other advantage that it can be sent ahead of a train and give it a perfect track without delay. The way it sends the snow and ice flying is a caution. It is attached to a flat car by four bolts, and can be removed or adjusted in twenty minutes. Every one that sees it testifies for its usefulness, and says that there is a sure fortune in it for the inventor.—*Truckee Republican.*

SOMETHING NEW.—Capt. Taylor, superintendent of the Yellow Jacket mining company, will introduce a new feature in mining machinery in ventilation. He has returned from the Bay and has brought with him a new fan or blower, together with a small turbine wheel of about two feet in diameter. These he will erect in the 1500-foot level in the incline, using the wheel, which will be fed by the water running down the incline, to work the blower on the 1500-foot level of the Yellow Jacket, a drift connects with the Crown Point, from which proceeds a good draft. The blower, which will be operated by the turbine wheel, it is calculated, will save 500 feet of air, and greatly benefit the miners working in the lower levels. We hope to hear of the success of Captain Taylor's experiment.—*Gold Hill News.*

The Columbus mill and mine, of Esmeralda have been sold at an assignee's sale for \$13,000. This sum is only a tithe of its indebtedness. One mortgage is for over \$26,000, and the small claimants are legion.

The Panamint News rejoices at the fact that Jones & Stewart, of the Surprise Valley mill and water company, have discharged all the Chiuamen in their employ and their places are to be supplied with white men.

Cinnabar in Trinity.

We make the following extracts from Trinity county Journal in relation to the cinnabar interests:

Within a couple of years developments have been made which show that our county has element of wealth which has thus far lain dormant, but the production of which will take its place among the leading and permanent industries of the county. We allude to the cinnabar discoveries, first made three years ago, but only lately tested to an extent to testify us in believing that within our territory limits some of the richest mines of that which the world can boast of are to be found. Within a few years quicksilver has so advanced in price that it may almost be reckoned as one of the precious metals.

The constantly increasing demand for quicksilver, combined with the high price it commands, stimulated prospecting to a great degree, and has resulted in the discovery of a number of mines of more or less value. The new discoveries have had little or no effect upon the market price of quicksilver, and article of commerce is held at a figure twice as great as the ruling value five years ago. The western slope of the Sierra Nevada contains gold in abundance; on their eastern slope, through the mountains of the deserts of Nevada, mines of silver abound, and it was served for the Coast Range to furnish deposits of quicksilver so necessary to successful and remunerative working of more precious minerals. Napa, Lake, Colusa and Mendocino counties have each in turn furnished the field of enterprise for energetic prospectors, and their labors, to certain extent, have been repaid. Their discoveries created quite an excitement; not great a one, indeed, as followed the rich silver discoveries, but, for a time, the counties have named were thronged with prospectors eager in the search for indications of that which has of late years assumed such a prominence. Our own county was last among them in which prospecting to any extent was undertaken, but the present indications are that will soon take rank as the leading quicksilver producing county of the State.

The existence of rich deposits of cinnabar in this county has long been suspected. From almost the earliest days of mining on Trinity river, the presence of small particles of mineral was noted, though what it was was a great extent unknown. The small particles were difficult to separate from the fine dust, and nearly every ounce of dust washed out by the old-fashioned methods of the roasting and sluicing contained more or less cinnabar. When found on the low river bars the particles were small and solid—those found in the hills and benches were larger in size and more easily pulverized. In heating the gold to melt it, it would be observed in the dark that particles buried with a blue flame; and it was also noticed that the cinnabar was thicker the gold washed out of "top" gravel than that taken from strata near the bedrock. Since the search for the more valuable mineral, the constant presence of cinnabar was overlooked, or dismissed with a passing comment; and it was not until a few years ago that prospecting for the source of this supply was inaugurated, with what promises to be the most happy results. It is found in a part of the country remote and difficult of access, and this fact, together with high altitude at which they are situated, making the working season very short, has materially retarded their development. We have no disposition to magnify or overrate the extent or value of our cinnabar deposits, but the counts which have come to us from reliable sources warrant us in the belief that the large and permanent manufacture of quicksilver will, long, become a permanent and leading industry of the county.

BLUE TENT.—There are at present but two mines at work at Blue Tent—the Blue Tent and the Sailor Flat. The former mine is run by five machines and using 1,500 inches of water in 24 hours. The latter uses 500 inches one motor. The water used at the Blue Tent mine is obtained from the South Yuba canal company, and from summer ditch owned by the company. A ditch was commenced last spring which will, when completed, afford a supply the year round. It commences at the Yuba river above Culbertson's bridge opposite Emigrant Gap. It will be 27 miles long. Over half of the labor and cost has been expended. The heavy fluming and tunneling has been completed. There is one tunnel 1,000 feet long, which cost \$6.50 per foot, another 300 feet long which is about half completed at a cost of \$3.50 per foot. The ditch will be completed in the early summer. It might have been done now with the work which has been expended by running around hills with flumes, but it would have been less permanent. C. W. Tozer is the superintendent, to whom we are indebted for above items.—*Nevada Transcript.*

A large boiler is being made by Moynihan & Acken for the steamer, Wm. Taber, weighs nearly 90,000 pounds; it measures sixteen feet in width across the front; the height, including steam chimney, is twenty-five feet, nineteen feet; and diameter of shell fourteen feet eight inches, all of the very best of iron, three-eighths of an inch thick.

The mining intelligence from Cariboo is considered very favorable.

MECHANICAL PROGRESS.

Foundry Economy.

a lecture on "Applied Mechanics," (in England, some time since), Mr. John Anderson, C. E., after familiarly describing the distinctive properties of cast and wrought iron, speaks of the molecular structure of cast iron. All metals, he said, are crystalline, the crystallization is better observed in some than in others. In cast-iron, especially, it is very apparent. The crystallization of cast iron is governed by a natural law. This law was first pointed out, to the best of his belief, twenty years since, by Mr. Mallet, and is this: In cast-iron is in a liquid state—when the scales have sufficient heat among them to give liquidity—the direction of crystallization is determined by the lines into space which the scales take. When this law was first stated, it received with skepticism, but ever since law had been pointed out, he (the lecturer) never observed in any piece of broken cast iron an example to the contrary. If we introduce into castings irregularity of figure, or anything which creates currents outward, in various directions, then we get wrong; we introduce lines of weakness. According to this law, gains up to this time have always been wrong. The Americans are acting upon law in every thing they are doing, and that of theirs, which some time back came to this country, almost like a soda-water bottle in shape, was constructed in strict accordance with this law, and, therefore, possessed the utmost strength attainable with the same weight of metal. The molecular appearance of cast iron depends on the rate at which the heat is taken out of the casting.

As to the goodness of cast-iron, goodness for all castings is not goodness for a hydraulic cylinder; goodness for a hydraulic cylinder is goodness for a gun. Density is a quality required for both the latter, but we don't want density for a hydraulic cylinder, but for a gun we require very great density. As a rule, the hardness of cast-iron or cast-steel depends upon three things: First, on the quantity of carbon which the mass contains; second, on the heat which it was raised before carrying the heat out of it; and third, at the rate at which that heat is hastened out of it. All these conditions determine the character which cast-iron or cast-steel assumes. In casting iron in moulds, where hardness is wanted, some method is adopted so as to carry the heat out rapidly; where softness is required, means are taken to carry the heat out slowly, and it does not matter what the method is so long as it is effective. The hardness of steel depends on the quantity of carbon which it contains, and on the rate at which the heat has been taken out of it. After allying at some length to the founder's art, the lecturer proceeded to speak of the casting of a fly-wheel, stating that the only thing which would serve such a casting intact while cooling, is to take care that every part should cool at the same rate. The arms, being least in substance, would naturally cool first, but they must be kept hot by covering them with fire, or by other convenient means. If we require a particularly good casting it must be cooled slowly.

Many of the difficulties of the caster would be got rid of if we could prevent the formation of gas within the mould. The Americans are very much more careful in this respect than we are, and this is the explanation of their castings standing so well. Mr. Babbitt uses fire-bricks, which after, say, ten years' service, have not changed color; any fire-bricks that are discolored he rejects. He grinds these to a powder, and thus gets a perfectly pure and refractory material for his moulds, using pipe-clay, the best material for the purpose, to render it adhesive. The mould is first made red-hot, and this red-hot mould then receives the metal. Not a particle of gas is generated by the mould. Another American founder, Mr. Rennie, uses Kaolin, which he obtains from England (Devonshire), and treats it in a similar way to that in which Babbitt treats his powdered fire-bricks and pipe-clay. To show the earnestness of our American competitors—and we shall have them as competitors—they resort to the method of taking the heat out of the castings in the way least injurious to them. They try to establish the conditions of a built-up gun in a cast-iron one, to have every atom of the gun under tension. We English, as a people, must pay the same attention to natural laws as the Americans and French are doing.

ENGLISH RAILROAD IRON.—The importation of English railroad iron into the United States is falling off at a rapid rate. The average monthly importations for 1872 was 37,000 tons; for 1873 it was 15,000 tons; while for 1874 it has fallen to 9,000 tons. America is now nearly independent of Great Britain in the iron trade, and will soon prove her powerful competitor in foreign markets—British iron masters see this, and are seeking to save themselves by establishing free trade between this country and Canada, and establishing branch manufacturing in that province.

SUPERIOR STEEL.—By means of one or two processes now in vogue in some of the European workshops, says a contemporary, an article is produced equal, in all respects, to the celebrated Damascus iron and steel of antiquity.

Metallic Contraction.

The following from Pynchan's Chemical Forces, although published some time since, will be found peculiarly interesting:

The force of contraction is equal to that of expansion, and quite as irresistible. Its immense power was strikingly illustrated some years ago in Paris. The two sides of a large building, the Conservatoire des Arts et Metiers, having been pressed out by the spreading of the arched ceilings and the immense weights supported by the floors, M. Molard undertook to remedy the evil by boring holes in the wall at the base of the vaulted ceilings, and opposite to each other, through which strong iron rods were introduced, so as to cross the interior of the building from one side to the other. On the projecting ends of the bars on the outside of the building were placed strong iron plates, which were screwed, by means of nuts, tightly against the walls. The rods were then heated by means of rows of lamps placed under every alternate bar, and being lengthened by the expansion, the nuts and plates were pushed out to the distance of an inch or more beyond the wall. While in this condition, the nuts were screwed a second time tightly against the wall. The lamps were then extinguished, and the rods, contracting as they cooled, drew the wall together with a force almost irresistible, and to a distance as great as that to which they had been lengthened by expansion. These bars being then left in their new position, the alternate bars, which had remained unheated, and by the contraction of the others had been also made to project beyond the walls, were again tightly screwed against the building. These were in turn expanded and lengthened by the application of the lighted lamps, and once more screwed up tightly against the walls. The lamps were then extinguished, and by the contraction of the second set of bars the walls were drawn still further toward each other. These were then left, in turn, to hold the building in its new position, and the first set of bars was again brought into requisition. And thus the process was continued until the walls were drawn into their proper vertical position; and the bars being left in their places, they have remained firm and upright ever since. In this manner a force was exerted which the power of man could scarcely have applied by any other means. The same process has since been applied to the restoration of other buildings which were threatening to fall.

IMPROVED TUYERE FOR FORGES.—We find in the English journals, the following notice of a paper read by Mr. W. Smyth, before the British Association, which described a very simple but important improvement in Smyth's forges, by which the forge is much more fully under the control of the workman, and by which the life of the tuyere is greatly prolonged, the work of heating the metal more uniformly and uninterruptedly carried on, and a great economy of fuel effected. A cast iron trunk or box is placed horizontally from the back and front of the forge. The front end is closed by means of a slide or door. The back end has a hollow tower which rises above to a suitable height, and upon which is fitted a cast iron tuyere block with, by preference, two long slot holes for the blast. Within the trunk is a long lever working in an axle or spindle, which at its longer end has two punches which rise vertically, and are from time to time projected through the slots to displace the slag and keep the tuyere openings clear. This the workman does, by moving a lever upon the outer end of the spindle or fulcrum of the levers. The iron trunk or box becomes heated by the surrounding fuel, and utilizes the heat, which would otherwise be wasted; thus effecting a considerable economy of fuel by heating the air of the blast.

THE FIRST PLANING MACHINE.—The first planing machine ever made was, according to the London Iron Trade Exchange, constructed in the Holland street works of John Rennie the elder. "In March, 1814 (and we copy from an original memorandum book of the late George Rennie), the following plan was adopted for 'chipping' the cast-iron sides of a new lathe. The sides are placed close together, with their faces upward. Two planks of elm, one on each side, are bolted with their edges truly placed end upward. Upon the edges of the elm planks run four wheels on axles, which support a truck of oak. To the truck is fixed a slide rest, to which is attached a cutting tool. The truck is well loaded with weights, and pulled along the surface of the elm planks by means of a crab and chain. Thus the tool, in fact, planes the iron lathe-beds straight." This was in fact the first planing machine, crude and rude as it was, and from it Whitworth, to whom the original apparatus was shown subsequently made a self-acting machine. We all know how important a tool it has become, and the wondrous saving it effects in the manufacture of nearly every kind of machinery.

LARGE HAMMER AND CRANE.—The largest trip-hammer in the United States has recently been completed at Nashua, New Hampshire, at an expense of \$75,000. The weight of iron in the machine is about 200 tons; the rams weigh 12 tons; its striking force is about 100 tons; and four large boilers are brought into use to furnish steam to run the 600 horse-power engine required to work it. The immense crane with which the iron that is being manipulated is hoisted into position is the largest in the country, and is rigged with modern mechanism so nicely that two men can easily hoist 50 tons dead weight.

FILE CUTTING MACHINERY.—Dr. G. Haseltine, of Southampton-buildings, London, has taken out a patent for machinery for cutting files. The invention relates to a file cutting machine in which a bed is used that rests directly upon the feed screw, the said screw being of sufficient strength to support the bed while the file is cut. The feed-motion of the screw is produced by a ratchet wheel and pawl, and with these parts is combined a spring which acts on the cover of the journal box, at one end of the feed screw, the cover being supported by an eccentric. The bed is saddle shaped, and with it is combined a frame with parallel motion links, for the purpose of lifting the bed out of gear with the feed screw. This bed is provided with a cavity to receive a semi-cylindrical secondary bed, and with these two beds is combined a gauge, which bears on the secondary bed and maintains the surface of the file blank parallel with the edge of the cutter. The file blank is retained on the secondary bed by clamping jaws and a spring. The stock which carries the cutting tool moves between guides or slides, which can be set to insure accuracy in the movement of the cutter. The tool stock is operated by compressed air.

TROWING WATER FROM PIPES.—Experiments made at the Holley water works in the town of Lake Michigan, shows that a pressure on the service pipe of 109 pounds to the square inch will force water to an elevation of 120 feet through a fire hose. The same experiments also proved that while the water pressure at the engine, eight miles distant, was 129 pounds, it stood at 109 pounds in town. This seems to be a very small waste of power in conveying water eight miles. If the report is correct, the fact is important.

SCIENTIFIC PROGRESS.

Science and Faith.

Professor Tyndall lately gave the first of a series of six popular science lectures at the Free Trade Hall, Manchester. The subject was "Crystalline and Molecular Forces." Toward the close of the lecture, after a successful experiment showing the tendency of atoms to follow an architectural instinct, he said although he had seen this experiment hundreds and hundreds of times, he had never looked upon it without feelings of astonishment. The revelations of science were not in the least degree calculated to lessen one's feelings of astonishment. We were surrounded by wonders, by mystery everywhere. He had often in the spring time watched the advance of the sprouting leaves, and observed the general joy of opening life in nature, and had asked himself this question: Can it be that there is no being or thing in nature that knows more about these things than I do? Do I in my ignorance represent the highest knowledge of these things existing in this universe. The man who put the question fairly to himself, if he were a man capable of being penetrated by a profound thought, would never answer that question by professing that creed of atheism which had been so lightly attributed to him. "It is not," Professor Tyndall said, "always those who are charged with skepticism who are the real skeptics, and I confess it is a matter of some grief to me to see able, useful and courageous men running to and fro upon the earth wringing their hands over the threatened destruction of their ideas. I would exhort them to cast out skepticism for this fear has its root in skepticism. In the human mind we have the substratum of all ideals, and as string responds to string when the proper note is sounded, so surely, when words of truth and nobleness are uttered by a living human soul, while these words have a resonant response in other souls, and in this faith I abide, and in this way I leave the question."

TIDES OF LAKES AND LAKELETS.—It is said by most authors on tidal theories that there can be no tides on lakes, for the reason that the moon's attraction is equal over the whole surface of water. I hold that there is a tide raised from every body of water on earth. It is impossible for the moon to raise a body of water from the earth by its attraction, but it counterbalances or neutralizes a portion of the earth's attraction for the water, in consequence of which the water becomes lighter, and the lower portion not so much compressed. Hence, on account of the elasticity of the compressed water, the diminution of compression is followed by an expansion which drives the superincumbent water upward. This is a natural principle which belongs to all bodies of water, although the effect is imperceptible if the water be shallow and not connected with very deep water.

By this theory I account for the very considerable tide that rises on Eagle Lake in the northern part of California. The lake is very deep and has never been fathomed.—*Cor. Scientific American.*

FALL IN THE VALUE OF AMETHYSTS.—According to the *Journal of Applied Science*, the large number of diamonds that has been thrown into the market since 1872, from Brazil, has caused a great depreciation in their value. The first lots sent to Europe brought from \$500 to \$600 per araba of 32 pounds weight; but as the quantity increased the price rapidly receded, and at last finally decreased to nothing. At present no offer can be obtained for any lots on hand.

Use of the Spectroscope in Puddling.

Mr. A. McMartin recently stated, at the American Institute of Mining Engineers, that the use of the spectroscope in the Zwickau process was one of the most beautiful experiments in metallurgy.

He says that one never tires watching the brilliant changes in the spectrum, blow after blow. The specific causes of these changes have been the subject of much dispute and unsatisfactory investigation. But all are agreed that carbon has something to do with them, whether as such, or in gaseous form in such nitrogenous compounds as cyanogen. Whatever be their cause, these changes do take place—and that so regularly that an experienced eye can place full dependence upon them as indications of the state of preparation of the metal bath. The spectrum at first appears without lines; but as soon as the spark period begins to give place to its successor, and the clear flame to extend out of the mouth of the converter, the bright orange yellow sodium line quickly makes its appearance, and remains clearly visible till the blast is turned off. After the sodium line appear the red lines, which represent calcium lithium; and then a beautiful series of perfectly graded green lines in the green, and pale blue lines in the blue section of the spectrum, manifest themselves, one after another, each in its series, until, at the climax of the operation, when the greatest heat is attained, the spectrum rivals that of chloride of copper in beauty and brilliancy. A very experienced eye can also see a beautiful violet line in the violet section at this point.

But the characteristic lines of the Bessemer spectrum are the beautiful, band-like, graduated series in the blue, and especially in the green section. In the inverse order to that in which they arose to their climax, these lines gradually diminish in brilliancy, and at last vanish. But some of the green lines still remain, after the blue series has entirely vanished; and at this point nothing must be allowed to distract the conductor of the operation from closely watching the spectrum; for the only index (though a perfect one) of the exact end of the operation, is the degree of brilliancy of certain green lines, which remain when the charge has arrived at the point of desired decarburization. For different mixtures of pig iron a slight difference in the appearance of the indicating green lines is noticeable at this point; and to secure with the same mixture a desired slight difference in the character of the steel produced in two different blows, proper allowance must be made, on the other side, of a certain degree of brilliancy of the green hues.

SEWAGE UTILIZATION.—Recent investigations have raised grave doubts as to the propriety of using sewage as a manure, the vegetables raised by its means proving unhealthful. If we can light our streets and houses with the contents of the sewers, the great problem of what to do with the sewerage of great cities is in a fair way to be solved, but it will not do to be too sanguine. In this connection we may call attention to a ridiculous paragraph which has recently found its way into the public journals to the effect that an English inventor is making an illuminating gas from sewage water. It is said that forty-seven feet of gas is obtained from one quart of sewage water. One foot of sewage gas gives as much light as three feet of coal gas, and the flame is much clearer, purer, more healthful, and cheaper. The process consists in passing the liquid through two heated retorts, then through an iron cylinder called the hydraulic main, which is above the furnace, then through another heated retort, and next through a coil of metal piping immersed in cold water. Afterward the process is the same as in making coal gas.

BURIED KNOWLEDGE.—It is impossible to foresee to what extent scientists of our time will resurrect the buried knowledge of the past. The bricks of Nineveh, stamped with unknown letters in an unknown language, have been deciphered and translated; the existence and manners of the men who lived contemporaneously with the elephant and rhinoceros in Europe have been inferred from fragments of bone and stone; the domestic religion of the early Greeks has been explained for the first time after a lapse of 2500 years; and now we are about to have a translation of a comprehensive treatise on medicine, as understood and practiced in the valley of the Nile 3400 years since. A large papyrus, written in hieroglyphics and in excellent preservation, found in a pyramid, has been translated in Europe, and is now being printed by steam to satisfy the doctors that their learning and their ignorance do not date from yesterday.

IMPORTANT DISCOVERY IN LUBRICATION.—Professor Barker, of Philadelphia, and formerly of Yale College, has recently made a discovery which promises to be of great value to railroad men. It is a metallic paint, intended for application to "journal boxes" on railroad cars. The paint when heated to about 160 degrees Fahrenheit turns from its original color, which is a deep clear red, to a pure black, and immediately on cooling it resumes its redish hue. The journal boxes being covered with this paint, train hands detect at a glance whether a journal has heated or is heating. Their knowledge now is only gained when the wood work is ignited, and the damage has already been done.

Mining Stocks.

The bottom has apparently dropped out of stocks and everything is at "bed rock" prices. Even the big bonanza mines have had spots knocked out of them, and are down at the bottom of the ladder. All animation has departed from the stock market, and with the depression in prices the buyers are fewer. The news from the principle mines on the Comstock is as favorable as ever, there being no noted indications that the big mines are any poorer than they were a few weeks ago. Neither is there any indication that some of the little mines are richer, as the falling off in prices would seem to indicate, according to the rule of late. How long the present depression will last, it is, of course, impossible to state. The difference in prices between stocks this week and last, can be seen by our stock table.

Sales at the S. F. Stock Exchange.

Last Week.

THURSDAY, JANUARY 28.	MORNING SESSION.
810 Alpha.....	18 1/2 @ 20
200 b.....	10 1/2 @ 10 3/4
963 Belcher.....	34 1/2 @ 35
100 b.....	45 @ 46 1/2
425 Best & Belcher.....	49 @ 50
380 Confidence.....	24 @ 25
725 Con Virginia.....	32 @ 33 1/2
140 2 1/2 California.....	12 @ 13
100 b.....	41 @ 42 1/2
570 Chollar.....	67 @ 68 1/2
655 Crown Point.....	30 @ 31 1/2
730 Empire Mill.....	17 1/2 @ 18 1/2
725 Gold & Curry.....	17 @ 18 1/2
390 Hale & Norcross.....	30 @ 31 1/2
155 Imperial.....	13 @ 14 1/2
885 Kentucky.....	15 1/2 @ 16 1/2
9435 Mexican.....	30 @ 31 1/2
2255 Ophir.....	100 @ 110
40 b.....	10 @ 11
100 b.....	105 @ 110
70 b.....	108 @ 110
20 b.....	108 @ 110
195 Savage.....	12 @ 13 1/2
535 Nevada.....	16 1/2 @ 17 1/2
975 Y Jacket.....	100 @ 110

This Week.

THURSDAY, FEBRUARY 4.	MORNING SESSION.
590 Alpha.....	16 1/2 @ 17 1/2
50 b.....	30 @ 31 1/2
1625 Belcher.....	34 @ 35 1/2
100 b.....	45 @ 46 1/2
2650 Best & Belcher.....	42 @ 43 1/2
950 Chollar.....	67 @ 68 1/2
140 2 1/2 California.....	12 @ 13
935 Crown Point.....	24 @ 25 1/2
570 Chollar.....	67 @ 68 1/2
655 Crown Point.....	30 @ 31 1/2
730 Empire Mill.....	17 1/2 @ 18 1/2
725 Gold & Curry.....	17 @ 18 1/2
390 Hale & Norcross.....	30 @ 31 1/2
155 Imperial.....	13 @ 14 1/2
885 Kentucky.....	15 1/2 @ 16 1/2
9435 Mexican.....	30 @ 31 1/2
2255 Ophir.....	100 @ 110
40 b.....	10 @ 11
100 b.....	105 @ 110
70 b.....	108 @ 110
20 b.....	108 @ 110
195 Savage.....	12 @ 13 1/2
535 Nevada.....	16 1/2 @ 17 1/2
975 Y Jacket.....	100 @ 110

AFTERNOON SESSION.

455 Meadow Valley.....	12 @ 13
210 Ray Patch.....	12 @ 13
100 El Dorado South.....	12 @ 13
170 Golden Chariot.....	22 @ 23 1/2
125 Harbinger.....	12 @ 13
150 S Nevada.....	16 1/2 @ 17 1/2
25 Ida Elmore.....	12 @ 13
255 Raymond & Ely.....	30 @ 31 1/2
105 Eureka Co.....	12 @ 13
25 Pioche.....	12 @ 13
200 American Flag.....	12 @ 13
50 b.....	10 @ 11
110 Newark.....	12 @ 13
450 M Belmont.....	12 @ 13
25 Eschschuer.....	12 @ 13
40 Seg Belcher.....	12 @ 13
650 Overman.....	12 @ 13
50 b.....	10 @ 11
45 Justice.....	12 @ 13
150 Succor.....	12 @ 13
355 Union.....	12 @ 13
1600 Jolly.....	12 @ 13
190 Caledonia.....	12 @ 13
175 Knickerbocker.....	12 @ 13
580 Baltimore Con.....	12 @ 13
260 Bullion.....	12 @ 13
15 b.....	10 @ 11
315 Utah.....	12 @ 13
480 Silver Hill.....	12 @ 13
20 Challenge.....	12 @ 13
120 Dayton.....	12 @ 13
190 New York.....	12 @ 13
610 Occidental.....	12 @ 13
100 Rock Island.....	12 @ 13
60 Senator.....	12 @ 13
1325 Phil Sheridan.....	12 @ 13
110 Woodville.....	12 @ 13
335 L Washington.....	12 @ 13
330 Kossuth.....	12 @ 13
280 Original Gold Hill.....	12 @ 13
160 Seg Rock.....	12 @ 13
275 C P Ravine.....	12 @ 13
100 J Little.....	12 @ 13
1822 Andes.....	12 @ 13

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office at San Francisco:

INDIAN QUEEN M. AND M. CO., Jan. 21.—Location: Emeraldal county, Nevada. Directors—A. E. Davis, Seth Cook, Edward Barron, Grove Adams and Wm. Adams. Capital stock, \$6,000,000, divided into 60,000 shares.

NORTH SAN FRANCISCO S. M. CO., Jan. 21.—Location: Storey county, Nevada. Directors—A. Staples, C. J. Eaton, C. M. Peck, C. J. F. Atwell and H. R. West. Capital stock, \$10,000,000, divided into 100,000 shares.

HOPE QUINCY MINING CO., Jan. 21.—Location: Sonoma county, California. Directors—Thomas Hardy, Edward McLean, Jacob Hardy, S. W. Howland and W. P. Morey. Capital stock, \$5,000,000, divided into 50,000 shares.

GOODALL, NELSON & PERKINS STEAMSHIP CO., Jan. 22.—Objects for which the corporation is formed are, the transaction of the business of a steamship company on the Pacific Coast, and in any of the ways or harbors thereof, and anywhere in the Pacific Ocean. Also, the carrying on of the business of warehousemen and wharfingers in connection with said steamship company. Directors—Charles Goodall, Christopher Nelson, George O. Perkins, John O'Farrell, John Rosenfeld, F. S. Wiegner and Edwin Goodall. Capital stock, \$2,000,000, divided into 20,000 shares.

WELLS-FARGO MINING CO. OF CALIFORNIA, Jan. 22.—Location: Storey county, Nevada. Capital stock, \$10,800,000. Directors—D. L. McDonald, C. R. Johnson, A. C. Taylor, H. Z. Wheeler and George W. Hammer.

NORTH CONSOLIDATED VIRGINIA M. CO., Jan. 22.—Location: Virginia mining district, Storey county, Nevada. Capital stock, \$10,000,000. Directors—H. P. Wakelee, Robert C. Rogers, E. M. Fry, N. B. Stone and George W. Hopkins.

ALBANY QUICKSILVER M. CO., Jan. 22.—Location: Lake county, California. Capital stock, \$6,000,000. Directors—R. W. Tully, C. N. Toser, E. G. Waite, William U. Young and J. G. Kiley.

SENATE No. 1 or PATENT MINERALS, Jan. 27.—The purposes of the organization are to deal in real estate, mining stocks, and anything else for which individuals may lawfully associate themselves. Capital stock, \$10,000,000. Directors—J. W. Rimington, Uriah B. Thomas, Charles C. Terrill, Frank D. Morrell, and A. M. Winn.

The Union Consolidated silver mining company has filed a certificate of increase of capital stock from \$2,000,000 to \$10,000,000.

The Buckeye silver mining company on the 20th, increased its capital stock from 16,000 to 48,000 shares.

THE LAIRD MINING COMPANY. Object: Carrying on

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Bowery Cons M Co	Ely District	3 20 Dec 15	Jan 25	Feb 23	O E Elliott	419 California st
Caledonia S M Co	Washoe	10 300 Jan 8	Feb 12	Mar 5	R Wagoner	414 California st
Cedarburg G M Co	Cal	1 50 Dec 24	Jan 29	Feb 24	D M Boker	215 Sansome st
Charlot Mill & M Co	San Diego Co	1 50 Dec 24	Jan 29	Feb 24	F Swift	419 California st
Confidence M Co	Cal	1 50 Jan 16	Feb 23	Mar 17	W S Anderson	210 Battery st
Dancy M Co	Washoe	12 75 Jan 12	Feb 16	Mar 9	G R Spinney	320 California st
El Dorado South Cons M Co	Nevada	5 75 Jan 15	Feb 19	Mar 12	W Willis	419 California st
Empire Mill & M Co	Washoe	17 50 Dec 23	Jan 27	Feb 18	W E Dean	419 California st
Empire M Co	Idaho	9 100 Jan 30	Feb 24	Mar 25	W E Dean	419 California st
Florida S M Co	Washoe	1 100 Jan 8	Feb 10	Mar 2	L Hermann	11 Pine st
Golden Chariot M Co	Idaho	12 150 Jan 4	Feb 8	Feb 23	L Kaplan	Merchants' Ex
Hale & Norcross M Co	Washoe	1 50 Jan 12	Feb 12	Mar 2	J S Kennedy	419 California st
Ida Elmore S M Co	Idaho	16 100 Feb 1	Mar 8	Mar 23	W Willis	419 California st
Indus G & S M Co	Washoe	2 25 Dec 30	Jan 30	Feb 18	D Wilder	Merchants' Ex
Iowa M Co	Washoe	2 25 Jan 13	Feb 15	Mar 10	A D Carpenter	605 Clay st
Justice M Co	Washoe	15 500 Jan 12	Feb 12	Mar 2	J S Kennedy	Merchants' Ex
Knickerbocker M Co	Washoe	11 150 Dec 23	Jan 30	Feb 19	H Boyle	Stevensons Bldg
Lady Bryan M Co	Washoe	5 100 Jan 11	Feb 12	Mar 3	F Swift	419 California st
Lady Washington M Co	Washoe	2 80 Dec 17	Jan 21	Feb 8	H O Kibbe	419 California st
Mahogany & S M Co	Idaho	12 200 Jan 15	Feb 24	Mar 18	W E Dean	402 Montgomery st
Mint G & S M Co	Washoe	9 200 Jan 19	Feb 24	Mar 18	D A Jennings	401 California st
Newark S M Co	Ely District	18 100 Feb 2	Mar 10	Mar 31	J W Hardy	419 California st
Pago Tunnel Co	Utah	1 25 Jan 21	Mar 2	Mar 30	F R Townsend	299 Pine st
Phil Sheridan G & S M Co	Washoe	2 25 Jan 21	Mar 2	Mar 30	F R Townsend	299 Pine st
Pioche West Ex M Co	Ely District	6 30 Dec 28	Feb 9	Feb 25	C E Elliott	419 California st
Poorman G & S M Co	Idaho	2 100 Jan 2	Feb 5	Feb 26	T W Kimball	419 California st
Raymond & Ely M Co	Pioche	3 300 Jan 18	Feb 26	Mar 26	T W Colburn	418 California st
Red Jacket M Co	Idaho	6 50 Feb 1	Mar 9	Mar 30	W Willis	419 California st
Rock Island G & S M Co	Washoe	4 100 Jan 19	Feb 17	Mar 9	J W Clark	419 California st
Silver Cord M Co	Idaho	1 100 Jan 2	Feb 5	Feb 26	Frank Swift	419 California st
South Chariot M Co	Idaho	12 100 Jan 9	Feb 16	Mar 9	H O Bogan	402 Montgomery st
St Patrick G M Co	Cal	10 80 Feb 2	Mar 8	Mar 31	D F Verdenal	409 California st
Taylor M Co	Washoe	7 50 Nov 19	Jan 21	Feb 12	D Squire	Stevensons Bldg
Union S M Co	Washoe	9 200 Jan 23	Feb 24	Mar 25	W E Dean	419 California st
War Eagle M Co	Idaho	9 100 Jan 25	Mar 2	Mar 23	L Kaplan	Merchants' Ex
Yellow Jacket S M Co	Washoe	19 500 Dec 10	Jan 13	Feb 19	G W Hopkins	Gold Hill

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

California and Arizona M Co	Arizona	10 10 Jan 8	Feb 22	Mar 12	T E Jewell	567 Montgomery st
California Cons M & W Co	Cal	3 100 Jan 14	Feb 16	Mar 5	J W Tripp	408 California st
Carrie Hale Hydraulic M & W Co	Cal	3 100 Jan 15	Feb 24	Mar 17	H Knapp	Merchants' Ex
Combination G & S M Co	Panama	5 100 Dec 28	Feb 26	Mar 23	D Wilder	Merchants' Ex
Con Reform L & S M Co	Lower Cal	2 50 Dec 21	Jan 30	Feb 20	A D Carpenter	605 Clay st
Edith Quicksilver M Co	Cal	2 20 Dec 23	Feb 3	Feb 23	W Stuart	112 Liederstorf st
Emma Hill Cons M Co	Utah	2 400 Jan 23	Mar 2	Mar 31	G J Cole	303 Montgomery st
Golden Rule S M Co	Utah	2 120 Dec 26	Feb 2	Mar 2	M J Galt	415 Kearny st
Equitable Tunnel M Co	Utah	9 25 Jan 12	Feb 17	Mar 9	C S Healy	Merchants' Ex
"420" M Co	Washoe	9 100 Dec 29	Feb 2	Feb 20	E F Stone	419 California st
Gold Mountain G M Co	Boar valley	4 100 Jan 35	Mar 6	Mar 25	A Wiesner	515 California st
Golden Rule S M Co	Utah	5 5 Dec 8	Jan 15	Feb 15	K Wertheimer	300 Clay st
Hale & M Co	Mariposa Co	3 125 Jan 13	Feb 16	Mar 16	W A M Van Bokkelen	419 Cal st
Hayes O & S M Co	Robinson Dist	6 20 Jan 4	Feb 12	Mar 8	G R Spinney	320 California st
Illinois Central M Co	Idaho	1 20 Jan 24	Feb 17	Mar 10	F H Hermann	402 Montgomery st
Independence Cons M Co	Cal	10 10 Jan 9	Feb 17	Mar 10	F H Hermann	418 Kearny st
Janiata Cons S M Co	Aurora Nev	2 100 Dec 16	Jan 21	Feb 10	C S Neal	419 California st
Kearse Cons Quicksilver M Co	Cal	3 30 Dec 23	Feb 2	Feb 22	J W Tripp	408 California st
Kennedy S M Co	Cal	8 150 Dec 16	Jan 20	Feb 10	A Wissner	210 California st
Little Pancho Quicksilver M Co	Cal	1 20 Feb 7	Mar 4	Mar 25	G R Spinney	320 California st
Martin & Walling M & M Co	Cal	1 50 Dec 1	Jan 8	Jan 23	J W Tripp	408 California st
New York M Co	Washoe	11 50 Jan 15	Feb 5	Feb 25	H O Kibbe	419 California st
North Elmfield Gravel M Co	Cal	35 100 Dec 16	Jan 16	Feb 3	I Derby	320 California st
Onida V Co	Amador Co	10 100 Dec 11	Jan 16	Feb 3	L Kaplan	Merchants' Ex
Ophir G M Co	Bear valley	1 10 Jan 22	Mar 2	Mar 27	J P Cavalier	515 California st
1155 S Nevada	White Pine	10 10 Jan 9	Feb 15	Mar 8	A K Durbin	498 California st
Pinto M Co	Nye Co Nevada	3 100 Jan 12	Feb 18	Mar 12	R H Brown	402 Montgomery st
Pruslan G & S M Co	Cal	2 125 Dec 24	Jan 28	Feb 19	A Baird	315 California st
Rattlesnake Quicksilver M Co	Cal	2 100 Jan 2	Feb 5	Feb 25	C R Carrigan	100 Front st
San Yacinto M Co	Cal	5 100 Jan 13	Feb 20	Mar 20	F R Bunker	606 Montgomery st
Silver West Cons M Co	Eureka Nev	1 25 Jan 23	Mar 30	Mar 30	D A Jennings	401 California st
Webfoot M Co	Elko Co Nev	1 25 Jan 23	Mar 30	Mar 30	D A Jennings	401 California st
Wells, Fargo & Co M Co	Washoe	1 50 Jan 13	Feb 20	Feb 15	A O Taylor	333 Montgomery st
Wyoming G M Co	Cal	5 50 Jan 13	Feb 20	Feb 15	W J Gunn	410 Montgomery st
Yarborough S M Co	Kern Co	6 30 Dec 23	Jan 31	Feb 23	E Barry	415 Montgomery st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Bellingham Bay Coal M Co	Nevada	J H Dobinson	305 Sansome st	Annual	Feb 15
Bowery Cons M Co	Idaho	Obas E Elliott	419 California st	Annual	Feb 9
Cherokee Flat B G M Co	Cal	H Hermann	603 Washington st	Annual	Feb 19
Ida Elmore S M Co	Washoe	D Wilder	Merchants' Ex	Annual	Feb 7
Iowa M Co	Washoe	Called by Trustees	605 Clay st	Special	Feb 16
Knickerbocker M Co	Washoe	J S Kennedy	419 California st	Special	Feb 15
Lady Bryan M Co	Washoe	Called by Trustees	419 California st	Special	Feb 11
Omaha Table Mountain M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 24
Pintuna M Co	Cal	E P Flint	419 California st	Special	Feb 15
Saw Pit Cons M Co	Cal	J W Clark	419 California st	Annual	Feb 11
Tinto M & M Co	Utah	H O Miller	411 1/2 California st	Annual	Mar 3
Vivian G & S M Co	Cal	H S Fitch	333 California st	Annual	Mar 4
Welch Cons Quicksilver Co	Cal	E R Ryan	330 Pine st	Annual	Feb 8
Zacatore G M Co	Cal	L Hermann	330 Pine st	Annual	Feb 9

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M. Co.	Washoe.	H. O. Kibbe.	419 California st	3 00	Jan 11
Charlot M & M Co.	Cal	Frank Swift	449 California st	40	Nov 16
Consolidated Virginia M Co	Cal	E. T. Kibbe	401 California st	3 00	Jan 11
Crown Point M Co.	Washoe	C. E. Elliott	44 California st	2 00	Jan 12
Diana M. Co.	Nev	N. G. Fasset.	220 Clay st.	1 00	Jan 25
Eureka Consolidated M Co	Nev	W. W. Traylor	419 California st	50	Feb 5
Ray Patch M Co.	Nevada	D. F. Verdenal	409 California st	25	Feb 5

MENOCINO M. CO.—Location: Mendocino county. Capital stock \$100,000, in shares of \$20 each. The following companies have filed certificates of increase of capital stock:

CONS. VIRGINIA M CO. from \$10,800,000 to \$54,000,000 in shares of \$100 each.

CALIFORNIA M. CO. from \$10,800,000 to \$54,000,000 in shares of \$100 each.

GOLD & CURRY M. CO. from \$4,800,000 to \$10,800,000 in shares of \$100 each.

SUCCOR M. & M. CO. from 22,800 shares to 68,400 of \$50 each.

Meetings and Elections.

The following mining companies have elected officers for the ensuing year during the past week:

NORTH CALIFORNIA G. & S. M. CO., Jan. 25.—Directors: C. B. Greathouse, J. H. Blood, S. Franklin, W. H. Aitken, and J. K. Laska.

LYON M. & M. CO., Jan. 27.—Trustees: F. Birdsell (President), Henry F. Stone (Secretary), and John Scott and Edward F. Stone (Secretaries). The company paid two dividends of \$20,000 each during the fiscal year, one in April and the other in July. The works of the company are at Dayton, Nevada, and consist of large buildings, mills and other improvements, and considerable custom work is done.

BONANZA M. CO., Jan. 25.—The following officers were elected: F. B. Horton, President; C. F. Hurley, Vice-President; John M. Johnson, Treasurer; F. Madge, Secretary, and D. G. McLaughlin, General Superintendent.

CALIFORNIA M. CO.—Trustees: Edward Barron was elected President; Charles H. Fish, Secretary, and Edward Barron, J. C. Flood, W. S. O'Brien, S. Haydenfeld and T. H. Williams, Trustees. The balance sheet shows the company's indebtedness to be \$80,500; expenses last year, \$78,812.41; cash on hand, \$1,087.86.

KOSSUTH M. CO.—Trustees: A. F. Everett, Robert Sherwood, J. E. Shawhan, Peter Thompson and M. Hochstetler were elected. The company was continued as Secretary, and P. H. Scott was chosen Superintendent.

RAYMOND & ELY M. CO., Jan. 26.—Trustees: Alpheus Bull (President), R. F. Morrow, Geo. W. Haver, A. K. P. Harmon and Henry Raymond, T. W. Colburn, Secretary and H. H. Day, Superintendent.

BELORES M. CO.—Trustees: J. D. Fry, President; A. K. P. Harmon, Vice-President; J. H. Dohinson, R. F. Morrow, B. F. Sherwood, H. C. Kibbe, Secretary and William H. Smith, Superintendent.

MINING SUMMARY.

Following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

VERAS COUNTY.

CAVALERAS MINE.—*Calaveras Chronicle*, Jan. 23: Work is progressing favorably in the San mine at Railroad. The main shaft is deep, and levels are now being run. It is thought the lode will widen as the levels are run, and very favorable developments are expected in the near future. No other district is more energetically and vigorously worked than the Sanderson, and there is one that gives better promise of permanent and valuable.

The temporary interruption of the mine, resulting from the late heavy rain, is now over, and operations are going on. The shaft is free from water, and work of running the 1000-ft level is going on. The batteries continue to find metal in crushing rock from the 900-ft level.

REPAIRED.—The damage to the ditch Canal and Mining Company, resulting from the late storm is repaired, and a full water again running. The break was by land slides—avalanches of soil slipping down the steep hills into the ditch below. It is not probable that either miners or stock will have to mourn the scarcity of grain this season.

HILL MINE.—The new company has taken hold of the Prussian Hill mine, and is pushing operations forward. The main shaft is down 225 ft, and at this point the developments are of the most encouraging character. The company is determined to thoroughly prospect the mine, and the object in view will continue sinking. It is supplied with good machinery.

COUNTY.

MINES IN SCOTT'S VALLEY.—*Lakeview*, Jan. 28: In November, last year, J. H. Hunter discovered a lode of mineral in the hills bordering Scott's valley, five miles northwest of Lakeport. Having started at mining both in California and in Nevada, Mr. W. was pretty confident that the silver-bearing in character, so he sent men from the surface to San Francisco, Cal. The return received gave \$97 in value to the ton. A subsequent assay made by Whitton at Ukiah, by mill process, gave the ton of rock from the outcroppings of the same mine, which is named the "Emigrant." Three other mines, the Mountain, the Manzanita and the Morning Star are in the vicinity, all of which show silver rock. The ledge are from four to 20 ft thick. The miners have organized and their locality the Blue Lake District. H. Wattenbarger has been elected assessor.

DA COUNTY.

YORK HILL.—*Foot Hill Tidings* Jan. 30: Work of rich ore still continues in this district and if anything gets better. Superintendent has his hands full of rich specimens every time he comes up. The ledge is three feet thick and it all contains gold and silver fully up to bonanza standard. The Rocky Bar, Allison Ranch, Gold Hill, and scores of others which are in the vicinity, all of which show silver rock. The ledge are from four to 20 ft thick. The miners have organized and their locality the Blue Lake District. H. Wattenbarger has been elected assessor.

Work is going on in many places here just now. We strolled over the hills in all directions this week and found new veins to the surface in a great many places. This is as it should be, and we hope to be able to note a good many rich veins here, heretofore, nothing encouraging has been brought to light.

Lucky mine and the old Cambridge, now belonging to one company, are being worked under charge of Capt. J. White, the superintendent. A shaft on each of these has reached the ledge and the quartz is being worked. The company which we have known as the Howard Hill, except to stop their mill and to produce gold bars as a spring as a supply of wood can be obtained. This will put life into the long deserted village of Union Hill.

ROBBING.—*Nevada Transcript*, Jan. 23: The Holme mine at Scott's Flat was visited by robbers on Wednesday night, and a box at the head of the flume was cleaned up. Mr. Holmes thinks it has been done early Thursday morning, and it was traced by their tracks to an old mine where the amalgam had been burned. A fire still burning in the cabin. Mr. Holmes came immediately to town, and found \$50 worth of gold which had evidently been taken from an above, had been sold at the store. It is supposed that between three and four hundred dollars in all were taken, besides a tank of quicksilver.

There is in the mine hereabouts have been very busy keeping down the water, but are found equal to the task, and every day is a lovely now.

JUAN ITEMS.—*San Juan Times*: We read Mr. Burns, of Malakoff, that the ditch, the Eureka lake ditch, and the Bloomfield ditch are broken in many places between here and Eureka. It is impos-

sible now to make even a guess at the amount of damage resulting from the late storm.

The Eureka lake company's mines at North Columbia are in full blast. They have plenty of water and are breaking rich ground.

PLUMAS COUNTY.

NORTH FORK ITEMS.—*Plumas National*, Jan. 23: Surveyor Keddie, who has been at work for some weeks over in the North Fork country, returned on Sunday last, and kindly furnishes us with the following items: The recent trial of the North Fork Company's big pipe demonstrates to a certainty that it will prove a grand success. Five hundred inches of water went through the pipe with only a "head" of thirty feet—that is, the water only backed up thirty feet higher than the outlet at the lower end. This leaves 120 feet of pressure to be used, and as soon as the cold weather is over the water will be turned through again, and there is no doubt but that 2,000 inches will go to Dutch Hill. The pipe only burst three times, so far, and that can be accounted for by the fact that the pipe-makers ran out of iron after the storm set in, and were obliged to use some that had been discarded and laid away as unfit to work. Mr. Keddie has lately surveyed two claims for the Cariboo Hydraulic Mining Company, who will perfect their title by a patent. The two claims embrace about 200 acres, and it is thought to be the splendid ground. They are called the Clear Creek and the Mosquito Creek claims. They will get their water from Butt creek, and will have every facility for working the ground easily and rapidly. The North Fork section shows every indication of permanent prosperity.

Daniels & O'Brien, on Whaponee creek, are still driving away at their head-rock tunnel, in hopes of getting beyond the old workings.

McCarger & Co. have commenced operations again on Whaponee creek.

SHASTA COUNTY.

QUARTZ.—*Shasta Courier*: We are gratified to learn that J. P. W. Davis, formerly of Healdsburg, has not only succeeded in benefiting himself, but has been the means of developing a new feature in Western Shasta, in the way of gold-bearing quartz. A mill is to be put up, and Mr. Davis has bonded three mines owned in Trinity for \$50,000. Judging from what we have seen and heard, we think there is something pretty good in Bullychoop.

SIERRA COUNTY.

Mining Items.—*Mountain Messenger*, Jan. 30: We understand that the Bald Mountain Mining Company lost all their sluices from the small dump to the bridge, and boxes were taken out in spots all the way down the creek.

John Conrad, one of the owners of the Iowa mining claim at Mt. Pleasant Ranch, informs us that the bed of blue gravel which they have struck is six feet in thickness, and prospects well all through. The company have not yet decided how they will work their claim. It is said that a tunnel can be run in to tap the channel within 2,300 feet or less. Work will be suspended for a time.

We are informed that the high water in Slate Creek did a great deal of damage in Scales' Diggings. The high bridge on the creek at that place was carried away, and the flumes, etc., crossing the creek were badly wrecked. The two large reservoirs belonging to the Boyce Bros., were broken and ruined, and one he belonging to Col. Williams was also destroyed. On Sunday a slide occurred in Col. Williams' diggings, damaging a large quantity of pipe and doing other damage. Probably \$50,000 would not more than make good the damages done in this small camp.

SONOMA COUNTY.

CLOVERDALE MINE.—*Sonoma Democrat*, Jan. 30: The furnace of the Cloverdale mine is within a few days of commencing work. It would now be running but for the delay caused by the late storm in delivering some necessary articles. The furnace is well built, and stands upon the bank of Big Sulphur, about half a mile above the mouth of Squaw creek. Hones for men, shops, and other necessary sheds have been built, and all is ready for work. A railway is also completed from the mine to the furnace. The cars are raised and lowered by a wire rope. There is considerable ore on the dump, said to be of high grade. The Cloverdale will make a good showing among the mines in this county, which are now about ready for reducing ore.

The Livermore, under the charge of John Magoon, is progressing finely. The furnace there is also near completed. It will be ready for work as soon as the weather settles. The owners are sanguine and we wish them success. We are informed that R. S. Johnson, formerly of Mark West, and Dave Collier, have made a discovery of cinnabar on the Clear Lake and Cloverdale road.

MINES NEAR MERCURYVILLE.—*Cor. Russian River Flag* Jan. 28: At the Geyer mine, the furnace, (a Kuox & Osborn) was started on the first of January, and the first charge of ore was put in on the 3d inst. On the 6th the mercury flowed from the condensers—a remarkable occurrence, and unprecedented in the history even of this ex-flood furnace. The ore is delivered in carts from the mine above the furnace from 5 or 6 different places. This mine is destined to be a wonderful property. The Superintendent told me that the vein was 150 feet thick, with pay ore all throughout. On my return past the Oakland, found a boy lot of men assaying ore and shipping it to the Ida Clayton furnace, with the tunnels going ahead and shafts sinking, taking out rich ore to supply the furnace which is to be built on the mine in the spring. I found the Missouri retorts run-

ning on ten per cent ore from the Georgia, owned by Thompson Brothers, of Pine Flat and Reynolds of Healdsburg. The mines about this flourishing camp employ about 200 men now and will employ perhaps five times that number in the spring.

TRINITY COUNTY.

RUSHING THINGS.—*Trinity Journal*, Jan. 30: The Weaverly D. & H. M. Co. has been mining the Ware mine day and night up to Wednesday, when the supply of water getting short, they were compelled to discontinue night work. Six thousand feet of bed-rock has been stripped.

GOON PROSPECTS.—Later advices from Cinnabar confirm the news last week regarding the strike made by the Trinity company. Six feet of good cinnabar ore has been cut through by their tunnel. Stock in the company has an upward tendency.

Although miners throughout the county are doing some work, the supply is not sufficient to keep them steadily employed. Frost and wind during the past week has reduced the supply to a great extent.

TUOLUMNE COUNTY.

NEW ALBANY MINE.—*Tuolumne Independent*, Jan. 30: The recent development in the New Albany mine, in the opinion of those who have examined it thoroughly, will prove to be the most important strike, as regards size and richness, that has been made in this county for many years. The vein was tapped in a level running south from the shaft, some 50 feet below the level of the main tunnel, which disclosed a large body of ore, pitching with considerable inclination, and showing free gold in a dark blue sulphuretted hearing ore, pronounced by all who have seen it, to be of extraordinary richness. The shaft is being driven down below this level as rapidly as possible, and when they arrive at a depth of 60 feet a level will be run to strike the shaft, from whence they will proceed to extract and raise this valuable and seemingly inexhaustible body of ore. Dr. J. Walker, under whose faith and intelligent administration the work has been so successfully prosecuted, will leave for San Francisco in the course of a week or ten days, with the view of perfecting arrangements with his company, for a mill and hoisting works.

ANOTHER MARBLE STRIKE.—Hugh Coyle & Co. have taken up a marble lead at the upper edge of town, which promises to be of great value. It measures 200 feet wide and crosses a ten acre lot. The marble is pure white, clean and free from dirt, and the specimen we have before us we believe would make a white mark on the "beautiful snow." It will be excellent for statuary.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—*Gold Hill News* Jan. 28: Daily yield, 400 tons of ore. This ore is mostly extracted from the 1300 and 1400-ft levels although the running of cross-cuts and prospecting drifts necessitate the extraction of some ore from the 1500 and 1550-ft levels. The ore breasts both north and south on the 1300 and 1400-ft levels are yielding splendidly. The north drift on the 1500-ft level has penetrated the California ground a distance of 70 feet, the face still in the same immensely rich chamber of ore as that heretofore described. The bottom of the winze below the 1550-ft level is still in the richest possible character of ore. The 1500-ft level is opening up magnificently at all points, and the prospects of the main mine never were brighter than at the present. The new mill is working splendidly, crushing about 250 tons of ore per day. The old mills are all working up to their full working capacity, and good returns may be looked for.

OPHR.—The ore slopes between the 1300 and 1455-ft levels as well as those on the 1455-ft level are all looking well and yielding the usual amount of high grade ore. The bottom of the north winze on the 1455-ft level, still continues in the finest quality of rich ore. Assays from the bottom of the winze last evening gave over \$1,000 per ton as the result. The southeast cross-cut, on the 1455-ft level, is passing through a very favorable formation, cutting occasional streaks of low grade ore, a formation similar in almost every respect to that penetrated by the east cross-cut in the Consolidated Virginia mine before cutting their immense rich ore body. The repairs to the drift on the 1700-ft level are completed, and cross-cutting has commenced so that some good developments may be looked for in that quarter soon.

BELOHER.—The bottom of all three of the prospecting winzes below the 1400-ft level are in fine ore, and the prospects of the lower levels are apparently on the increase daily.

CALIFORNIA.—The face of the cross-cut on the 1500-ft level, near the south line, is still in the richest possible character of ore. The face of cross-cut No. 2, on the same level, is now penetrating the same character of material as that found in the cross-cuts further to the southward just before striking the rich ore found in the other cross-cuts and in Consolidated Virginia.

LADY BRYAN.—The prospecting drifts, both north and south at the first of the new shaft are showing fine ore, and great expectations are based upon developments about being made by a cross-cut started a short time since to cut the ledge further to the northeast than it has yet been prospected.

DAXTON.—The face of the south prospecting drift at the third station level is in a fine quality of red sulphuretted ore, which is rapidly proving itself a fine development.

CROWN POINT.—Sinking the main incline is making excellent progress. The incline is fast

approaching the 1700-ft level, at which point a new station will be opened and a drift started to prospect the ledge. The main east drift on the 1600-ft level is being pushed ahead toward the ore vein as fast as the nature of the work will permit. The ore breasts between the 1500 and 1400-ft levels continue to yield a good supply of good ore. The ore breasts on the 1300-ft level are also yielding a considerable quantity of good ore. Daily yield, 400 tons of ore.

KOSSUTH.—Sinking the south winze on the ore body found in the south drift at the first station level has been stopped by a flow of water for the present.

UTAH.—Preparations are being made for the erection of new and powerful pumping machinery for draining the water from the shaft and prospecting the mine to a much greater depth than it has yet been prospected.

WONVILLE.—The ore breasts at the 300-ft level of the old works are looking well and yielding the usual amount of good milling ore.

CHOLLAA-POTOSI.—The only work being done in the mine at present is the putting in of new and powerful pumping machinery at the 1100-ft station of the incline.

IMPERIAL-EMPINE.—The main east drift on the 2000-ft level is being steadily driven ahead, with increasing prospects of soon reaching the main ore vein.

HALE & NOACROSS.—Daily yield, 40 tons of ore, from the old workings south, at the 11th station level.

JULIA.—The main south drift on the 1000-ft level is being steadily driven ahead, following the west wall of the ledge, occasionally cutting some fine streaks and bunches of ore.

UNION CONSOLIDATED.—The face of the northeast drift on the 1300-ft level is still in very favorable ledge material, containing streaks and spots of fine looking quartz.

JUSTICE.—The connection is not yet completed between the mining drift north from the Waller Defeat section and that coming south from the 400-ft station of the Justice shaft, but it will be very shortly, after which good developments may be looked for in cross-cutting at that level.

GEOROLA.—A fine, first-class working shaft, of three compartments, has been commenced, the tunnel explorations having indicated the most advantageous point for sinking. Powerful machinery is engaged for the hoisting works, sufficient for working the mine to a depth of 1500 ft.

FLORIDA.—Main shaft down 377 ft to-day, with the bottom in very favorable ground with occasional stringers of quartz coming in.

BULLION.—The south drift on the 800-ft level is still showing some excellent prospects of good ore. The north drift on the 1700-ft level is steadily developing better indications of a paying ore vein.

AMERICAN FLAT.—The prospects for good ore developments on the 750-ft level are excellent.

JACOB LITTLE CONSOLIDATED.—The old Jacob Little, on Cedar Hill, having been consolidated with other valuable ground adjoining, is now about being worked up once more.

NEW YORK CONSOLIDATED.—The prospects of a fine ore development on the 700-ft level are excellent.

IOWA.—The prospects of soon cutting the ore vein are growing better every day.

NIAGARA.—Preparations for the erection of the new hoisting works are going steadily on without interruption. The ore prospects in the surface incline are improving.

PHIL SHERIDAN.—Main west drift in 243 ft. The ledge looks finely, and excellent assays are obtained, which improve as further advance is made.

MEXICAN.—The face of the north drift, on the 1455-ft level of the Ophir, is gradually improving as the work advances. Some fine looking quartz, giving excellent assays, has been encountered.

ANDES.—Development of ore bodies going ahead as usual, but milling facilities are lacking at present.

Montana.

BANNOCK MINES.—*Montanian*, Jan. 21: In this particular section we are highly favored in respect to lodes of superior quality. As an illustration of this fact we refer to the Delmonte, owned by Sears & Smith. Under the skillful management of Messrs. Peck and Bray, after a heavy expenditure of time and money, these energetic gentlemen have developed a mine of inestimable value, attracting the attention of capitalists from Utah, California, and all parts of our Territory. The ore is exceedingly rich in silver, as various assays and shipments have amply demonstrated, and as a natural consequence the value of this mine is rapidly increasing and a new impulse is being given to quartz mining here.

THE SMELTING WORKS.—The smelting works recently burned at Jefferson City are being rebuilt with all possible dispatch. Mr. Nowlan is helping to develop the camp by constructing roads to the adjacent mines, in order to obtain the quartz to furnish the works as soon as they are rebuilt. Con. Cannon, the popular hash vendor at the Merriman House, is a man of large calibre, and deserves a large share of public patronage.

PLACER DIGGINGS.—Extensive placer diggings have been found by Messrs. Kelly and Furvine, in the foothills of the Blue Wing district, near Bannock, but, owing principally to the scarcity of water, they will probably remain unworked for a time.

THE PIONEER QUICKSILVER MINE.—Known as the Socrates, in Sonoma county, was sold last week for \$200,000. The Flagauff, adjoining, was sold to the same purchasers for \$60,000.

The "Tailings" Question.

The Nevada Transcript says: The results of the last storm presents a question of serious import to the people of both the agricultural and mining sections of the State. There is no doubt but a large share of the lands adjoining the rivers which carry the water from the mountains to the ocean, have been flooded, and irreparable damage has been the result. It is evident that no system of damming can prevent an overflow when such a freshet as the last occurs. What are the owners of farms to do? It is evident mining can never be etopped. It is an industry the whole world desires to foster. The Government will encourage it, notwithstanding agriculture may suffer. Hydraulic mining is in its infancy. The very storms which are so destructive to the valleys are just what the mines require. The sediment, which has been accumulating for years in the ravines and river beds, and preventing a proper fall, has all been washed away, and made a place for the deposit of other quantities unwashed. There are thousands of acres of gravel unwashed to one which has been washed. Each year adds to the amount of sediment deposited in the valleys. Fifty years hence the whole surface of the country there will be raised much above its present level, by the accumulation of dirt washed down from above. Men have invested their money and labor there to make homes and develop the resources of the country and they find themselves each successive winter subject to an overflow which renders their property valueless. The same process will be continued as long as mines are worked in the mountains. We believe this state of facts exist only on the Sacramento, American and Feather rivers, above Sacramento. It is evident mining will have to be etopped or that country will have to be abandoned for its present purposes, unless some method can be devised to overcome the difficulty. It is certain mining will never be etopped. So the question as before stated, becomes one of serious import, and will continue to attract the serious consideration of the residents of both sections. What relief can be afforded we cannot apprehend. The question is a complicated one and full of difficulties.

Mining Claims in River Beds.

The Commissioner of the Land Office, in a letter to the Surveyor-General of Montana, wrote as follows:

"So far, however, as your letter may be regarded as asking the advice of this Office for your own guidance upon the subject-matter therein submitted, I have to say, generally, that the mere fact that the banks of a stream are meandered is not conclusive of its navigability. The question is one of fact, and the rule is thus stated:

"Rivers are deemed navigable waters of the United States when they are used, or are susceptible of being used in their ordinary condition, as highways for commerce between the States." (10 Wallace, 557; 11 Wallace, 411.)

The general status of the navigable waters of the United States is thus declared:

"The shores of navigable rivers and the soil under them were not granted by the Constitution to the United States, but were reserved to the States respectively, and new States have the same rights, sovereignty and jurisdiction over this subject as the original ones." (3 Howard, 212; 9 Howard, 471; 13 Howard, 25.)

For general discussion and determination of the rights of proprietors in lands bordering on navigable rivers, under the acts relating to conveyance and sale of public lands, see Railroad Company vs. Schurmeir. (7 Wallace, 272.)

This office will not in any way complicate the full jurisdictional rights in navigable rivers now in territorial limits, but which must in future fall within the boundaries of a new State, by an attempted sale of any portion of the beds of such streams.

The ninth section of the Act approved May 18th, 1796 (1 Stats, 468), furnishes a rule upon the subject of the proprietorship of the stream and the bed of non-navigable rivers.

The last clause of that section is in the following words, viz.: "That in all cases where the opposite banks of any stream not navigable shall belong to different persons, the stream and the bed thereof shall become common to both."

GEOLOGICAL SURVEY IN MASSACHUSETTS.—They are talking of another geological survey of Massachusetts. The last survey was in 1830, and was incomplete. The Committee on the subject say that there are extensive coal and lead measures not yet determined, and deposits of iron. It is probable that the survey will extend over a period of fifteen years and the estimated cost is \$25,000 per annum. We have heard it stated in this city that Professor Whitney, formerly chief of the State Geological Survey of California, is looking out for a similar appointment on the proposed Massachusetts survey. We do not know how much truth there is in the statement.

BASE BULLION.—The exact number of bullion bars shipped from Cerro Gordo by the Cerro Gordo freighting company, from January 1, 1874, to the first of the present month, was 123,176, averaging 82½ pounds each—5,050 tons.

The first shipment of quicksilver from Mendocino county was forwarded to San Francisco a short time ago from the Empire mine on Dry creek.

The Alfalfa Parasite:

Improved agriculture is of so recent a date in California, that but few of the pests in the way of insects and weeds that trouble the cultivator in the older States, have come to plague his California brother. Alfalfa or lucerne is one of the staples of California agriculture, and a weed that threatens the destruction of this crop, is a matter of the first importance. Notices of a particularly troublesome dodder have appeared in the California papers, and we are indebted to the kind attentions of our friends of the PACIFIC RURAL PRESS, of San Francisco, and of the Sonoma Democrat, for specimens, which have enabled us to examine the plant, and to make an engraving of it. Almost every one knows our common dodders, which hang their yellow or copper-colored, wiry stems over the bushes in the swamps of the Atlantic States. There are ten native species east of the Mississippi, several more west of that river, and about seventy species thus far known throughout the world, all of which, with their varieties, are admirably described in Dr. G. Engelmann's elaborate account of the genus. The dodders are all parasites; the seed germinates in the ground, and the stem attaches itself to some other plant; by means of numerous disks or suckers, it draws upon the plant for nutriment, and soon cuts itself loose from the root, and feeds wholly upon its unfortunate host. Some dodders live upon exogenous plants in-

should be taken to prevent its spread. Cut the infested plants, and burn them, and do this before the parasite has matured its seeds. If the dodder has too full possession to allow this to be done, then the plan followed in France, (where a dodder, and probably the same species, is destructive,) may be adopted. Straw is laid in abundance among the plants in a dry time, and then set on fire; the sudden flame destroys the parasite, but does not materially injure the alfalfa, which starts from the roots, and the stems, that escape injury by the fire.—American Agriculturist.

COAL LANDS.—The Commissioner of the Land Office has addressed a letter to the attorney of the Union Pacific Railroad Company, which is applicable to other railroad lands when the United States government made grants from the public domain. The letter is in answer to one written by the attorney requesting the Commissioner to continue the act of June 22, 1874, for the relief of settlers on railroad lands, so as to permit the Union Pacific railroad to select lands containing coal and iron, in lieu of agricultural lands, proposed to be released in favor of actual settlers. The Commissioner in reply reviews the several acts applying in the case, and concludes as follows: "Your company receives all its coal and iron lands without diminution on account of the claim of any settler. To allow you in addition to select lands purely agricultural, and take



A CALIFORNIA WEED—DODDER UPON ALFALFA.

discriminately, while others prefer particular plants, or those of certain families; one confines itself to flex, which, besides the one in question, is the most generally injurious. One of our native species has been known to be troublesome upon young trees in nurseries. The dodder upon alfalfa, so far as we can determine from description, having no authentic specimens for comparison, is *Cuscuta racemosa*, variety *Chiliana*. The species is a very variable one, and between it and related species there is some confusion. The seeds of this were no doubt introduced into California with alfalfa seeds from Chili, the same as it was into Europe many years ago, where it was very destructive to lucerne, often destroying whole fields. The engraving shows the habit of the weed; when once fixed, it spreads and entangles the several branches of a plant, or those of neighboring plants; under this heavy draught made upon its life-blood, as we may regard the sap, the lucerne ceases to grow, and at length turns yellow, and dies from exhaustion. The Sonoma Democrat publishes an opinion that the dodder now so troublesome upon the alfalfa is a native species, but an examination of the specimens makes us quite sure that it is not. One not acquainted with the minute characters, by which the species are distinguished, might, from their outward resemblance, regard them as the same. At the lower left hand of the engraving the relative size and shape of the two seeds are shown, both of course magnified. The alfalfa seed is like a minute, rather flattened, kidney bean; that of the dodder is irregularly orbicular, and only about one third as long as the other. An ordinary magnifier will readily detect the presence of this or other foul seeds in the alfalfa seed. With this, as with other weeds, one important point is to avoid introducing it, and care in selecting the seed will do this. Where it makes its appearance the most prompt measures

therefor reserved coal lands of greatly increased value, would in my opinion materially enlarge your grant, and would therefore be in express violation of the act under which the claim is presented."

SAN DIEGO MINES.—The patent has been issued for the Cuyamaca rancho, San Diego county, containing 35,000 acres. The confirmee is Augustin Olvera, former owner of the grant. The patent conforms to the decision of the Interior Department, excluding Julian and Banner mining districts from the survey. The receipt of the patent settles the long contested controversy between the grant owners and miners, and gives the latter a right to work unmolested. A letter to the San Diego World from Julian, dated January 18th, says that James Pascoe, who made the original survey of the Cuyamaca grant, which caused so much litigation and which has since been thrown out by the Interior Department, visited Julian last Monday, when the citizens hung and burnt him in effigy.

MANY valuable improvements have recently been made in the machinery of E. T. King & Co's paper mills, at Seratoga, and a new boiler has been put up with arrangements for consuming all the smoke. The company is now working a full force of hands, and the mill is turning out large quantities of paper.

THE strike in the Welch coal mines is still unsettled. In some of the mines men are at work. Violent disturbances are frequent in consequence of the workers being interfered with and intimidated by strikers.

PROCEEDINGS have been begun in the U. S. Circuit Court by Charles C. Coolidge against J. Hendy, to obtain \$180,000 and costs of suit, for an illegal infringement of a patent for concentrating metallic ores.

Placer Claims.

The following letter from S. S. Burdett, Commissioner of the General Land Office, to Congressman Page, is of importance. He says: The size of placer claims located prior to Act of July 9, 1870, is regulated and controlled by local law. Subsequent to July 10, 1870, and prior to May 10, 1872, no location of a placer claim can exceed one hundred and six acres.

From and after the passage of the mine act of May 10, 1872, no location made by individual can exceed twenty acres, and no location by an association can exceed one hundred and sixty acres.

There is nothing in the Mining Acts of Congress forbidding one person, or an association of persons, purchasing so many separate distinct locations as he or they may desire, embracing in one application for a patent entire claim to which they have the position and the right of possession by virtue of compliance with local laws and congressional enactments.

The law does not require an expenditure of \$500 upon each location of a placer claim, embraced in an application for patent where locations are contiguous and constitute one claim.

Where an application embraces two or more separate and distinct tracts of placer mining ground, the required amount, viz: \$500, may have been expended upon each tract, so copy of the notice and diagram posted up each tract to entitle the claimant to make a thereof.

FIRST SHIPMENT.—The Humboldt mill mining company, recently incorporated in San Francisco, made its first shipment of bullion last evening. It consists of three bars of bullion, the assayed value of which was \$2,000. The bullion was from ore from the company's mine in Winnemucca mountain, which is producing well, and has the advantage of being easily worked, the country rock adjoining vein being what miners term "picking ground." Joseph Ginacos is Superintendent of the company's mill and mine, and under his experienced management good results may reasonably be expected.—Silver State.

THE Sierra Nevada mine produced bullion the value of \$90,700 during the past fiscal year. The principal source of revenue, however, the pockets of stockholders, which panned \$250,000 on three assessments. The company are engaged in sinking a new shaft, and \$210,000 was spent last year on that account. There was also \$71,000 paid on account of hoisting ore and other work in the mine, \$49,500 on account of the Sacramento-Sierra Nevada mills. The financial condition of the company shows that there is still \$3,000 cash on hand, and \$2,200 due from assessments. There are no liabilities.

NEW DISTRICT.—At a miners' meeting at Lang's station, Los Angeles county, on 12th inst., a new mining district was formed called the "Blue Ledge District." It is north of San Fernando mining district, connecting on the same, and extending north to the summit of what is known as Chico Mountains.

HOWLAND tunnel in the Little Cottonwood district, Utah, will be about 6,000 feet in length when completed. It is to penetrate the mountain belt from the base of Emma Hill, and the general course is northeast. The tunnel will be through the Flagstaff, Vallejo, Ohio, San Hiawatha, Emma, Diamond, Davenport and other mines.

THE Salt Lake and Ogden Railroad Company, lately incorporated, is to build a narrow-gauge railroad from Ogden to Salt Lake, making a continuous line of narrow-gauge between different mines of the Territory and Idaho. Active operations have already been commenced.

BRANCH MINT.—A bill has been introduced in Congress providing for the establishment of a branch mint at Omaha, with the fitting office superintendent, assayer, melter and refiner and the requisite clerks. An appropriation of \$150,000 is asked to meet the expense of the building and machinery required.

A rich deposit of quartz has been struck 10 feet down from the top in the old Greer claim, two and a half miles north of Vallejo, which pays from \$60 to \$65 per ton, and the ore is getting better as they go down. The casings pay from \$25 to \$30 per ton. The vein is from 15 to 18 inches in width.

THE San Juan Times of Saturday says that a land slide at Forest City, Sierra county, buried a house away, and one bridge there was swept off. The Beld mountain company, 1,000 feet of flume and all the gold therein obtained. As the gravel of that company is exceedingly rich, the loss is heavy.

THE force at the Globe foundry, Stockton, on the iron work of the two stern wheel steamers ordered some time ago for a Rensselaer company, to ply on the Amoor river. The boats will cost \$16,000 each, and will be ready for shipment in about a month.

THE people in Truckee are elated over discovery of the bonanza, on account of the land which it will create for their lumber, most of which will have to come from the mills.

GOOD HEALTH.

The Philosophy and Relative Warmth of Clothing.

A London medical journal says that Dr. Von Stenckner, in a careful study of this subject recently published, has pointed out that the permeability of stuffs to air is a condition of their warmth. Of equal surfaces of the following materials, he found that they were permeated by the following relative quantities of air, the most porous flannel, such as is used ordinarily for clothing, being taken at 100: Flannel, 10; linen, of medium fineness, 58; silk, 40; tick-kin, 58; tanned leather, 51. Hence, if the warmth of clothing depend upon the degree in which it keeps out the air from our bodies, then a glove must be 100 times warmer than flannel, which every one knows is not the case. The whole question, then, is resolved to that of ventilation. If several layers of the same material be placed together, and the air be allowed to penetrate through them, the ventilation through the second layer is not much less than through the first, since the meshes of the two form a system of continuous tubes of uniform diameter, and the rapidity of the movement of the air through those, is affected merely by the resulting friction.

Through our clothing, then, there passes a stream of air, the amount of which, as in ventilation, depends upon the size of the meshes, upon the difference of temperature between the external and internal atmosphere and upon the locality of the surrounding atmosphere. Our clothing, then, is required, not to prevent the admission of the air, but to regulate the same so that our nervous system shall be enabled to have no movement in the air. Farther, our clothes at the same time, regulate the temperature of the contained air as it passes through them, so that the temperature of the air between the clothing and the surface of our body averages 84 to 86 degrees Fahrenheit. The hygroscopic property of different material used for clothing essentially modifies their actions. This property varies with the different materials; wool, for instance, takes up more water than linen, while the latter takes up and gives off its watery contents more rapidly than the former. The more the air is displaced by water from the clothes, the less will be their power of retaining the heat; in other words, they conduct the heat more readily and hence we are quickly chilled by wet garments.

About One's Self.

The object of brushing the teeth is to remove the destructive particles of food which by their decomposition generate decay. To neutralize the acid resulting from this chemical change is the object of dentifrice. A stiff brush should be used after every meal, and a thread of silk or India rubber passed through between the teeth to remove particles of food. Rinsing the mouth in lime water neutralizes the acid.

Living and sleeping in a room in which the sun never enters is a slow form of suicide. A sun bath is the most refreshing and life-giving bath that can possibly be taken.

Always keep the feet warm, and thus avoid colds. To this end, never sit in damp shoes or wear foot coverings fitting and pressing closely. The best time to eat fruit is half an hour before breakfast.

A full bath should not be taken less than three hours after a meal. Never drink cold water before bathing. Do not take a cold bath when tired.

Keep a box of powdered starch on the washstand; and after washing, rub a pinch over the hands. It will prevent chapping.

If feeling cold before going to bed, exercise; do not roast over a fire.

THE VIRTUES OF BUTTER MILK.—Mr. Robing, in a paper presented to the French academy, has extolled the virtue of buttermilk: Life exists only in combustion, but the combustion which occurs in our bodies, like that which takes place in our chimneys, leaves a detritus which is fatal to life. To remove this he would administer lactic acid with ordinary food. This acid is known to possess the power of removing or destroying the incrustations which form on the arteries, cartilages and valves of the heart. As buttermilk abounds in this acid, and is, moreover, an agreeable kind of food, its habitual use, it is urged, will free the system from these canases, which inevitably cause death between the seventy-fifth and hundredth year.

HOUSE WINDOWS.—The more light admitted to apartments the better for those who occupy them. Light is as necessary to sound health as it is to vegetable life. Exclude it from plants and the consequences are disastrous. They cannot be perfected without its vivifying influence. It is a fearful mistake to curtain and blind windows so closely for fear of injuring the furniture by exposure to the sun's rays; such rooms positively gather elements in darkness which engender disease. Let in the light often and fresh air too, or suffer the penalty of aches and pains and long doctor's bills, which might have been avoided.

TO PREVENT BALDNESS, says a correspondent, throw away all oils and pomades, and wash the parting of the hair with cold water, night and morning, dry thoroughly, and then use a good stiff brush, and keep brushing until redness or a warm glow is produced.

The Abuse of Appetite.

The appetite is one of the least appreciated of nature's gifts to man. It is generally regarded in this work-a-day world as something to be either starved or stuffed—to be got rid of at all events with the least inconvenience possible. There are people who are not only glad that they have been endowed with sound, healthy bodies, for which nature demands refreshment and replenishment, but they are actually ashamed to have it known that they are sustained in the usual manner. The reason of this we are at a loss to conceive. Everybody admires beauty, and there can be no true beauty without good health; and no good health without a regular and unvarying appetite. We are disinclined to let appetite take any responsibility on itself. If we happen to consider it too delicate, we try to coax it, perhaps stimulate it with highly seasoned or fancifully-prepared food. There are times when this may seem necessary, as in the case of a person so debilitated as to depend for daily strength on what he eats. But, usually, the cajoling process is a mistake. If the appetite of an individual in fair bodily condition be occasionally slender, it is no cause for alarm, and it should be allowed to regulate itself. It may safely be considered nature's protest against some transgression, and it is wise not to attempt coercion.

At certain seasons, as in spring and summer, the appetite of even the robust is apt to fail, and the relish for meats and heavy food to wane. This is all right enough, for animal diet in warm weather heats the blood, tends to headaches, and is generally unwholesome, unless sparingly used. On the other hand, fresh vegetables, berries, fruit and bread are cooling, corrective, and what the palate most craves. Don't be afraid to go without meat a month or so; and if you like, live purely on a vegetable regimen. We will warrant that you will lose no more strength than is common to the time, and that you will not suffer from protracted heat, as when dining on the regulation toast. —Good Health.

HEART DISEASE AND SUDDEN DEATH.—Do not all persons with heart disease die suddenly? By no means. The popular impression is that all heart diseases entail a probability of sudden death. Dr. Lancereux states that the ordinary termination is slow death, due to the increased difficulty in the circulation, and to the organic lesions that this induces. A less frequent termination he calls rapid death. This is caused by some sudden impediment, more or less complete, to the introcardial circulation, such as a displacement of fibrinous concretions in the heart, or rupture of the valves. In this case death ensues in from ten to fifteen minutes. A third mode of ending is sudden death, which, of course, frequently happens under certain circumstances.—Herald of Health.

GREEN TAPERS POISONOUS.—The use of red and green wax tapers on Christmas trees is pronounced highly dangerous by the *Popular Science* monthly on account of the poisonous nature of the colored matter employed. Yellow and blue tapers are harmless.

USEFUL INFORMATION.

THE improved German bleaching process, known as Pabst's, is spoken of in foreign journals as an important success. It consists in first dissolving about nine pounds of permanganate of potash or soda, in water, and then adding one-fourth this quantity of sulphate of magnesia dissolved in water. The color of the liquid is then a very fine violet, and the amount thus prepared will suffice for about two hundred and twenty pounds of wool. A sulphurous acid bath is also prepared, heated to seventy-seven degrees, Fahrenheit, when used. The materials to be bleached are first thoroughly cleansed, and then kept in the permanganate bath for a quarter of an hour, on withdrawal from which they are found covered with a deposit of peroxide of manganese. They are next introduced into the sulphurous acid bath, which reduces the peroxide of manganese to the peroxide, the salts of which are readily removed by subsequent washing. If the yarns or fabric resist the bleaching process, they are treated with hydrochloric acid, containing one part of commercial acid to twenty parts of water. One special advantage of this process is, that it affords a means by which even indigo may be discharged by a series of successive bleachings, leaving the stuff fit for re-dyeing.

SOMETHING NEW IN THE PRESERVATION OF FRUIT.—The following method for the preservation of fruit has been patented in England. The fruit is placed in a vertical vessel in layers, separated by layers of pulverized white sugar, and is then covered with alcohol of 80° Gay Lussac. After twelve hours the closed vessel is inverted and the maceration allowed to continue from 12 to 72 hours, according to the nature of the fruit, which is then removed and allowed to drain and dry. About two pounds of sugar and two pounds of alcohol are recommended for four pounds of fruit.

NUMBER OF AMERICAN NEWSPAPERS.—There are now published in the United States and Canada 7,769 newspapers—of which number 7,360 are published in the States, and 409 in the Dominion of Canada. There are 400 papers printed in New York city.

THE ANTIQUITY OF IRON.—We are relieved from any doubt as to whether iron was in use 3,400 years ago by the discovery of a wedge or plate of iron imbedded in the masonry of the Great Pyramid itself. This instructive relic, like the half found magnifying lens found at Pompeii, throws much light on questions of early workmanship. It has been a great puzzle to those who attributed the first use of iron to a date not much more than 2,900 years back, how such sharp and well defined hieroglyphics could have been cut by the ancient Egyptians on porphyry, granite and the hardest stone. From the certain proof that iron had been produced and wrought in the age of King Cheops, 5,400 years ago, we can better understand how the innumerable and exquisitely sunk symbols and figures were wrought on tombs, temples and sarcophagi. And more than that, from the great similarity in the mode of treatment that prevailed from the time of the Ptolemies back to the very earliest known Egyptian inscriptions, we have sometimes closely approaching a proof of the use of iron as far back as the fifth Egyptian dynasty, if not in the time of Moses himself; that is to say, six thousand three hundred years ago.

PREVENTING THE DECAY OF SHINGLES.—A CHEAP WAY.—Take a large kettle or tub that will hold about a barrel and fill it half full of wood ashes or potash lye, add to the liquid about three pounds of alum, and as much salt as will dissolve in the mixture. Make the liquor quite warm, and put as many shingles in it as can be conveniently wetted at once. Stir them up thoroughly, and when well soaked take them out and put in more, renewing the liquor as necessary. Then lay the shingles, when dry, in the usual manner.

After they are laid, take the liquor that is left, put lime enough into it to make white-wash, and if any coloring is desirable add ochre, Spanish brown, lamp-black, etc., and apply in the roof with a brush or an old broom. This wash may be removed from time to time. Salt and lye are excellent preservatives of wood. It is well known that leach tubs, troughs and other articles used in the manufacture of potash never rot. The become saturated with alkali, turn yellowish inside and remain impervious to the weather.

WEIGHT BY MEASURE.—It will be a very great convenience in the family, and sometimes elsewhere, to remember the following:

Wheat flour, one quart is one pound.
Indian meal, one quart is a pound and two ounces.

Batter, when soft, one quart is one pound and one ounce.

Loaf sugar, broken, one quart is one pound.
White sugar, powdered, one quart is one pound and one ounce.

Best brown sugar, one quart is one pound and two ounces.

Eggs, average size, ten eggs are one pound.
Sixteen large table-spoonfuls are a half pint, eight are a gill, four are a half gill, etc.

DON'T SELL THE PELTS.—The skin of an animal, whether cow, calf, colt or horse, that dies on the farm is worth more at home than at the tanner's. Cut it into narrow stripes, and shave off the hair with a sharp knife before the kitchen fire, or in your workshop on stormy days and evenings. You may make them soft by rubbing. A rawhide halter strap an inch wide will hold a horse better and last longer than an inch rope. It is stronger than hoop-iron and more durable, and may be used to hoop dry casks and boxes, and for hinges. Try it on a broken thill or any woodwork that has been split. Put it on wet and nail fast. Thin skins make the best to use it in its natural state. For other purposes it may be dressed.

HOW TO PREVENT DAMP FROM ENTERING INTO STONE.—The following ingredients melted and mixed together and applied while in a hot state to the surface of the stone, will prevent all damp from entering into it, and also those vegetable substances from growing upon it: 1½ pounds of rosin, 1 pound of Russian tallow, 1 quart of linseed oil. This simple remedy has been proved upon a piece of very porous stone made into the form of a basin, and two coats of this liquid being applied, caused it to hold water as any earthenware vessel.

FIRST USE OF ANTHRACITE.—It appears by letters embraced in the Penna manuscripts that anthracite coal was found in the Wyoming region, and a specimen sent to England in 1766. Heretofore it has been supposed that the discovery was first made about 1770 or 1771. In 1769, Thomas Penn, writing from London, refers to coal hills near Pittsburgh. A map of Pennsylvania, published in 1770, notes the existence of coal in the vicinity of Pottsville.

HEAT IN THE HUMAN BODY.—If the heat which a human body gives off in twenty-four hours could, consistently with life, be retained within the body, its temperature would, at the end of that time, have reached 185 degs., Fahrenheit, a temperature above the point of coagulation of albumen, and high enough to cook the tissues.

OREGON PINE.—A recent test of the relative strength of oak and Oregon pine made at San Francisco, with bars an inch square and three feet long, showed that the pine was equal to the oak. Both broke under the same weight placed in the middle of each bar, namely, 260 lbs.

DOMESTIC ECONOMY.

Flavorings.

Good flavorings are a most desirable addition over the cooking of olden times, when spices were the chief resort. These, however, are somewhat expensive, and thus many are deterred from using them in the common cooking of oakes, custards, puddings, etc.

But much can be done to help the matter by making some, at least, of our own "extracts." Vanilla beans are not expensive, and these boiled in milk flavor dishes nicely, and, we think, that the beans put into spirits would give a good extract at little cost.

Lemon, which is a more general favorite, can be easily made, and, when lemons are cheap, at a very small expense. Take the peel off, say of three or four lemons, and bruise or chop fine, and put it into a pint bottle, filling the bottle with good spirits, and, in a few days you will have a strong "extract," and at a cost of one quarter of what the small bottles of the same amount, would cost. To do this economically, the right season of the year, when lemons are low-priced must be chosen, and then enough can be made to last the year.

The oil of bitter almonds is also inexpensive, but great care must be taken in using this, as it is a violent poison, and needs but a mere trifle to flavor a pudding, custard, or other sauce, for which it is desirable. It is well to reduce a little of the oil, as for an essence, before using.

To those fond of flavorings, these hints may be acceptable and lead others to experiments of their own.

Beecher on Apples.

Rev. Henry Ward Beecher expatiates with true ecclesiastical unction on the manifold uses of the apple in the domain of culinary art. It might take its place on the table as regularly as the potato or the onion, for though "the onion is far more odorous, the apple is far more blessed." It is an admirable sauce for meat, which always craves a piquant acid for relish. When meat is wanting, "a scrap of pork in the frying pan, with sliced apples, will serve the economic table almost as well as if it had been carved from a beef or cut from a sheep." Mr. Beecher blesses the memory of the unknown inventor of the apple pie. He would fain make a pilgrimage to his grave and rear over it an everlasting monument. But the juice of the apple, he accepts only with discreet reservations. Though banished from its former universal position upon the farmer's table, cider is creeping back again, but it comes in the name of a neighbor, and is called champagne. Whether in one form or another, it is still savory of the orchard; it still brings warmth to chilly veins, and adds to the cheer of many a homely domestic festival. "I cannot," says Mr. Beecher, "as a temperance man, exhort you to make it, but I must say, that if you make it, you had better make it good."

PLAIN DIET.—This is what children ought on every account to be accustomed to from the first; it is vastly more for their present health and comfort than little nice things with which fond parents are so often apt to vitiate their appetites and it will save them a great deal of mortification in after life. If you make it a point to give them the best of everything; to pamper them with rich cakes, sweetmeats and sugar plums; if you allow them to say with a scowl, "I don't like this or that," "I can't eat that," and then go away and make them a little toast, or kill a chicken for their dainty palates depend upon it you are doing a great injury, not only on the score of denying a full muscle and rosy cheek, but of forming one of the most inconvenient habits that they can carry along with them in after life. When they come to leave you they will not half the time find anything they can eat—and thus you will prepare them to go chafing and grumbling through life, the veriest slaves almost in the world. Mothers, listen and be warned in time, for the time will come when you will repent; seeing your sons and daughters make their homes miserable by complaint, and raising their children up in the same way.—Rural New Yorker.

ABOUT BRAN.—Wheat bran is very much richer in phosphoric acid than corn bran. Wheat contains in the whole grain 8.2 per cent.; but nearly the whole of the phosphoric acid of the grain exists in the husk or bran. The wheat bran contains nearly twenty-nine per cent. of this valuable substance. What percentage is in the bran of corn we have no means of ascertaining, but it is certainly less rich in phosphoric acid than wheat bran.

Rye bran is richer still than wheat bran, containing over thirty-four per cent. of phosphoric acid, which is a larger proportion than is contained in any other article of food for poultry than the latter. If wheat bran is preferred free from damp or mould it will not deteriorate in quality or keeping for any moderate length of time, a year for instance.—New York Tribune.

STRENGTHENING JELLY.—Boil in two quarts of water one ounce of rice, one ounce of sage, and one ounce of barley, until reduced one-half. Strain into a mold; take a teaspoonful morning, noon and night. It can be sweetened and flavored to taste.

MINING SCIENTIFIC PRESS

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San Francisco:

Saturday Morning, Feb. 6, 1875.

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THE PARTIES interested in the mining district
of Mud Lake are taking the proper course to
determine the value of their discoveries. A
three stamp prospect mill, to be run by an
eight-foot breast-wheel, is being framed in Reno
and will be shipped and set up in the district
as soon as completed.

THE Carson Mint has lately received a large
quantity of new machinery, including a grind-
ing machine, lathe machine, shaping machine,
hydraulic press, hydraulic pump, rolling ma-
chine, draw-bench, cutting press and coining
machine.

THE BOARD of Management of the Ruby Hill
Miner's Union has passed a resolution giving a
free use of its hall on Sundays for religious ser-
vices, without distinction as to denomination.

SENATOR John P. Jones and E. R. Burke have
purchased the remaining two-twelfths of the
Sumner gold mine, in Kern County, for \$150,-
000, which gives them the entire ownership.

PRATT's bill compelling miners to take out
patents for claims, whether they want to or
not, has been indefinitely postponed in Con-
gress, which action kills it.

THE company which recently purchased the
Pioneer claims, Sierra county, have already re-
ceived a portion of their freight and will at
once commence getting ready to open them.

ORE FOR LIVERPOOL.—The steamer "Dakota"
for Panama on the 23d inst., took on at Wil-
mington 738 sacks of Panamint ore, weighing
81,810 pounds.

THE mint fever is spreading. Chicago, St.
Louis, Cincinnati and Omaha want one. The
rest of the country is to hear from.

THE Nebraska mine, near Nevada City,
has struck a deposit of gravel yielding 12 ounces
to the pan.

THE Enreka Sentinel says there are over 1,000
tons of bullion in bars, now cooed up at the
Richmond smelting works, awaiting shipment.

Among the Foundries and Machine Shops.

The share-holders of the Lineeed Oil Mills
are so well satisfied with the profits of this con-
cern that they are about doubling the mechan-
ical capacity of the present apparatus for ex-
tracting the oil from the seed; and Messrs.
Booth & Co. are now engaged on designs for
another pair of oil presses with the hydraulic
pumps and connections for working the same.
The designs are in their hands, and we trust
they will carry this job through in spite of the
Eastern competition in price which they have
had to contend with in estimating, and prove
that in the now rapidly increasing demand here
for hydraulic machinery of this class, our re-
sources on the spot are sufficient to supply our
mechanical needs.

The Risdon Works.

The handsome little steamer built at these
works for the use of the Custom House
Officials in the harbor, was launched at these
works. The details of the machinery through-
out are unique. The hull, machinery and all
was built at the works, the Dickie Brothers
superintending the construction of the wood
work. The hull is of the following dimensions:
length over all, 68 feet; beam, 11 feet 6 inches;
depth of hold, 6 feet 6 inches. The timbers
are all of white oak, and the planking is of
cedar. All the deck fittings and facings are of
East India teak, and the bit-heads, mooring-
pipes and rudder, with all its fittings, are of
brass. The engine is of the surface condensing
type. The boiler is cylindrical, with one fur-
nace-flue, three feet in diameter, the diameter
of the boiler being six feet nine inches. The
boiler has 600 feet of heating surface, and will
be able to develop about 70 horse-power. The
propeller is 5 feet 10 inches in diameter and 9
feet pitch, and is made of hoes.

The Corliss valve, by which means the steam
is made to travel the least distance possible
from the steam chest to the cylinder, is gaining
in favor, and we notice the same applied to the
large hoisting engines now building at the
Risdon Iron Works. We think, however, that
the equilibrium stamp or lifting valve with
which most of the engines for mining purposes
built and building at the works have been
supplied, are on the whole preferable. The adjust-
ment being more simple, the liability to dis-
arrangement less; the greater durability giving
by far the least amount of friction surface and
the decrease in prime cost. Mr. Moore, the
able superintendent is now busily arranging
the plan for the steam hoists. The most im-
portant mechanical work connected with the
new Palace Hotel. We expect at an early day
to furnish our readers with details of this work,
the principle involved in the design being of
special interest.

Lifting Pumps.

At the machine shop of Messrs. Hendy, we
noticed a new design for a lifting pump, to be
worked by steam power, which is certainly
worth the consideration of all interested in
mines and other concerns when the question of
pumping on a large scale has to be considered.
The design, which is not limited to capacity,
was drawn out for an 8-inch ram, having a 5-
foot stroke. The outside of the ram clears the
pump barrel by $\frac{1}{4}$ of an inch, and works air-
tight in the necks or bodies of two stuffing
boxes fitted in the center of the pump barrel;
an ordinary lid and box is attached to either
end of the barrel for access to the check valves.
The bottom valve seat is fitted into the bottom
of the barrel. The top valve seat is cast solid
on the top of the ram. The facility of access
to the working parts, diminished friction and
convenience of this arrangement for mining
purposes is self apparent.

The Aetna.

The company incorporated a short time since
for the manufacture of linen, claims in the list
of its directors, Mr. Hanscom, of the Aetna
Iron Works. We understand that the plant, as
far as possible, is to be manufactured in this
city. That, as every one acquainted with this
class of manufacture is aware, includes a num-
ber of powerful presses driven by steam power
and worked by water pressure. This points
to busy times at the Aetna Iron Works at no
distant day.

Brass Fitting and Finishing.

One important branch of the machine and
steam engine trade has been gradually estab-
lishing itself in the midst of our foundries.
We allude to the brass fittings and finishing of
engines and boilers. First among the estab-
lishment of works competing in this class of
work is the firm of Garratt & Co. The compe-
tition of the agents of Eastern firms has been
somewhat severe in this department, these
goods being of easy transport. However,
scarcely a new piece of machinery is made
amongst us the finished fitting of which does
not bear the name of this firm and others sta-
tioned here. We noticed here a very elegant
little design of gearing being made. It consists
of a pendulum about five feet long, with rods,
stand, levers, shaft, etc., all of polished brass,
and was designed by Mr. Hedburn for connect-
ing with and working the indicator on the hori-
zontal engine in the new mint, which drives
the machinery when the load does not require
the power of the beam engine, of which men-
tion was made a short time since.

Hawkins & Cantrell

Have, in the course of some three years, built

up a nice little business in the specialty of
hoisting engines, and during the last few
months have been pushing a brisk trade in this
specialty, the material for the top stories of the
Palace Hotel and much of the shipping freight
being hoisted by engines made by them. One
of the first jobs they performed was to build
the handsome little beam engine that drives
their shop at the present time. They have just
had full sized designs prepared of all the work-
ing parts of their pattern of hoisting engines,
together with cloth tracings of the plans for
use in the work-shop, to facilitate the prepara-
tion of the different parts.

One department of mechanical engineering
offers at the present time a favorable opportu-
nity for the investment of skill and enterprise.
We allude to the small, strong and compact

Marine Engines.

Available for use in the numerous tugs which
find such remunerative employment in our
harbor. There is no reason why the engines
and boilers of the new tug just finished build-
ing between the ware-houses and dry dock
should not have been made here, taking into
consideration the freight and numerous extra
expenses in fixing and preparing for working
order this class of machinery brought from the
East.

We made an inspection of the engines of the
tug "Redmond" during two or three trips. The
engines, as far as coal consuming goes, will
compare favorably with any for similar pur-
poses. The design and details of the same are
scarcely uniform in any of the working parts,
crank shaft, rods, valve, gear, etc., having
been renewed from time to time with whatever
material was most handy for use. In this re-
spect the engines of the tug "Wizd" form a
marked contrast, the design throughout being
in uniform proportion. The link movement be-
ing specially good in this respect.

The Union Iron Works are to be moved with-
in a few months, over on the Potrero, where
extensive works are to be erected.

Academy of Sciences.

The regular meeting of the California Acad-
emy of Sciences was held on Monday evening,
Dr. Henry Gibbons, Second Vice-President, in
the chair. The following named gentlemen
were halloted for, and duly elected resident
members of the Academy: J. R. Scowden, Jere-
miah Clark, Horatio Stone, and Cornelius
Herz, M. D.

Donations to the Museum.

The additions made to the museum embrace
a number of interesting articles, the most val-
uable of which was received from J. C. Merrill
& Co., being a marine glass that originally be-
longed to Captain William Bligh, commander
of the British war-ship *Bounty*, which was
taken by mutineers in the last century. The
glass is of the old style, the case being about
thirty-six inches in length and covered with
leather, which has an antique hue, although
well preserved. It draws out in two sections
about eighteen inches longer, and is a glass of
good power. On the leather has been painted
the following inscription: "This glass origi-
nally belonged to Captain William Bligh, who
commanded H. B. M. ship *Bounty*, when taken
by the mutineers, who afterward settled on
Pitcairn's Island. It was left at Tahiti, and
from thence came into the possession of Kame-
hameha III., of the Hawaiian Islands, and was
presented by Kamehameha V. to Captain James
Smith, who left it with J. C. Merrill & Co.,
who presented it to the California Academy of
Sciences."

J. C. Raymond presented a valuable case and
drawers, also a collection of books for the
library.

J. C. Merrill presented a miniature Esquimaux
boot, a fine specimen of workmanship, and
whale's teeth.

Dr. H. Behr presented the web of the larva
of the *eucheira socialis*, a species of caterpillar,
from New Mexico, in about the same climate as
that of California. It feeds on a species of
arbutus, and could be introduced into this State
if desired. It forms a water-proof sack, into
which it retires for shelter from the weather.
The bag is remarkable for its exceeding delicacy
and lightness.

W. G. W. Harford presented several species
of crustaceans, from Santa Barbara.

Wm. J. Fisher presented thirty specimens of
crustaceans from Japan, Behring Straits and the
Arctic Ocean, several of which were new to
science, and none were before included in the
collections of the Academy.

Communications.

Mr. T. J. Lowry, of the U. S. Coast Survey,
read a paper on the "Protracting Sextant,"
which is given in another column.

Dr. Henry Gibbons read a paper on climatic
changes in California, which we will give next
week.

W. N. Lockington read an interesting and
exhaustive paper on sponges, illustrating his
remarks with diagrams.

Two papers were received from Dr. J. G.
Cooper, one "On Origin of California Land
Shells," and another "On Shells of the West
Slope of North America."

A paper was read from Professor George
Davidson, of the U. S. Coast Survey, President
of the Acad-my, giving a brief description of
the recent Transit of Venus, as observed by
him while in charge of one of the Government
expeditions for that purpose in Japan.

Economic Botany.

Second Lecture Delivered before the University of
Cal. College of Agriculture on Tuesday, Jan.
19, by Prof. C. E. Bessey, M. S., of the Iowa
College, Ames, Iowa.

[Reported expressly for the Press.]

Fungi Continued.

At the conclusion of the preceding lecture I
was telling you about these three forms, *Eci-
dium*, *Uredo* and *Puccinia*. You will recollect
that the *Ecidium* is the cup-like growth,
which after a while develops into something
which is quite different. De Bary thinks that
the spores of *Ecidium Berberidis* will not grow
upon the Barberry. They grow upon wheat
and produce first, *Uredo* and then *Puccinia*.
Uredo appears earliest in the season and has
rounded spores which are orange colored.
Later in the season there appear upon the
leaves of the wheat elongated black patches;
which, upon microscopic examination, are
shown to be composed of elongated spores. In
the first form, it has received the name *Uredo
rubigo-vera*; while in the second form it is called
Puccinia graminis. This last form is the true
rust. This theory is pretty generally accepted.
However, the two forms have been watched
carefully and found to run one into the other.

You will find that always in describing the
Puccinia, the kind of fruits are described; that
is, the elongated red spores. These, you un-
derstand, push through the epidermis, the leaf.
Now, these two, *Uredo* and *Puccinia*, are cer-
tainly the same, and the probability is that
Ecidium is but one of the forms of this poly-
morphic species.

Now, Botanists have not determined whether
the spores of *Puccinia* will germinate upon the
grass or not; or, whether it is necessary that
these pass back, and germinate again upon
the Barberry. The latter is probably the case.
The present state of our knowledge then,
amounts to this, that *Ecidium*, which grows
upon the Barberry is but one form of the same
plant which grows upon wheat; first as *Uredo*
and then as *Puccinia*. *Ustilago segetum*, (or
Ustilago carbo of some authors), is the next
one and belongs to this same group, No. IV,
and is the

Black Smut, Blast, or Blight.

Here is shown (Fig. 2,) a head of wheat, nat-
ural size, blasted, and also some of the spores
highly magnified. The spores are, as you see,
not entirely round, but somewhat flattened.

The next, *Ustilago Maydis*, is the one that
produces the black blast, or smut, on Indian
corn. (See fig. 3). Its spores, under the mi-
croscope, are found to be rounded, larger, and
are full of little prickles all over the surface.
We do not know the full history of these smuts
and it is likely that they are polymorphic also.
Please to observe the differences in their spores,
as shown in the figures. Those of *Ustilago
segetum* are rounded and somewhat flattened,
while those of the last species (*Ustilago May-
dis*), are rounded and covered with prickles.
Wheat is sometimes troubled with what is
called "bunt, or stinking smut." (*Tilletia caries*).
Wheat, affected with this fungus, changes its
appearance somewhat. The kernels are al-
ways large and a little green in color.

You take this in your finger, crush it and the
odor is exceedingly fetid. Under the micro-
scope myriads of little spores will be visible.
You will find that these spores are borne on
threads, and are very much reticulated. It
takes a power of three to four hundred diam-
eters to show these well.

Last year I made measurement of these
spores, and also measured an average kernel
of wheat. I find that

About Thirty Quadrillions

Of these spores are in each wheat kernel, and
now as each spore is capable of filling a whole
wheat plant, you see that means of reproduction
are exceedingly good in this case. Every wheat
plant seemed to be affected throughout. Wheat
grows in what we call "stools," first one stem
and soon little branches here and there so that
we will have four, five or six stems from one
kernel, each stem bearing a head of wheat. In
most cases if you find one head affected you
will find all the heads affected, which indicates
this: that these fungus growths affect all parts
of the plant; that if you wish to

Purify the Seed

You must apply the substances, or whatever
you do apply, to the seed itself. That is, in
treating certain wheat you must apply the rem-
edy there to the wheat sown. No doubt this
fungus disease begins when the plant is small.
The probability is that one spore is sufficient
to infest a whole stool of wheat; and as each
stool of wheat has at least three heads, you see
there is immense reproductive power. In the
figure here shown (figure 4); first, a head of
wheat, as it appears when affected; second, the

kernel of affected wheat, one of which is cut in two, showing the blackened and dusty interior; third, some of the spores highly magnified. In this fungus plant botanists have found the fertilization. This is interesting from the fact that for most fungus plants no fertilization has yet been discovered.

Without attempting a detailed explanation of the method of fertilization in this species, I will simply say that it is what is known as fertilization by conjugation; and is almost identical with what takes place in many of the seaweeds. The only point in the fertilization which we need notice is, that during the process, successive crops of very minute spores are produced. These minute spores are undoubtedly the bodies which enter into the stomates of the plants, and so propagate the species. These are exceedingly small and require a microscope of five or six hundred diameters to find them. From it again grows another smaller body that also has spores. This shows that Fungals have

Genuine Fertilization,

Such as the higher plants, which results simply from the union of two different cells. I will treat of remedies hereafter.

In the fifth of these orders the *Lycoperdaceae*; we have one plant of some interest, the *Lycoperdon*, the puff ball. Here is a specimen picked up alongside the walk coming from the horse cars. After a while this would become of the nature of a pulverulent substance. Under the microscope you would find a great many different little threads, and on these threads you would find spores. I do not exactly know what species this specimen is. Some species of *Lycoperdon* are used for eating. There is one that is called *Lycoperdon giganteum*—about as large as your head. This taken when perfectly white, sliced up like shoing a loaf of bread, and fried, is said to be exceedingly good. The caution in eating *Lycoperdon*, is never to eat it when it is in color. It is also used occasionally

For Staunching Blood

When a wound has been made. When a little of that is put in a wound, it staunches it very easily. I suppose that even a poisonous one would be good for staunching blood. Taking *Agaricaceae*, we have *Agaricus*. I show here the common one which is eaten, *Agaricus campestris*. The ring, which is found passing around it, is the remains of a covering that was once over it. Taking a gill, making a cross-section—a difficult thing to do, of course—and placing it under a microscope of high power, you will observe projections, which are simply longer and larger cells growing at right angles to the general surface. These cells bear upon their extremities four minute spores. So if you want to get the spores of these at any time, take a plant and lay it upon a sheet of white paper. The dust will be of the color of the spores—black, pink, white, purple, etc. The spores give the color to the gills. The species *Agaricus* are very general, there being many hundred species of them. You will find, usually, rules given as to the poisonous and unpoisonous kinds. These rules, I find, are of almost no use whatever, if they are based upon color. Very many times people choose pink-colored ones, but this will not do to rely upon implicitly. One kind of *Agaricus*, which is eaten in England and in Italy, is considered so poisonous as to be unfit for food; so you may be quite certain that there is nothing in those rules, and that you cannot place any dependence at all upon color. From a very careful examination, I am very certain that instead of any species being always poisonous or unpoisonous, its quality in this respect will depend very much upon surrounding circumstances; all of which have not yet been fully made out. These facts will show you that there is no dependence to be placed upon a certain species.

One more, the *Polyporus*, having a name indicating its character. In many of these upon the underside, instead of gills there are myriads of little holes. The spores are borne in just the same way as the *Agaricus*, but these spores are reflected back into little cavities instead of being distributed over the surface of the gills. Most of them have a one sided form, instead of being equal. Here in the middle of the stalk is one sided, so that they are more or less ear shaped. Many times you will find them growing upon the side of a leg, a sort of foreign growth. They have brown and white underside. Now the *Polyporus* is one of the greatest enemies that the engineer has to do with, or that any one who is putting up timbers has to encounter, because it sends mycelium through the wood, growing almost always on wood. Of course the mycelium is nourished by the wood. It is breaking down the tissues constantly, and brings about what we call rot. The railroad tie are probably thus injured. Instead of the decay being due to ordinary causes, it is due to the presence of *Polyporus* mycelium. Occasionally, if the timber is not in very damp soil, it decays with dry rot. Then you break the timber open and you will find mycelium. I have brought a specimen here to show you about what mycelium looks like. One or two other allied genera having the same characteristics, also produce the rot.

The fungus plants seem to possess a poisonous alkaline principle. Probably this principle is more due to some substance upon which the plants grow, difference in climate, dryness and all that, than to anything especially belonging to them. Now, as to certain rules which will make it safe to use them. First,

Never Eat any Bad Smelling Species.

Here smell is a good guide. By the way, that is a good guide, even for the *Campestris*. Second, they must always be perfectly sound. Now, this will require a knowledge of the species.

Fig. II.

Ustilago Segetum.—Head of Wheat, natural size.

Ustilago Maydis.—Blasted Indian Corn.

cies. Third, they must be perfectly white. In this they must not have begun their decaying state at all. Fourth, in cooking they must always be sufficiently cooked to make them tender. If they are tough, they are not eatable.

Fig. IV.

Tilletia Caries.—Head of Wheat affected with Burnt or Stinking Smut.

Fifth, as they are a sort of concentrated food they must always be eaten with moderation. They take the place, very largely, of the muscular parts of animals, in supplying nu-

Fig. V.

Agaricus Campestris.—Edible Mushroom.

tritive qualities, much more than does the ordinary use of vegetables.

A student asks, "What is that silver spoon test?" Professor—"I do not know of that at

all. I do not know what that would indicate at all. I do not know anything, about the plants, that would make it a good test." Student—"It is nearly always used, especially among the French people." Professor—"It

Fig. III.

Ustilago Maydis.—Blasted Indian Corn.

may have reference to the soundness of the spores. If the development is beginning to rot, possibly the spoon would be darkened, simply by the dark-colored spores." Then, as a note after these rules, it must be remembered

Fig. V.

Agaricus Campestris.—Edible Mushroom.

that some people can not eat them with safety. There are some peculiarities of constitution that will not admit of their use, and what that is may be difficult to describe, so that each man must be an experimenter in this for himself. The gist of these rules may be put down as this: That you must

Go at them very Carefully.

If you are very cautious, I do not see why you may not be able to use them. I would say, however, it will hardly pay you to try the dark-colored ones. They seem to purify so soon it will hardly repay your trouble.

The fungus plants, with a few exceptions, are of little account medicinally. In Northern Asia, one species is used very largely in procuring intoxicating drink. Another, in certain parts of Europe, is mixed with pepper and made into a certain sort of snuff. There are certain other species which have a brilliant color, from which is extracted a dye. In part of Germany, some mycelium of the *Polyporus* is collected, poured up and used as a tinder, usually mixed with sulphur or something like that. Another species, usually grow in thick, fey masses, and this felt is used as material for clothing, so that we actually have the fungus plants furnishing clothing.

Fly poison is manufactured from another species of *Agaricus*.

This green color, which is frequently found in oak wood (in cutting up an old log of wood you will frequently find a green color), is due to mycelium. This plant departs from the usual law of the fungus plants. This green is a sort of metallic green. In certain parts of Africa, the natives have such high regard for these plants that one is deified and

Worshipped as a God.

Phosphorescence on decaying wood is simply the rapid decay brought about by the presence of a great amount of mycelium. Blood red drops, which frequently have been referred to rains of blood, must be referred entirely to the presence of minute fungus growths.

A few years ago, the bakers in Paris were astonished because the bread was found very frequently to be covered over with

Blood Red Drops.

The people were somewhat superstitious, and it caused a great deal of alarm. Careful investigation showed it to be simply a fungus growth. Contagious diseases have sometimes been induced by rubbing the spores of some of this species upon the skin. These, as you observe, are simply disjointed facts.

Dry Rot

May be very easily prevented by using gas tar, corrosive sublimate and sulphate of copper; or any of the processes, of course, which keep out these spores. Painting, when well done, and oiling, would serve equally as well as long as it lasts.

Botanists have a great many times called attention to the fact that the same species of tree will not grow well where it has been cut down. The remark has been frequently made that hard wood requires to be replaced by soft wood and these again by hard wood. The explanation is probably due to this: That the mycelium which destroyed the roots and prevented their growth, will attack the more recent growth. Perhaps it will better explain the fact to state that if any of the orchard trees—for instance an apple tree—is killed in the same way, it is quite difficult to start a young apple tree in the same place; because the same mycelium which destroyed the old, will attack the young apple tree roots, and, of course, destroy the tree. I suppose the species which does the mischief belongs to this group, the *Polyporus*.

The mildews and blights which are found upon the leaves of plants may be treated with sublimated sulphur. We do not know just how this is; for sulphur is largely insoluble; yet simply sprinkling it over very soon destroys this fungus growth, and the plant will be saved; or, if any of the soluble forms of sulphur are used you will find, in almost all cases, good will result. So, of course, sulphate of copper or any of the sulphates are good.

For bunt or smut (*Tilletia caries*) in wheat the seed should be washed in water, brine or hot lime water. A more certain remedy is to steep the seed in a strong solution of sulphate of soda (glauber salts) and then to dust it with quick lime. Sulphate of copper (blue stone) dissolved in water and sprinkled over the seed, is another remedy relied upon by farmers.

In general moulds and mildews—all these small growths here—do not flourish well in dry places. If you have a place that is affected simply dry it, let sunlight into it, and they will very largely disappear, either mould or mildew. Really there is no need of any of these being found in any of our houses.

The Rain Fall.

We give below a report of the rain fall to date from all the localities in the State, from which we have thus far been able to obtain the same. We shall add to this list reports from other localities as they may come to hand:

Our Rain Gauge.

NAME OF PLACE.	DATE.	REPORT.	TOTAL.
San Francisco.....	For the Season		16.18
Davisville (Yolo).....	" "		10.57
San Rafael.....	" "		35.26
Santa Cruz.....	" "		16.09
Gilroy.....	" "		17.90
Colusa.....	" "		8.76
Napa City.....	" "		19.23
Grass Valley.....	Jan. 24 to Jan., 25	6.50	12.08
Yreka.....	For the Season		9.14
Los Angeles.....	" "		21.18
Santa Barbara.....	" "		13.44
Monterey.....	" "		3.40
Woodland.....	" "		10.67
Nevada City.....	" "		35.56
Lakeport.....	" "		14.58
Los Banos (Merced).....	" "		8.42
Cherry Station.....	" "		12.00
Mare Island.....	" "		11.44

DEFERRED.—As we desire to publish in full the lecture delivered by Dr. Becker last Saturday at the Mechanics' Institute on "Quicksilver and Fuel," we are obliged to defer its publication until our next issue.

COAL retails in Virginia at present, at from \$22 50 to \$28 per ton. Wood retails as follows: Nut pine, \$16; limb wood, \$15; tamarack, \$15; Carson split wood, \$14; Empire split wood, \$12; stove wood \$6 to \$8 per cord.

The recent rains are reported to have damaged the ditches and reservoirs of the California Water company in El Dorado county, to the extent of over \$30,000, one large reservoir costing \$25,000 being entirely swept away.

THERE are thirteen furnaces for smelting quicksilver ore, running or nearly ready for work, in Sonoma County.

QUARTZ mine in this section, says the Placer Herald, are all running full forces with favorable results.

THE TEXT BOOK MATTER.

A Statement by the Publishers of the Pacific Coast Series of Readers.

Many incorrect statements having been made with reference to the changes in text books, recently ordered by the State Board of Education, we desire to submit to the public the following facts:

On June 22, 1874, the State Board of Education advertised for proposals for new text books, said proposals to be in by January 5, 1875.

In response to this advertisement, twelve Eastern houses and one California house came forward with proposals and samples.

Of all the changes proposed by these several competitors, the Board made but three, viz:

First—The Pacific Coast Readers were adopted in place of McGuffey's.

Second—The Spencerian Penmanship was adopted in place of the Payson, Dutton & Scribner Series.

Third—Cornell's Geographies were adopted in place of Monteth's.

These changes were made by the following vote: Readers—Ayes—Allen, Denman, Kelly, Kennedy, Lynch, Noes—Bolander, Booth, Crawford, McMeans.

Penmanship—Ayes—Allen, Bolander, Crawford, Kelly, Lynch, McMeans. Noes—Booth, Denison.

Geographies—Ayes—Allen, Bolander, Booth, Kelly, Kennedy, Lynch, McMeans. Noes—Crawford, Denman.

We give below copies of the proposals for Readers and Geographies, that the public may see what publishers have dealt generously with them, and what members of the State Board have kept most steadily in view a consistent regard for the interests of the people and of the schools.

We make no mention of the Penmanship, as a gradual change in copy books is evidently attended with no expense.

The publishers of the Pacific Coast Readers submitted the following proposals:

SAN FRANCISCO, January 5th, 1875.

To the Honorable the State Board of Education of the State of California: GENTLEMEN: In accordance with the resolution passed by your honorable Board on June 22, 1874, we submit the following proposal:

First—We will supply the Pacific series of Readers at the following prices, viz: First Reader, 20 cents; Second Reader, 35 cents; Third Reader, 55 cents; Fourth Reader, 60 cents; Fifth Reader, \$1. These retail prices shall hold good in San Francisco for the whole four years for which the books are adopted, and to enable dealers throughout the State to sell at the same figures, we will give them a reasonable discount from the prices herein named.

Second—We will also give our books in even exchange for McGuffey's, as follows: Pacific Coast First Reader for McGuffey's First Reader; Pacific Coast Second Reader for McGuffey's Second Reader; Pacific Coast Third Reader for McGuffey's Third Reader; Pacific Coast Fourth Reader for McGuffey's Fourth Reader; Pacific Coast Fifth Reader for McGuffey's Fifth. Books sent for exchange to be in sufficiently good condition for continued use in school and accompanied by a certificate from the teacher or school officer that the books offered for exchange are the property of a pupil and designed for use in school by said pupil. In order to secure the full benefit to the people throughout the State and avoid all expense of a change, we agree to establish one or more depots of supply in each county, to which we will send the books at our own expense, till such time as the use of the books become satisfactory under the action of your Board; and we further agree to make such even exchanges at our place of business for and during the whole four years covered by their adoption.

Third—We guarantee that the stock supplied shall be in all respects as good as the samples presented, and we agree to replace at our own expense, during the entire four years, any book sent to us which has become worn through defect in binding, or which is defective in arrangement of signature, or in any other respect in which we, as manufacturers, are properly responsible.

Fourth—We hereby agree that the press work and binding of our books shall be done within the State of California for and during the whole four years covered by their adoption.

(Signed) A. L. BANCROFT & Co., SACRAMENTO, JANUARY 5, 1875.

At a reasonable discount we hereby agree to give to the trade throughout the State a discount of not less than 20 per cent. from the prices named herein, and an additional discount of 10 per cent. to the wholesalers.

(Signed) A. L. BANCROFT & Co., Per Dorville Libbey, Attorney.

The proposal for Cornell's Geographies was as follows:

Cornell's Primary at 75 cents; Intermediate, \$1.25; Physical, \$1.48. Discount to the trade same as in case of Readers. Agencies to be established at San Francisco, Sacramento, San Jose, Stockton, Oakland and Santa Rosa. Introductory exchange as follows: Cornell's Primary, for Monteth's Introduction and 45 cents; Cornell's Physical, for Monteth's Physical and 90 cents.

By comparing these proposals it will be seen that the Publishers submitted to the people in exchange for McGuffey's, absolutely without expense, while for the Geographies (always the most expensive of common school text-books) the pupils must pay 45 and 90 cents, respectively, besides giving up their Monteth's Geographies. Indeed, the publishers of Cornell were prevented by the Eastern Publishers' Board of Trade, of which they were members, from offering more liberal terms on their books, even if they desired to do so.

We do not make these comparisons particularly as against the adoption of Cornell's Geographies, for which we presume the Board of Education had the best of reasons. We desire merely to show the injustice of the criticisms upon the Board for the adoption of our Readers, while the change of Geographies remains unchanged.

The very parties who now seek to put themselves forward as guardians of the public interest, and against a home industry which costs the people nothing, and for a change in Geographies, made in New York, which will be a tax upon every pupil in the State.

A careful analysis of our proposals will show:

First—That the prices of our Readers are 15 cents per set less than the prices at which McGuffey's were adopted four years ago, and at which they have been sold up to the present time.

Second—That we agree to give our books for McGuffey's old ones, without expense to the pupil, and that we will organize distributing agencies and give every facility for such exchanges during the whole four years.

Assuming the cost of the readers now in the hands of the pupils at \$4,000 (not \$250,000 as frequently quoted), and assuming that the stock is worth one-third less now from use and wear, we have over \$13,000 actual gain to the people by the exchange of the old books for the new.

Third—That we agree to replace, at our own expense, any of our books defective in manufacture, a guaranty never given in this market by any Eastern House.

Fourth—That the books shall be manufactured within

in our own State during the entire period covered by their adoption.

Fifth—That we make the same terms to the trade as all the Eastern houses.

We leave the public to judge whether a proposition so liberal for an important home industry deserves the violent and malicious attacks which have been made against us, incited by parties whose private interests were ignored by the Board of Education in favor of the interests of the people.

As to the merits of the Pacific Coast Readers, we ask the public to consider the following endorsements:

First—The County Superintendents of California. We sent a circular and a set of Readers to all the County Superintendents, asking for their "opinion of the book and our enterprise." We received in all 38 replies; 37 of them indorsing our books very heartily, and one indorsing McGuffey's in preference to ours.

Of the 37 indorsing our Readers, 14 distinctly ask for a change from McGuffey's to the Pacific Coast Series; and the remaining 23 either remain silent about a change or object solely on the ground of expense, or declare that a change will be desirable if it can be brought about without expense.

The originals of these letters are all on file in our place of business, and we shall be glad to have any one call and examine them and verify this statement.

The assertion was made at the meeting by Superintendent Bolander that "Thirty-four of the forty-seven County Superintendents had sent in a remonstrance against a change."

It is noteworthy that he did not name them or offer to produce the documents, and, in view of the facts, we can only suppose that he accidentally said "against" instead of "for."

Second—Our books are indorsed by leading teachers throughout the State. Their indorsements were submitted to the Board, and can now be seen at our place of business.

Besides these, we presented to the Board another class of indorsements, bearing upon our enterprise as a home industry, viz:

First—From the State Grange of the Patrons of Husbandry, unanimously and enthusiastically adopted at their meeting in October, 1874.

Second—From a large number of local Granges.

Third—From the Mechanics' State Council.

Fourth—From leading and representative business men of San Francisco.

This document will be given in full to the public, to show what leading citizens think of our enterprise.

Against all this array of favorable opinion we have, so far as we know, the opinion of but one educational man, viz: Superintendent Bolander, who enters his "solemn protest" against the Pacific Coast Readers as "inferior in contents, presswork, binding," and, indeed, in every particular.

After an eager and microscopic search for errors to justify his opposition to the books, Superintendent Bolander, in the meeting of the Board made a few remarks which the Governor and his fellow members unanimously pronounced "hypercritical" and "unworthy of consideration."

On the other hand, so far as we know, not one indorsement of McGuffey's Readers were read or referred to in the meeting.

The public will surely remember how severely McGuffey's Readers were criticised at the time of their adoption four years ago, and later, in the interests of Mr. Bolander, in the election of 1871. At that time they were "relics of ignorance," "superannuated rubbish," "compliments of disloyalty," "pup and piety," and everything else that could be said derogatory to them.

The books have not been changed in a single word since then; public opinion is just as it was then; and yet now, strange as it may seem, we find Superintendent Bolander their special advocate; and that, too, against a better series, made at home, and offered at terms unprecedentedly favorable.

In conclusion we have only to say that we know that we are engaged in a legitimate and commendable business, of great importance to the State; that we have made excellent books, fully worthy of use in our schools; that they have been fairly and legally adopted by a competent Board of Education; that no expense whatever is caused by their introduction; and we appeal to the sober second thought and the disinterested common sense of the people for our justification.

A. L. BANCROFT & Co. Publishers.

Business Directory.

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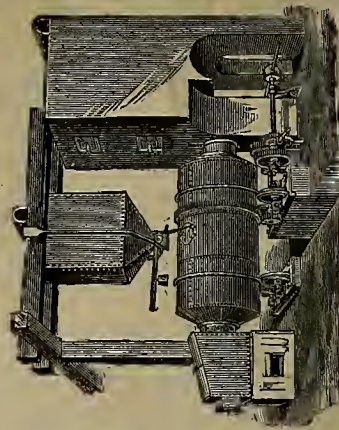
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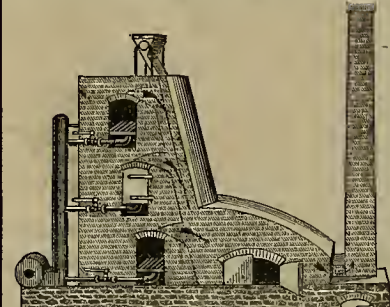


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Has been very lately well proven by performing a job of dredging at the mouth of San Antonio Creek, at Oakland, Cal.

There is but this one machine that has ever had these improvements employed. It is an old machine, formerly built for another device, and is unfavorably constructed for Ball's improvements; yet this first temporary experimental machine has filled a scow of eighty-five cubic yards in sixteen minutes in unfavorable digging. For durability, digging hard material and fast work, it has a reputation (supported by leading engineers) as having no equal.

Testimonials and references will be given on application to the inventor, who is the sole owner of patents (excepting having made an assignment of the one machine now belonging to the Central Pacific Railroad Company) Having resolved not to sell any rights unless upon a basis of actual work performed by a machine built by myself for the purpose of fairly establishing the worth of the invention, I therefore offer to sell machines or rights on the following plan, which is warranting the capacity of the machine by actual work:

I will enter into an agreement with any responsible party to build and sell a machine, scows and tender, all complete, and right of all my improvements in dredging machines throughout the Pacific Coast for \$20,000, warranting the machine to dredge six cubic yards per minute (to fill a scow at that rate). \$20,000 will but little more than pay the cost of building the machine, scows, etc., all complete; therefore I am proposing to ask nothing for my patents unless my machine dredges more than six cubic yards per minute. But it shall be further agreed that in case (at a fair trial to be made within a stated time) the machine shall fill a scow at the rate of more than six cubic yards per minute, then \$10,000 shall be added to the price above stated for each and every such additional cubic yard thus dredged per minute, and for additional fractions of a cubic yard thus dredged in the same ratio the \$10,000 is to be added to said price above stated.

I will sell any other Territorial or State rights (either United States or Foreign) upon the same plan and at a lower price proportionately than the rights for the Pacific Coast.

I will sell a single machine with scows and all complete, and right to use the same in a limited territory, for \$20,000 on the same plan as above stated, but will add only \$2,000 to each additional yard over the six cubic yards per minute. Each machine is not to employ more than two 10x20 inch engines.

Payments to be made in U. S. gold coin on delivery of machine, as may be indicated by agreement.

Address, **JOHN A. BALL,**
Oakland.

PACIFIC MACH'Y DEPOT
GUARANTEED PURE OAK TANNED
LEATHER BELTING
H. P. GREGORY
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PACIFIC MACHINERY DEPOT
H. P. GREGORY
SOLE AGENT FOR THE
TANITE EMERY WHEELS
SAN FRANCISCO

FIREMANS' FUND INSURANCE COMPANY OF CALIFORNIA.

Assets:	
REAL ESTATE (unencumbered) S. W. cor. Sansome and California streets.....	\$165,000 00
LOANS ON BOND AND MORTGAGE, first liens.....	120,572 00
INTEREST due thereon.....	701 42
do due and accrued on stocks.....	640 00
UNITED STATES REGISTERED BONDS, par value, \$138,500; market value.....	148,195 00
SAN FRANCISCO CITY AND COUNTY do.....	18,000 00
CALIFORNIA STATE BONDS.....	1,000 00
SOUTH CAROLINA STATE BONDS.....	2,600 00
STOCKS, BANK OF CALIFORNIA, 200 shares.....	20,000 00
do FIRST NATIONAL GOLD BANK, 100 shares.....	10,000 00
BILLS RECEIVABLE, secured by collateral, market value \$38,500—loaned.....	60,000 00
OASH in Company's Principal Office.....	6,892 86
do deposited in Bank of California.....	7,674 82
do do do do Sather & Co.....	9,285 01
do do do do Laidlaw & Co., New York.....	2,843 10
do do do do Union National Bank, Chicago.....	6,210 06
PREMIUMS in due course of collection.....	23,431 42
NET BALANCES in hands of Managers, Eastern and Western Departments, and in due course of transmission.....	25,749 00
BILLS RECEIVABLE, not matured, taken for Marine and Inland Risks.....	22,239 75
TAXES AND STREET ASSESSMENTS advanced on Real Estate, secured by terms of original mortgages.....	3,073 18
RENTS due and accrued.....	250 00
OFFICE FURNITURE.....	5,661 12
Gross Assets.....	\$687,469 93

Liabilities:	
LOSSES due and unpaid—none.....	
do reported and in process of adjustment.....	\$31,870 61
do resisted.....	2,126 25
MARINE BILLS payable.....	33,996 86
PERSONAL ACCOUNTS.....	1,784 00
	2,169 35
Total.....	\$37,940 21
Net Assets, December 31, 1874.....	\$629,529 72
COMPARATIVE.	
NET ASSETS, December 31, 1873.....	\$558,418 50
NET ASSETS, December 31, 1874.....	629,529 72
Gain.....	\$71,111 22

D. J. STAPLES, President.
ALPHEUS BULL, Vice-President.
GEO. D. DORNIN, Secretary.
WM. J. DUTTON, Assistant Secretary.



THE BIRMINGHAM SHOVEL.

These Shovels have No Rivets nor Straps.

The blade is made of one piece of BEST SOLID CAST STEEL, the blade and shank being one piece.


THEY WILL WEAR TWICE AS LONG

As the ordinary shove They are the STRONGEST, BEST and CHEAPEST SHOVEL EVER MADE. Examine the engravings carefully and you can see how they are made.

THEY NEED ONLY TO BE TRIED

To prove their value. Prices same as ordinary shovels. Ask for the BIRMINGHAM SHOVEL. Take no other.

TREADWELL & CO., Sole Agents for Pacific States,
San Francisco, Cal.



7000 IN USE

BLAKE'S PATENT STEAM PUMP.

FIRE PUMPS A SPECIALTY



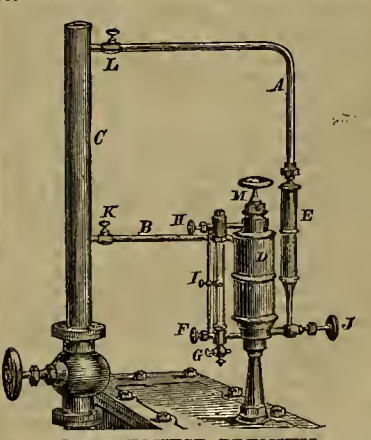
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Sole Agent for the Pacific Coast, Empire Warehouse
Beale street, near Market, San Francisco, Cal.

N. Seibert's Eureka Lubricators.



THE HIGHEST PREMIUM

Awarded by the Mechanics' Institute Fair, San Francisco, and State Fair, Sacramento, 1871.

These Lubricators are acknowledged by all engineers to be superior to any they have ever used: feed constantly by pressure of condensed water supplied by pipe A, regulated under the oil by valve J, and forced out through check valve and pipe B into the steam pipe C; it then becomes greasy steam, passes to all the valves and cylinder at every stroke of the engine; glass tube I indicates amount used per hour. Packing on rods and stems lasts longer, and the rings on the piston will not corrode. One pint of oil will last from three to six days, according to speed and size of engine; I, sliding gauge; K, valve to shut off when engine stops; H, F, valves to shut off in case of frost, steam does not enter the cup; it is always cool; warranted to give satisfaction. Patented February 14, 1871. Manufactured by California Brass Works, 125 First street, S. F. 24v23

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EXTRA HEAVY AND IMPROVED PATTERNS,
PUTNAM MACHINE CO.,
MANUFACTURED.

LATHES, PLANERS, BORING MILLS, DRILLS,
BOLT CUTTERS, DOUBLE NUT TAPPING
MACHINES, SLOTTING AND SHAPING
MACHINES ON HAND. GEAR
CUTTERS AND MILLING
MACHINES A SPEC-
IALTY.

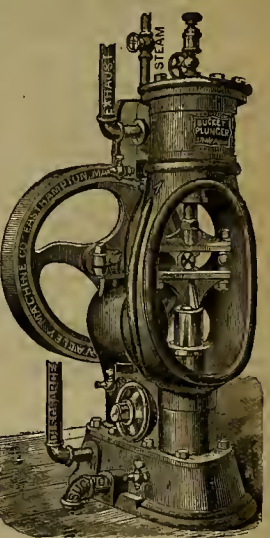
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Steam Pumps.

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Sole Agents for WRIGHT'S
BUCKET-PLUNGER STEAM PUMP.
ALWAYS RELIABLE.

THE SELDEN DIRECT-ACTING STEAM PUMP,

A. CARR, Manufacturer & Proprietor.

Patented
Aug. 2d. 1870.
Dec. 20th, 1870.



Combining simplicity and durability to a remarkable degree. Its parts are easy of access, and it is adapted to all purposes for which Steam Pumps are used.
As a Mining Pump it is Unsurpassed.

—ALSO—
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CARR PATENT STEAM RADIATOR.
Send for Price List and Circulars. Address,
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Stoves and Metals, Tinners' Goods, Tools and Machines,
11 and 12 California St., and 15 Davis St., San Francisco, and 173 J St., Sacramento. mr.-1y

Hydraulic Mining in California.

No. 11.

Water Ditches.

The ditches of California are the great arteries which bring life to the mines. Their even and constant flow secures a healthy and vigorous state of industry, while the dearth of water in the mines throws a pall over the business world of California, money becomes tight, and hard times are the consequence.

The engineering skill displayed in the construction of ditches in this State is of the highest character, accomplishing the most daring feats, hanging flumes on steep, rocky bluffs, and crossing gorges of a thousand feet in depth; and it must seem almost a presumption to inquire whether any improvements can be suggested.

Leaving the answer to this question open for the time, we will try to state the rules and conditions which justly have governed the constructions of ditches.

Location.

The first among them must be the ample supply of water during all seasons of the year. When this steady flow can be secured, even at a greater outlay of money, let it be done by all means. The winter supply of water is well enough, but the summer supply is far preferable, as the working of a hydraulic mine then has the advantage of long days, mild weather, and water made almost tepid under the rays of a hot sun. The latter point is the most important, as the quicksilver catches the gold far more easily at a high temperature than in cold weather. The yield of gold, therefore, increases always in the summer season, other conditions being equal.

The second condition must be the high elevation of the ditch. A ditch of high elevation commands a greater field of usefulness, as it may supply mines for which it was not constructed, when the original mines are exhausted. Besides this, the increased hydrostatic pressure is always valuable.

The snow line should be avoided, if practicable; but snow-sheds can be constructed, though in some regions this might involve a great expenditure. Pine boughs, laid thickly across sleepers from henk to bank, have been used with good effect, as the snow rests on them and forms finally an arch, supporting itself.

A third important point is to secure all the small water courses on the line of the ditch in such away that they can either empty into the ditch or run over it, according as their water is needed or not.

A fourth important condition is the abundance of waste gates, and their location in places where the discharge of water cannot wash the ground below the ditch, so as to produce a slide. This will permit the prompt drainage of the ditch whenever a break makes it necessary.

Fifthly, the building of flumes should be avoided so far as practicable, since they are liable to be destroyed by fire. When they have to be built, care should be taken to char well the bottom part of the supporting posts or sleepers, so as to prevent the rot. The settling of flumes, due to the decay of the bottom of the posts, or the sleepers upon which they rest, causes a great deal of annoyance.

Experience has shown in many cases that the above mentioned rules deserve close attention in choosing a route for a ditch, as the advantages or disadvantages pointed out can be weighed carefully beforehand.

Construction.

The building of a ditch can commence after a careful survey has been made. A grade of 10 feet per mile (three-eighths inch per rod) ought to be established by the survey, as this grade has proven itself the most convenient for the conveyance of water, securing an excellent flow, without endangering the banks of the ditch. This grade must be adhered to strictly, and under no circumstances must it be lessened at one point and increased at another, since the flow of water, once checked by less grade, cannot be regained by increasing the grade at another point. The ditch in such a case would have to be widened.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

Industrial Items.

INDUSTRIAL IMPROVEMENTS AT MOUNTAIN VIEW STATION.—The San Jose Mercury, Jan. 30th says: The people of Mountain View Station are happy now that Watkins & Co. have located their foundry and machine shop at that place. Operations will commence at once. The stockholders are J. T. Watkins & Co., G. W. Smith, J. Snyder, D. B. Beale, Castro & C. Ideron, W. H. Bubb, H. D. Magot, J. Heaverty, and H. McCleary all men of means.

There is talk of a flour mill being put up here this summer. If so the company will run a steamer from C. Guthe landing to San Francisco. It is only two miles from the Station to deep water in the bay. Mr. Guth is making preparations for digging a canal to high water.

THE BAMBOO.—Has anybody ever tried to grow the bamboo in this country? There are about sixty varieties of this valuable tree, and it would seem that some of the more hardy varieties might be made to grow in California.

FOREST TREE SEEDS.—The gathering and sale of forest tree seeds, is becoming quite a business in California. Messrs. Stegman & Sons of Yosemite valley, sell annually 200 pounds of the seeds of the Big Tree, *Sequoia Gigantea*. Each pound contains 120,000, so that the total number of seeds planted every year may be estimated at nearly twenty millions. They go to all parts of the world, and it seems that the ornamental gardens of Europe and the Asiatic states should soon have enough of them.

LAMP CHIMNEYS.—The Titusville Courier says: Two thousand Pittsburgh glass-blowers are constantly employed in the manufacture of lamp chimneys for the trade. These chimneys are warranted to break quicker by sudden changes of temperature than any others turned out elsewhere, and thus the trade is benefited. Judging from our personal experience we should suppose that a large invoice of these chimneys must have been received in California.

INDUSTRIAL SAVINGS.—The eleven savings banks of this city have now 60,658 depositors. The total amount of their deposits is \$55,021, 177; this is an average of nearly \$900 to each depositor. Their net earnings of this money is at the rates of 8 to 9% per cent per annum. There has been an increase of 4,947 in the number of the depositors within six months, and of \$4,160,915 in the amount of deposits.

NOVEL ROAD VEHICLE.—Twenty-four small two-wheeled vehicles have been constructed by the Kimball Manufacturing Company for use in China. They are to be drawn by Chinamen, and will each comfortably accommodate one lazy Caucasian.

HEALDSBURG offers \$10,000 for a supply of water. This is a fine opportunity for enterprising capitalists.

A POTTERY is to be established at San Bernardino. Superior clay for the purpose exists there.

General News Items.

SENSIBLE.—Carlyle has declined the Order of the Grand Cross of Bath, which was offered him. The Baronetcy tendered to Tennyson has also been declined, to protect his honor. Bismarck, it will be recollected, refused to receive his title of "Prince" unless it was coupled with the name with which his fame had up to that time been connected. The Emperor, after some hesitation, acceded to his wishes.

LOCKEN OUT.—News comes from London that 120,000 men are thrown out of employment in the dead of winter as the result of a coal-miners' strike in South Wales. How much better would it be for all governments to follow the example of France in establishing courts of arbitration for the settlement of labor quarrels, by means of which, in ninety-five cases in a hundred, there is a reconciliation between the parties.

PROTECTION TO SETTLERS.—Luttrell has, or soon will introduce a bill for the protection of settlers; providing that whenever any railroad is granted permission by Congress to change its location, all land originally granted to it shall be forfeited and become subject to the homestead and pre-emption laws.

SINGULAR DISCOVERY.—Fourteen pounds of mutilated bank bills, of various denominations, representing over a million dollars, have been discovered in a rag shop at 411 West Twentieth street, Washington. They are of various denominations with large pieces cut out of the center. No one seems to know anything of their history.

A SCIENTIFIC HOAX.—Several of our contemporaries have been hoaxed with a pretended calculation, based upon observations of the late transit of Venus which demonstrates that in 1,400 years the earth will fall into the sun and of course be destroyed. The New York World started the story.

ENCOURAGING THE CULTIVATION OF FOREST TREES.—Among the laws passed by the Idaho Legislature is one to encourage the growth of forest trees, which exempts the grower of five acres or more of forest tree from taxation on \$100 of his property for each acre planted in trees.

CALIFORNIA APPROPRIATIONS.—The Congressional Committee on Appropriation will report favorably on the following appropriations: For improvements in California harbors—Oakland, \$100,000; San Diego, \$80,000; Sacramento River, \$25,000.

NO TROUBLE WITH SPAIN.—By dispatches from Madrid, it is quite evident that no trouble is to be apprehended in settling the 'Virginian' difficulty with Spain.

ECLIPSES.—There will be two eclipses of the sun this year. One, April 6th, not visible in the United States; the other, September 29th, visible east of the Mississippi.

BANDIT THREATS.—The people living in the southern portion of Monterey county are afraid of Chavez, and are arming themselves to be ready for him should he make a raid among them.

THE SAW MILLS in Inyo county have been compelled to suspend operations, on account of the deep snow in the timber where they procure their logs.

"THE KING" left San Francisco on Tuesday last for his island home.

A PROPOSED HOSPITAL.—The Napa Register states that the German Benevolent Society of that city are contemplating the establishment of a hospital in Napa valley. Convalescent patients will employ themselves in weaving baskets from the willows in the vicinity.

FLOUR MILL DESTROYED.—The uncompleted flour mill located in Putah cañon, a short distance above Wolfskill, was washed away by the late heavy rains. Not a vestige of the mill remains.

Agricultural Items.

THE HARVEST OF UTAH.—The quantity of wheat harvested in Utah was 30 per cent. less during 1874 than the previous year. Barley was 10 per cent. less; oats, 7 per cent. less; Indian corn, 15 per cent. less; potatoes, 8 per cent. more; hay, 7% per cent. less. Dried peaches, in consequence of an unusually large crop, footed up nearly four times as much in 1874 and 1873. There was an increase of 50 per cent. in eggs, butter and poultry, and the number of hogs, beehives and sheep raised was considerably in excess of 1873.

FISH CULTURE.—The Plumas National says: Henry Landt, of the Big Meadows, has several men at work constructing a fishery, which he designs making one of the most extensive operations of the kind on the coast. The Big Spring, in the Meadows, is the basis of the operations, and large ditches, now being dug, are to lead the waters of several of the mountain streams into the spring, giving the trout an extensive range.

ALDEN FRUIT DRYER IN SONOMA.—The results of the working of the Alden fruit drying enterprise, which was established last year at Sonoma, have proved very highly satisfactory; so much so that the company contemplates enlarging their works for the operations of the coming season.

SALINAS RIVER CHANNEL.—The Captain of the steamer Salinas reports that the recent rains have quite changed the channel at the mouth of the river Salinas, and estimates that it has been shifted at least 1,000 yards from its former position.

GOAT RAISING.—C. S. Abbott, Flint, Bixby & Co., and B. Boswell have purchased most of the stock of the Guadalupe Island Company, and purpose going extensively into the business of goat raising.

LOS OF SHEEP.—Haggin & Tevis are reported to have lost between 1,500 and 2,000 sheep by the recent flood. The animals were grazing on the Norrie Ranch.

GROUP DISEASED BY ITS TERRORS.—The group cough, so alarming to the ear and so dangerous to life, to which children are subjected, may be immediately relieved by administering a dose of *Hale's Honey of Hyaloid and Tar*. When given to a child who seems to be choking under the effects of a spasmodic and husky cough, the effect is electrical as many a mother will testify. In fact there is no affection of the throat or the lungs, short of the actual disorganization of the tissues and membranes, which it will not cure. *Pike's Tooth-Ache Drops*—One in one minute.

METALS.

WEDNESDAY M., Feb. 3, 1875.

American Pig Iron, 30 ton	46 00
Scotch Pig Iron, 30 ton	42 00
White Pig, 30 ton	46 00
Oregon Pig, 30 ton	46 00
Refined Bar, bad assortment, 30 lb.	3 1/2
Refined Bar, good assortment, 30 lb.	4 1/2
Boiler, No. 1 to 4	2 1/2
Plate, No. 5 to 9	5 1/2
Sheet, No. 10 to 13	5 1/2
Sheet, No. 14 to 20	5 1/2
Sheet, No. 21 to 24	6 1/2
Horse Shoes, per keg	7 50
Nail Rod	10 00
Norway Iron	9 00
Roller Iron	10 00
Other Irons for Blacksmiths, Miners, etc.	4 1/2
COPPER.	
Brazier	31 00
Copper, Tin'd	45 00
O. N. E. Pat.	50 00
Sheathing, 30 lb.	24 00
Sheathing, Yellow	24 00
Sheathing, Old Yellow	24 00
Composition Nails	24 00
Composition Bolts	24 00
TIN PLATES.	
Plates, Charcoal, 1X 30 box	13 00
Plates, 10 Oharcoal	13 00
Roofing Plates	12 50
Bacon Tin, 30 lb.	20 00
SPRINGS—English Cast	20 00
Anderson & Woode's American Cast	16 1/2
Drill	18 00
Flat Bar	10 00
Flow Steel	9 00
ZINC.	
Sheet, 30 lb.	11 00
Nails—Assorted sizes	4 25
QUICKSILVER, per lb.	1 55

LEATHER.

WEDNESDAY M., Feb. 3, 1875.

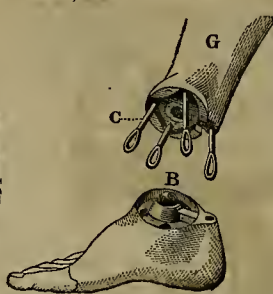
Santa Tanned Leather, 30 lb.	26 00
City Cruz Leather, 30 lb.	26 00
Country Leather, 30 lb.	24 00
Stockton Leather, 30 lb.	26 00
Jeckel, 30 lb.	26 00
Jeckel, 11 to 13 Kil, per doz.	68 00
Jeckel, 14 to 16 Kil, per doz.	82 00
Jeckel, second choice, 11 to 16 Kil, 30 doz.	57 00
Cornellian, 12 to 16 Kil, 30 doz.	57 00
Cornellian Female, 12 to 16 Kil	63 00
Cornellian Female, 14 to 16 Kil	71 00
Simon Ullmo Female, 12 to 16 Kil	60 00
Simon Ullmo Female, 14 to 16 Kil	70 00
Simon Ullmo Female, 16 to 17 Kil	73 00
Simon, 18 Kil, 30 doz	61 00
Simon, 20 Kil, 30 doz	65 00
Simon, 24 Kil, 30 doz	72 00
Robert Oalf, 7 and 9 Kil	25 00
French Kips, 30 lb.	1 00
California Kip, 30 lb.	8 00
French Sheep, all colors, 30 doz.	8 00
Eastern Oalf for Backs, 30 lb.	1 00
Sheep Roams for Topping, all colors, 30 doz.	9 00
Sheep Roams for Linings, 30 doz.	5 00
California Knott Sheep Linings	1 50
Best Jeckel Oalf Root Legs, 30 pair	5 00
Good French Oalf Root Legs, 30 pair	4 00
French Oalf Root Legs, 30 pair	4 00
Hames Leather, 30 lb.	30 00
Air Bridge Leather, 30 lb.	48 00
Skirting Leather, 30 lb.	30 00
Welt Leather, 30 lb.	30 00
Ruff Leather, 30 lb.	17 00
Wax Side Leather, 30 lb.	17 00
Eastern Wax Leather	17 00

THE DR. BLY ARTIFICIAL LIMBS

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COR. OF THIRD, BETWEEN HOWARD & FOLSOM.

References to parties wearing these Limbs given when applied for.



THE "ANATOMICAL LEG" WITH A UNIVERSAL ankle motion; the above cut is its illustration. This artificial leg approaches so much nearer an imitation of the functions of nature than any other, that it stands without a rival among all the inventions in artificial legs, old or new. (The very latest announced new inventions duly considered.)

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140 Degrees Fire Test, for Family Use

OWNERS OF MILLS AND MANUFACTORIES, your attention is particularly called to this beautiful and safe ILLUMINATING OIL. Its use is urgently recommended by the New York Fire Commissioners and Insurance Companies. For sale to the trade in lots to suit. A. HAYWARD, 224 California St. 19v23-3m

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tanned Manila Rope; Hay Rope; Whale Line, etc., etc.

de20
TUBBS & CO.,
611 and 613 Front street, San Francisco.

WANTED.—By a graduate of the Massachusetts Institute of Technology, who has had practical experience, the situation of Chemist or Assayer, or a position as Assistant in a Mine or Smelting Works. References given if required. Address, O. E. STAFFORD, Tol-do, Ohio.

SANTA ROSA, SONOMA CO., CAL., Jan. 27, 1875.
MESSRS. DEWEY & Co.—Sirs: My Patent is at hand, the receipt of which is hereby acknowledged. Accept my thanks for your energy and promptness in the premises. Yours, etc., Q. C. TEBBS.

Iron and Machine Works.

San Francisco Boiler Works,

123 and 125 Beale Street.....SAN FRANCISCO

F. I. CURRY,

Late Foreman of the Vulcan Iron Works, Proprietor

High and Low Pressure Boilers of all Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED
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SHEET IRON WORK of every description done at the Shortest Notice.

All kinds of **JOBGING** and **REPAIRING** promptly attended to. 17v25-3m

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Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868.
CAPITAL.....\$1,000,000.

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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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CROSS' PATENT BOILER FEEDER and SEDIMENT COLLECTOR

Dunbar's Patent Self-Adjusting Steam Piston PACKING, for new and old Cylinders.

And all kinds of Mining Machinery.

Front Street, between N and O streets,
SACRAMENTO CITY.

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W. R. ECKART.

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MARYSVILLE, CAL.

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Manufacturers of Quartz and Amalgamating Machinery. Hoisting Machinery, Saw and Grist Mill Irons, House Fronts, Car Wheels, and Castings of every description made to order. 9v23-ly

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Machinery and Castings of all kinds.



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BAILEY'S PATENT ADJUSTABLE PLANES.

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IRON AND WOOD.

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Stevenson's Patent Mould-Board Pan

THE BEST IN USE.

QUICKSILVER FURNACES, CONDENSERS, &c.

Having much experience in the business of the Reduction of Ores, we are prepared to advise, understandingly, parties about to erect Reduction Works as to the better plans, with regard to economy and utility.

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Heavy Forging Boilers, Stationary and Marine.

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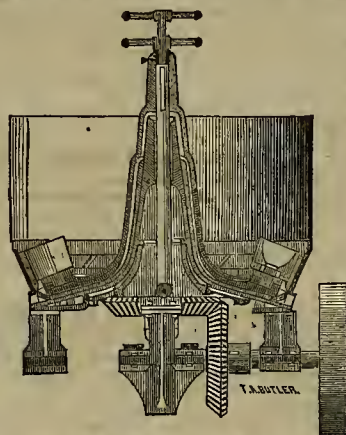
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Every Variety of Shafting.

Embracing ALL SIZES of
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The highest price paid for Scrap Iron.

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PRICES MODERATE.
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THE

Risdon Iron and Locomotive Works

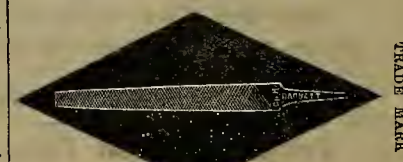
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Are prepared to make **SHEET IRON AND ASPHALTUM PIPE**, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material. Standard sizes of railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

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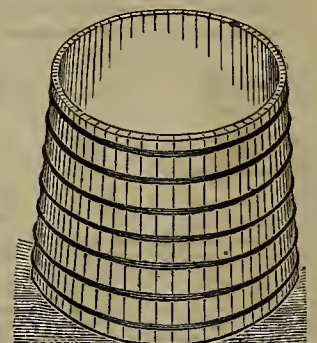
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TO COPPER SMELTERS, BLUE-STONE

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WATER TANKS of any capacity, made entire by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Cost less than elsewhere.

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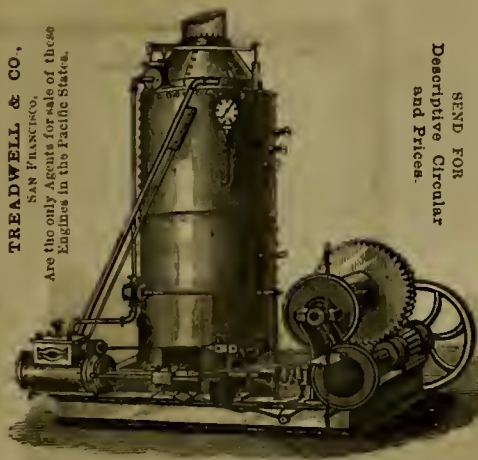
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IMPROVED HOISTING ENGINES.

HOISTING ENGINES.



TREADWELL & CO.,

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Are the only Agents for sale of these
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Descriptive Circular
and Prices.
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COOK, RYMER & CO.'S Celebrated Hoisting Engines have been too long in use on the Pacific Coast to require any special recommendation from us. We refer with confidence to any one of the hundreds now in use. We stoutly state that they still sustain their old reputation, the manufacturers not having followed the now too common practice of reducing the quality of material and workmanship for the sake of competing with cheaper engines. For details of sizes send for price list. We desire to call particular attention to our new

MINING HOISTING ENGINES.

(Manufactured by the same parties.)

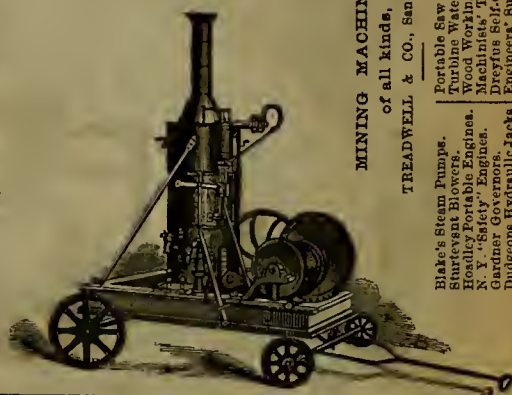
Which have just been introduced on this Coast. The plans and specifications are the combined efforts of our most successful MINING ENGINEERS, and the result is the most complete

DOUBLE-DRUM HOISTING ENGINE

Ever built. Their advantages will be seen at a glance by any one familiar with the necessities of a mine. One of these engines may be seen at work in the Belcher mine, and one in the Ophir, on the Comstock lode, to both of which we refer. We have all sizes of these engines constantly on hand. For sale only at

TREADWELL & CO.'S,

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MINING MACHINERY
of all kinds,
TREADWELL & CO., San Francisco.

Portable Saw Mills.
Furrowing Water Wheels.
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N.Y. "Safety" Engines.
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CENTENNIAL PACKING. SELF-LUBRICATING.

FOR
Locomotive
Marine and
Stationary
ENGINES.



FOR
Steam Pumps
AND
Hot or Cold
Water Pumps
OF ALL KINDS.

The CENTENNIAL is composed of the finest Hemp, made in strands or sections, of different sizes, each being saturated in a composition of pure German Black Lead and Tallow and covered with a braiding of the best Italian Hemp to be found in the market. It is manufactured in a shape the most convenient to use and handle, and gives from 50 to 100 per cent. more length compared with an equal weight of other makes. It runs with less friction on the rod than any other Packing made, from the fact of its being so perfectly soft and pliable, and so well lubricated so to require a minimum pressure on the rod. It cuts off smooth and makes perfect joints, is easily adjusted to any size rod, and only requires occasionally a new ring to keep the stuffing box full. ENGINEERS, TRY IT. For sale in any quantity by TREADWELL & CO., San Francisco.

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Comprising all those
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MACHINE, LOCOMOTIVE,

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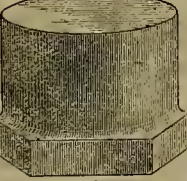
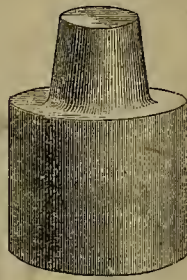
Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

[PATENTED MAY 26TH, 1874.]
Price Reduced to 18 Cents Per Pound.
SAN FRANCISCO, November 10th, 1874.

To Supts. of Quartz Mills and Mining Men generally.
We take pleasure in stating that owing to the rapid increase in our orders, our Pittsburgh Manufacturers have been compelled to add largely to their works—a new gas furnace and heavier trip hammer—and are thus enabled to reduce the cost of steel and at the same time produce SHOES AND DIES superior to any yet manufactured. We have consequently reduced the price to 16 cents per pound and solicit a trial order, guaranteeing that you will find them at least 10 per cent. cheaper than the best iron. There are no STEEL SHOES AND DIES made excepting under our patent and sold at this office, or by our authorized agents, though certain Eastern manufacturers advertise STEEL SHOES AND DIES which are only cast iron hardened by the addition of a composition. They will not out-wear two sets of common iron, though called steel. They are very brittle and are not capable of being tempered, flying from under the hammer like cast iron. Our STEEL SHOES AND DIES are in use in many of the largest mills on the Pacific Coast, and all who have tried them pronounce them cheaper and far superior to iron in every respect, even at the old price of 20 cents per pound. Their advantages over iron are cheapness on first cost, increased crushing capacity, time saved in changing and in setting tappets, increased value of amalgam by absence of iron dust and chippings, and a saving of 75 per cent. in freight. It takes 60 days to fill orders from the manufactory East. Price 16 cents per pound shipped at San Francisco. Terms liberal.

Address all orders, with dimensions, to

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IMPORTANT TO LUMBERMEN.

\$100.00 IN GOLD.

And FIRST PRIZE SILVER MEDAL were awarded to us for the best

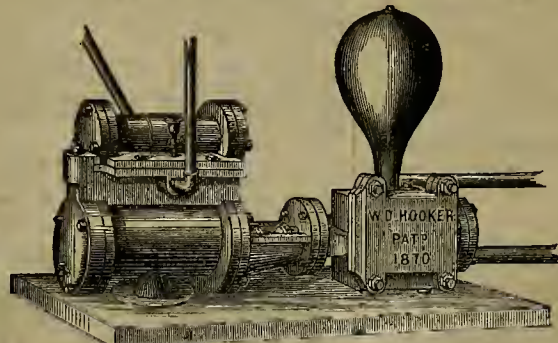
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In the great National contest held at Cincinnati, September, 1874, and lasting over six days. Our celebrated DAMASCOUS TEMPERED SAWS were declared the victors.

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Hooker's Patent Direct Acting Steam Pump



W. T. GARRATT,

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Sole Proprietor & Manufacturer for the Pacific Coast.

SIMPLE, CHEAP AND DURABLE.

Adapted for all purposes for which Steam Pumps are used.
The Best Pump in Use.

SEND FOR CIRCULAR

N. B.—Also manufacturer of Hooker's Deep Well and Double-Acting Force Pump. Received the Silver Medal awarded at the last Mechanics' Fair in San Francisco.

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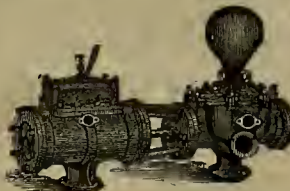
Send for sheets or catalogues illustrative of
any combination of

STEAM PUMPS, INDEPENDENT BOILER FEED
PUMPS, AND COMBINED COLD AND
HOT WATER ENGINE PUMPS.

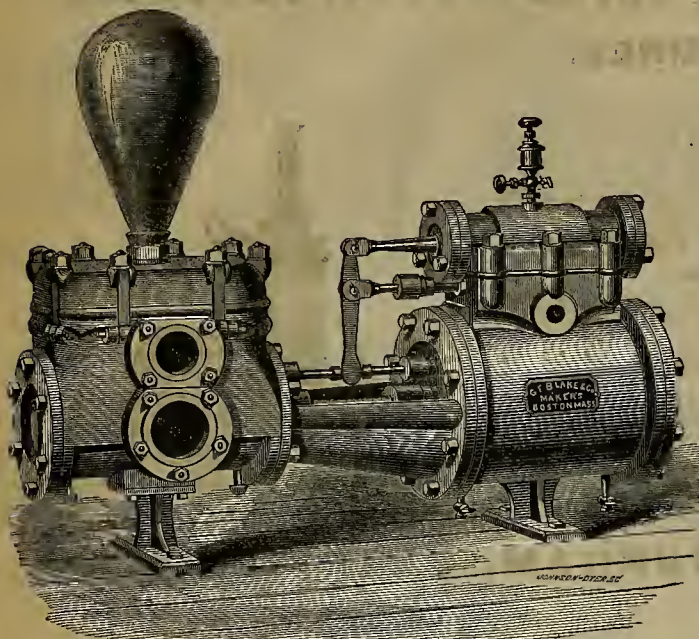
COPE & MAXWELL MFG. CO.,

Hamilton, Ohio.

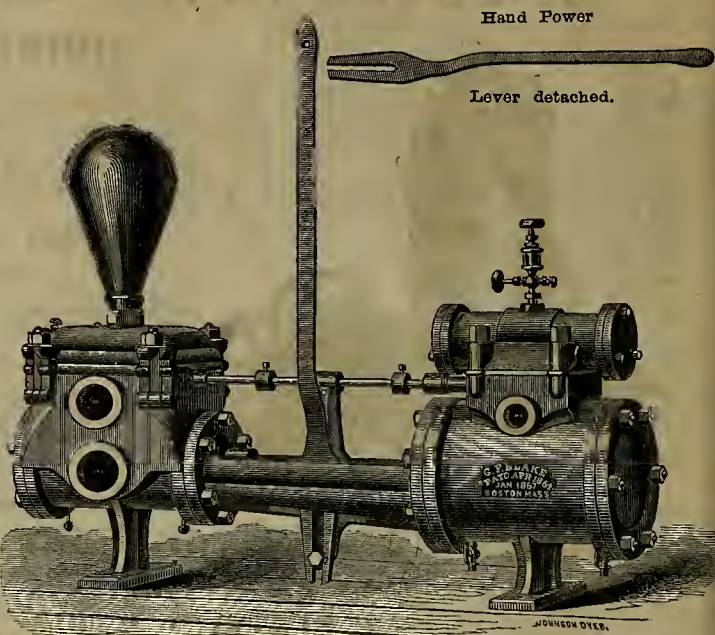
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BLAKE'S PATENT STEAM PUMP—MORE THAN 7000 IN USE.



MINING PUMPS,
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The BLAKE PUMP may be seen in many of the principal mines of California and Nevada. More than 7,000 have been sold, and we refer to any one found in use. Send for our large and handsomely illustrated Catalogue giving prices and details of over 100 different sizes. A large stock of all sizes on hand at the Machinery Depot of

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Patent Tooth Circular Saws.

They have proved to be the most durable and economical Saws in the World.

Each Saw is Warranted in every respect.

Particular attention paid to construction of

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MILLS FURNISHED AT SHORT NOTICE
At the lowest Market Prices.

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Brass and Bell Founder,

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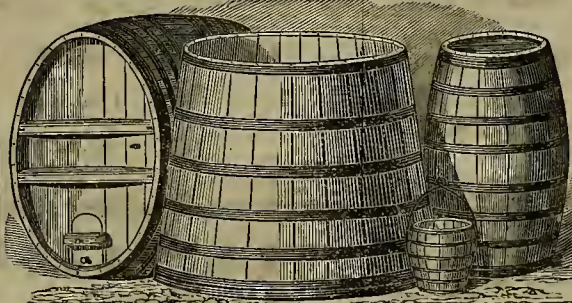
Steam, Liquor, Soda, Oil, Water and Flange Cocks,
and Valves of all descriptions, made and repaired.
Hose and all other Joints, Spelter, Solder and Cop-
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NOZZLES for mining purposes. Iron Steam Pipe fur-
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Particular attention paid to Distillery Work. Manufac-
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Highest Market Price paid for OLD BELLS, COP-
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The undersigned, owners of LESCHOT'S PATENT
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for the IMPROVED PROSPECTING and TUNNELING
DRILLS, with or without power, at short notice, and
at reduced prices. Abundant testimony furnished of
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WINE, BEER AND LIQUOR
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THE ONLY SAFE BLASTING POWDER IN USE.

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For hard and wet Rock, Iron, Copper, etc., and Submarine Blasting.

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For medium and seamy Rock, Lime, Marble, Sulphur, Coal, Pipe Clay and Gravel Bank Blasting, Wood, etc.

Its EXCLUSIVE use saves from 30 to 60 per cent. in expenses, besides doing the work in half the time required for black powder.

The only Blasting Powder used in Europe and the Eastern States.

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Cazin's Combination Ore-Sizer and Con- centrator—One Plunger System.

(Covered by Letters Patent of July 24, 1872, and recent applications.)

Containing a sizing apparatus, (revolving screen) deliv-
ering two or four sizes of ore to two or four rows of
sieves, each row independent of the other, and each
having 5 sieves, each row concentrating according to
specific gravity the special size automatically fed into
it, resulting in the simultaneous continual delivery of
separated materials, working 2d and 3d-class ores into
1st-class ores of perfect cleanliness. It thoroughly se-
parates native gold or copper from quartz or any other
lode matter—galena and silver sulphurets from
pyrite, barytes and quartz; and pyrites from quartz.

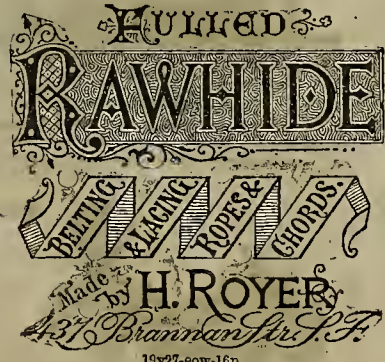
Added to a battery of stamps these machines consti-
tute a full system of ore concentration, sufficient in
most cases for the requirements of western mines, with
a capacity of 15 or 20 tons per 24 hours.

For particulars apply to,

F. CAZIN, M. & C. E.

Supt. Denver Concentration and Smelting Co.

At Denver, Colorado, Lock-Box 2225, or corner of
Blake and 32d streets.



W. BREDEMAYER,

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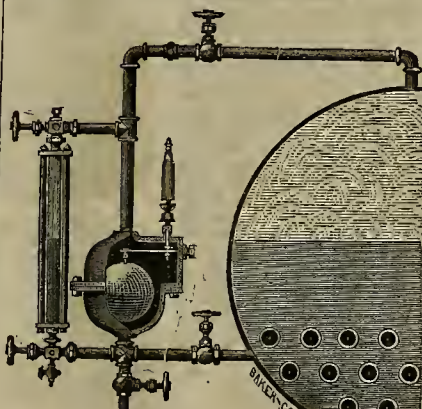
Working Plans and Estimates for Mines and Improve-
ments furnished; will superintend the establishment
and working of Mines.

The Concentration of Ores a Specialty.

Agent for the Humboldt Company, Manufacturers of
Mining and Concentrating Machinery.

For Plans and Information apply at my Office, No. 12
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I am prepared to take contracts on Tunnels and the
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1874. A GRAND SILVER MEDAL. 1874



The highest and only prize of its class given to any
Vertical Engine was awarded to the

HASKINS ENGINES AND BOILERS.

BY THE

MASS. CHARITABLE MECHANICS' ASSOCIATION,

at their Fair in Boston, in competition with the
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and the Sharpley Engines.

A GOOD CHANCE FOR INVESTMENT.

An interest in one of the best paying Patents issued
within the last twelve months. Working Model can
be examined at the Office of California Chemical Paint
Co., Cor. Fourth and Townsend streets, San Francisco.

H. W. McCOTTER.

ENGINES. ENGINES.

Kipp's Upright Engine

Has decided merits. Its Beauty, Compactness,
Strength, Durability, Economy in Fuel, Ease in Hand-
ling, and Small Space required attract the Buyer, and
the Price readily concludes the Sale.

Call and see it or send for Circulars.

J. M. KEELER & CO., Agts., 306 Cal. St., S.F.

A. WELDON'S PATENT

Low-Water Alarm Gauge

For STEAM BOILERS of Every Description

THE SUREST,
CHEAPEST,
SIMPLEST, and
BEST IN EXISTENCE.

Price, - - - \$40

With Glass Water-Gauge Complete, \$50.

A. POTTER, Sole Agent,

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 13, 1875.

VOLUME XXX
Number 7.

Low Water Alarm Gauge.

The accompanying cut represents Weldon's patent low water alarm gauge, which is now being introduced on this coast. The invention consists of a hardened float and the arrangement of a lever, valve and fulcrum in such a manner that it is impossible for it to hind or get out of order. As will be seen by the cut the float is at one end of the lever and fulcrum at the other, and the valve being close to the fulcrum, gives the float sufficient leverage when the water leaves it, to open the valve and blow the alarm whistle under 1,000 pounds pressure, which is more than any steam boiler will stand. The float is hardened by a new process, which leaves it perfectly round and smooth, and is tested outside and inside by a hydraulic pressure of 500 pounds to the square inch; it is then plated with nickel, so that the steam cannot oxidize the spelter. No float of this patent ever can collapse or fail; it is not necessary to shut off the gauge or take out the float while testing the boiler, for the float will stand more pressure than the boiler. The valve passes through the lever near the fulcrum, and is held in position by little adjustment nuts, and is guided to its brass seat. The valve, lever, fulcrum and valve seat are made of the best steam metal, and will never corrode. All cast iron yokes, pins, screws, gearing and clock work are avoided, there being but one valve, and one lever, and that direct acting, so that it is sure to blow the alarm when the water leaves the float. The height of water in the boiler is indicated in the glass, and the water cannot possibly leave the glass without the alarm being given. The glass gauge and alarm are each separate and complete in itself; the glass gets broken from any cause, the valves can be shut off and a perfect low water alarm still remains.

The alarm gives the engineers a gentle warning as the water approaches a dangerous state in the boiler, and if disregarded will soon alarm the whole establishment. They preserve the boiler, for with this protection the flues or rounsheet or sides of the boiler can never be injured for want of water, neither can the boiler be exploded. Every gauge is provided with a test and blow-off valve, the full size of the pipe, so that it can be tested as often as desired. The alarm gauge can be attached to any boiler already having a glass water gauge without making any additional holes in the boiler. Parties desiring further information can communicate with the agent, whose address may be found in our advertising columns.

PROFESSOR SILLIMAN has published a card in New York, with regard to the use made of his name in the complaint of the English stockholders in the Emma mining company against Ark, Stewart and others, in which he says very charge contained in that complaint, emanating from any source, imputing to me fraud, complicity or other improper act, either in connection with the examination of the Emma mine, with its sale, or with the owners hereof, is entirely without a shadow of truth."

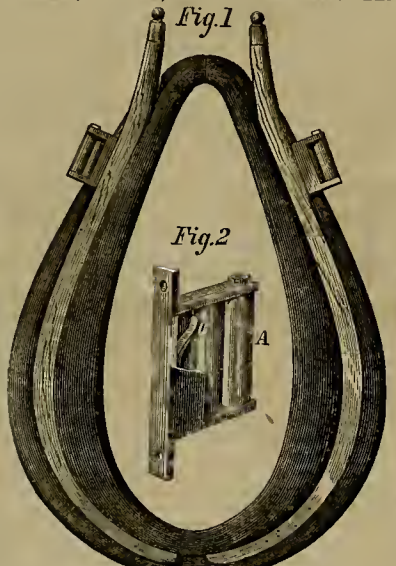
A. V. M., HELENA, M. T.—Your question answered by mail. Owing to the large amount of growth of timber on this coast our mechanics have, in order to meet the demands, tactically placed themselves in advance of all others in the manufacturing of saw-mills and lumbering machinery. We are always pleased to answer queries concerning machinery desired in this coast, and invite mechanics to give us their views of what is wanted.

HEAVY BLAST.—They fired a blast of 80 kegs of powder, in the Union claim at Truckee Flat on Tuesday, which blew rocks and gravel out, totally demolishing the company's blacksmith shop, doing great damage to Michael Dougherty's house and barn, and killing a young colt which was in the barn. The mines are working full force.

ANVIOKE from the Quahay (Arizona) mines say the minees are paying a good profit, and will soon pay largely.

The Oregon Mining Excitement.

They are having quite an excitement in Oregon over mining matters, and people are getting quartz on the brain badly. The excitement in the southern part of the State is by no means confined to the Galice creek discoveries. There are numerous prospectors tramping the gulches and hill-sides in all directions, and bringing in specimens daily. They have not only found gold, but cinnabar also. A 12-foot deposit of cinnabar is reported on Louise creek and indications are also found on Wagner, Griffin, Sam's and Brush creeks; as also on Farmers' Flat. They have found a large ledge, almost 20 miles north of Jacksonville, which is pronounced very valuable. The principal excitement, however, is at Galice creek. The



Smith's Improved Rein Holder.

developments made there lately, particularly on the Yank, or mammoth ledge, are beginning to excite considerable interest. Nothing has been done until lately to prove the value of the mine. The ledge in question is stated to be from 100 to 210 feet wide, which if true would make it probably the largest ledge ever discovered, discounting Fansmirt altogether in this respect. It is said to assay from a trifle up to \$500 per ton; but if it will work \$15 per ton and is as wide as claimed, it ought to be a fortune for the owners. The ore contains silver principally. The Oregon Sentinel states that two mills will soon be put up. Reynolds & Co. have a 40-stamp mill on the way, and a California company have a 50-stamp mill coming. Wood and water are abundant, and a wagon road is being constructed from the stage road on the north to the ledge, about 60 miles.

At present the snow has prevented much of a rush, but the Oregon papers predict a crowd in the spring. There are various other ledges in the same range of mountains, that are now being prospected. Some 15 miles of the Yank ledge are already claimed. The main ledge has numerous veins of rich ore running through it from one to ten feet wide. In other parts of Oregon the late rains and melting snows have put water in some of the ditches and smaller creeks and the miners are beginning to work.

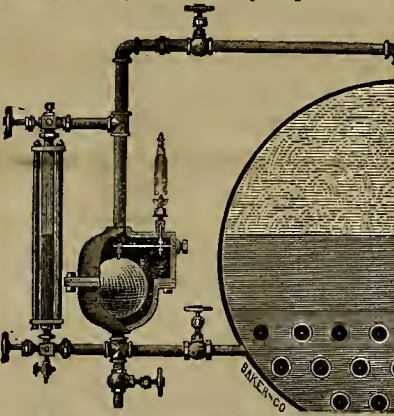
Oregon was credited with \$609,070 last year, as her bullion product, and if these discoveries prove half what is claimed for them she ought to quadruple the amount in 1875.

ANOTHER instance of a bankrupt estate being saved by a rise in mining values, is that of A. Delano, of Graec Valley, which was heavily encumbered at the time of his death, but it is now likely to turn out all right and leave a handsome balance. Mr. Delano was a heavy owner in a local mine, which is now yielding very rich rock.

Smith's Improved Rein Holder.

This improvement is intended to prevent the fastening of the reins to the bridle in a twisted condition; also to keep the former from falling under the horses feet when unattached to the bit, or from dropping under the tongue of the vehicle. The device is represented in our illustration secured to the harness and also separately in Fig. 2. It consists of a simple metal casting, having one pivoted roller, A, and another not pivoted but forced in close contact with the first by means of a spring, B. The rein is passed through between the rollers and thus supported.

On work harness the rein holder should be made pendent to conform to the position of the reins. On light harness it may take the place of the terret, and thus, it is claimed, be of greater service than a rein holder secured to the carriage, since it keeps the reins up in front of the animal, so that he cannot get his fore feet over them. At the same time the reins when thrown over the dashboard are less liable to get under the horses feet and tail. The inventor points out that in similar devices, which keep the reins taut, the horse is apt to put his tail



Weldon's Low Water Alarm Gauge.

over, and so pulling on the lines, to cause himself to back, thus breaking the hitching strap, a difficulty evidently obviated by the present invention. When used on backpad of harness the rein holder should be made of terret form where it is secured to pad, with rollers grooved for round reins. This device was patented by A. K. Smith, of Nebraska, Pickaway county, Ohio, who may be addressed for further information.

ESMERALDA.—A subscriber of ours writing from Lida, Esmeralda county, Nev., says: "I am compelled to complain a little of the condition of my paper on its arrival here. It would appear as though all the worthy postmasters on this side of the Rocky Mountains are thoroughly convinced that Esmeralda county, Nev., is in Mexico, and Mexico in Acapulco, and, therefore, all the letters and papers mailed for this place must first take an ocean voyage and then work its way to its destination the best it can. The result of this little arrangement is that mail matter that should reach here in six days from San Francisco is a great deal longer coming. The Press of January 9th, arrived on the 22d, and of late three sheets of the paper are chafed through now by being carried on the backs of mustangs. If the postmasters would send on mail matter by way of Austin, Nev., instead of Mexico, it would come in half the time, and the papers not be so defaced as to be unreadable. If you can do any thing to correct this nuisance you will greatly oblige this community." We give space to the above in hopes that the wife of some postmaster will cut it out and read it slowly to her husband at such times as she may want to convince him of the stupidity of postmasters in general, and her postmaster in particular. Its no use to argue with a postmaster; he must be allowed to think he is having his own way even if you are really having yours.

Bullion Product.

It is well known that the figures representing the annual bullion product of the Pacific States and Territories are always lower than the real production. Nevertheless the tables furnished by Wells, Fargo & Co. are recognized as statistics upon which to base calculations of advance or decline, as there are no others except such as are based upon estimates alone. This company, as common carriers, handle most of the bullion produced, carrying it from the mining districts to the mints, where it is coined. They have, therefore, the best opportunity of obtaining reliable data with reference to the bullion production. Still it must be remembered that the figures they give only represent what has actually passed through their hands, so that there is no danger of an over statement. But considerable dust and bullion is carried from the mines by private hands, of which Wells, Fargo & Co. know nothing. It frequently happens in this State that after a clean-up, a miner with a few thousand dollars, who is going to San Francisco, will carry his own bullion so as to save the charges of the express company. This, of course, happens elsewhere, so that the bullion product, as stated by Wells, Fargo & Co., falls actually short of the real product.

How much it falls short, is, of course, impossible to say; but 20 per cent. is usually added to the sum actually handled by Wells, Fargo & Co., for that carried by other means. There is considerable complaint from the newspapers in the Territories, especially those with comparatively small production—concerning the amounts as given by Wells, Fargo & Co. They perhaps, forget that without these statistics, which are compiled with some trouble by Wells, Fargo & Co., we should be entirely at the mercy of estimates, or would have to wait for those compiled by the United States Mining Commissioner, which are published a year or two behind time. Mr. Valentine, the General Superintendent of Wells, Fargo & Co., deserves credit instead of blame for furnishing us such as he does. Mr. Valentine considers that the allowance of 20 per cent. for "under-valuation and other conveyances" is a liberal concession. In some of the Territories, Arizona and Colorado, for instance, the statement is usually considered low. From Colorado and Utah considerable ore and base bullion is shipped, of which Wells, Fargo & Co. have no official knowledge. In Arizona considerable dust is shipped by private hands, as, in fact, is the case in all the States and Territories.

The bullion statistics give Arizona this year, a very poor showing for all the work done in 1874, and the figures are undoubtedly low. Colorado complains of injustice in this matter also, as will be seen by reference to an article in another column. In fact, the figures of all the States and Territories are small and may be taken as a minimum statement; Nevertheless they are much more reliable than mere estimates, and certainly more correct than half the statistics we take for granted on seeing them in print. The Government sets aside such a meagre appropriation for the collection of mineral statistics, that it is impossible for the Commissioner to collect them in any systematic manner. If all mine owners would send to some authorized individual an account of their work, it would be all right; but mine owners will not do it any more than people will pay taxes without compulsion. When the minees are prosperous the owners say they do not wish to parade their private affairs to the public, and are independent; and when the mines are poor the miners are still independent and even less likely to furnish information as to the result of their work. We fear that it is impossible to expect ever to have any thoroughly reliable statistics of the aggregate results of mining in the United States; but still we should not grumble at those prepared for us free of charge by a private corporation, which really had no direct interest in the matter.

CORRESPONDENCE.

The Australian Colonies.

ENTRONS PRESS:—As there appears to be every probability of a permanent line of steamers being established between San Francisco and these colonies, which will afford greater facilities for the transaction of business between the respective peoples, I have thought it might not be unacceptable to your readers to know somewhat concerning the area and population, resources and requirements of the several colonies forming the Australian group, more particularly as I have found from frequent intercourse with gentlemen from your State that gross misconceptions, both of the place and people, are commonly held by California residents.

Will you hear with me then if I make the commonplace observation that there are seven Australian colonies—five on the continent of Australia and two in the islands adjacent. Of those on the continent four only are of any consideration—the fifth, Western Australia, being separated from the rest by nearly two thousand miles, and used only as a penal station by Great Britain. The remaining four are named respectively Victoria, New South Wales, Queensland and South Australia, the order in which they are named indicating the wealth, population and importance, whilst in area Victoria is by far the smallest and South Australia by far the largest. New South Wales again is larger than Victoria and Queensland than New South Wales, a vast portion of Queensland and South Australia, being altogether unsettled. The island colonies are named respectively New Zealand and Tasmania, the first consisting of three islands of considerable size and ranking, at all events, third in importance of the whole group; whilst Tasmania is at the bottom of the list for everything except the salubrity of its climate.

With respect to area, population, trade, revenue and public debts, the following are the statistics:

Relative Condition of Australian Colonies.

	Area in sq. mi.	Population.	Imports.
Victoria.....	92,198	780,492	16,539,856
New South Wales.....	328,437	560,275	11,033,333
Queensland.....	678,600	146,690	2,835,493
South Australia.....	914,730	198,257	3,841,100
New Zealand.....	105,000	310,437	4,663,687
Tasmania.....	26,215	104,217	1,107,167

	Exports.	Revenue.	Pub. Debt.
Victoria.....	15,302,454	3,943,691	12,445,722
New South Wales.....	11,315,829	3,324,713	10,819,415
Queensland.....	3,542,513	1,120,084	4,786,850
South Australia.....	4,587,859	937,648	2,174,900
New Zealand.....	5,610,371	1,420,216	12,509,646
Tasmania.....	893,556	293,763	1,477,600

The provincial revenues of New Zealand are about \$1,500,000 in addition.

All these figures show pretty conclusively that Victoria is a long way ahead of the others in every respect, although the people of New South Wales, try hard to make themselves and others think differently. There is no doubt, however, that New South Wales, and in fact, all the Australian colonies—Tasmania only excepted—are in a sound and flourishing condition. Never during the 19 years I have been here has the look out all around seemed so promising. It is true the yield of gold has fallen off to some extent, and seems likely to fall off still farther, nevertheless, copper mines, tin mines and coal mines are being opened and worked, manufactories of various kinds are multiplying, the land is being settled upon and systematically worked, whilst the wool growers and cattle breeders are getting disgustingly rich. In addition to all this, the price of food is very low, and any man can save who will. There are some men, however, who seem to have no will about them, except it be to loaf and get drunk as much as possible.

The most important scientific event of the last month is the Transit of Venus, the nature of the observations taken of which, will be better understood by reading the accounts in the Australian papers, than by any description I could give.

Melbourne, Dec. 15, 1874.

OVER one hundred Chinamen have left Columbia since Friday week—most of them for the new quicksilver mines. After defacing the fair appearance of the "Gam," despoiling the best of her mines, robbing the country of thousands, leaving houses in the air on stilts, with unlighted holes beneath as the only relic, they depart like a lot of vultures from a carcass of dry bones, only to prey upon some other unfortunate community. However, there is one thing in their favor—they dislike to go below their noses in a mine, and this cowardice keeps many of them out of rich deposits. The ground mined up in the town can be easily slummed in and be made as good as ever. This will be done some day when a new condition of things transpires and a new population crowds the county. These mountain towns and hill-sides will come out brighter than ever.

A new ledge, with a very promising appearance, has been found on the southwest side of the ridge back of Pioche. The owners are Murphy, Jones & Co.

Quicksilver.

The third of the series of lectures given by the Professors of the University of California, at the hall in the Mechanics' Institute Building, was delivered on Saturday last, by Dr. Becker. The subject was "Quicksilver and Fuel." We present the first part of the lecture in full:

There can be no doubt that the most prominent characteristic of quicksilver is its fluidity at the ordinary temperatures of the atmosphere. This is, indeed, so striking a peculiarity that, except to a mind somewhat used to generalizing, mercury seems almost a substance apart, and not in the ordinary sense one of the metals. A moment's reflection, however, shows that there is nothing generically peculiar about quicksilver. The relation between the prevailing temperature of the surface of the globe and the melting point of the metals is an accidental and probably a temporary one. There is much less difference between the melting point of mercury and that of lead than between the temperatures at which lead and copper become fluid. The globe has certainly once had a temperature at which all these metals were permanently liquid, and a reduction of a hundred degrees more would familiarize us with a soft, ductile metal, much resembling lead, though with a tin-white color, for which the name of *quicksilver* would be a misnomer.

The Uses to Which We put Mercury

Depend to a great extent upon its fluidity under ordinary conditions—gold, for example, would be even better than mercury for barometers—were it only liquid. It is frequently a matter of great convenience to be able to bring water in contact with melted metal, and with the exception of an alloy or two, which melt just below the boiling point of water, mercury is of course the only metallic body available in such cases. I tried in my last lecture to bring into especial prominence the similarity of the action of quicksilver, in the amalgamation process, with that of other metals in a fluid state, and showed that the main difference is in the replacement of the melted slag of the furnace by a watery emulsion of the rock in the barrel or pan. A vast proportion of the mercury yearly produced is employed in amalgamation. Most of the remainder is consumed in the manufacture of vermilion paint and mercurial drugs.

Quicksilver sometimes occurs native in connection with its ores, but generally in inconsiderable quantities. It is also sometimes an ingredient of a complicated mineral called tetrahedrita, but by far the most important ore of mercury is the sulphide, called cinnabar, and identical in composition with the vermilion of commerce. The largest deposit of this ore is at Almaden, in Spain. The Almaden mine has been worked since 700 B. C., and is scarcely even well developed yet. The second largest deposit is at New Almaden, in this State; but as this far known, it does not approach the Spanish deposit in value.

Quicksilver belongs to the same general group of metals as gold and silver, and like them its affinities are weak, or in other words, its compounds are readily decomposed. The beneficence of cinnabar depends upon the fact that sulphur unites with much more strength with most other substances than it does with mercury. If cinnabar be heated with lime, the sulphur of the ore combines with it, forming sulphide and sulphate of lime, and leaving metallic mercury. If we heat cinnabar in a current of air, the mineral is also decomposed; the sulphur unites with the oxygen of the air to sulphurous acid, the unpleasant smelling gas we have met so often in these lectures, and metallic mercury is again left behind.

Perhaps you may remember that when sulphide of lead or galena is heated in a current of air, the oxygen attacks both constituents of the mineral, and we get, as here, sulphurous acid, but in place of metallic quicksilver, oxide of lead results. Gold, silver, platinum and mercury, the noble metals, are not attacked to any extent by free oxygen, and hence in the present case, metallic mercury is produced by simple roasting.

Quicksilver Possesses a Property

Which greatly simplifies the operations subsequent to its isolation in a metallic form. It is highly volatile and boils at a temperature of 675 degrees. It therefore distills off from the ore during the roasting, and only requires to be conducted through proper condensing apparatus to be liquified and obtained in a marketable shape. If gold and silver were but volatile at furnace temperatures, we could beneficiate their ores in the same way—i. e., sufficiently volatile; for, though we cannot distill these metals in any ordinary furnace, very small amounts of gold and silver do pass off as vapor when they are melted, and their volatility is consequently great enough to necessitate troublesome precautions, and to occasion loss, though it is insufficient to be turned to practical account.

Retorting quicksilver ores with lime is a method of beneficiating them now seldom practised, except for assay. When used this method differs but little from the retorting of amalgam, which I described in my last lecture. The retort is filled with a mixture of cinnabar and lime, and heated. The mercurial vapor passes out of the retort through tubes, cooled with water, and the liquid quicksilver drops from the end of the tube. The retorts are sometimes made so that they can be charged from the outside of the furnace, and thus be

kept at work continuously. A larger percentage of the metal is obtained than by the process of roasting; but the cost of apparatus, labor and extra fuel more than compensate for the gain under ordinary conditions.

The Oldest Cinnabar Roasting Furnace

Still, or until recently, in use is the Bustamante furnace. In this apparatus the ore and fuel are charged together in a short vertical shaft, and air is admitted from below and from the side. When the fuel is incandescent, the air decomposes the cinnabar and the volatile products, sulphurous acid, mercurial vapor and carbonic acid pass off through flues into two large, square chambers, where the gases are somewhat cooled. At some distance there is a second pair of chambers, and the two sets are connected by several tubes. These tubes are formed of short joints, and each joint is an earthen vessel swelling at the middle and with one end larger than the other, so that the small end of one "aludel," as these vessels are called, may be thrust into the large end of the next. The joint is made with clay. These composite tubes slope from each end toward the center, and rest on a foundation of masonry. The mercurial vapor passing through this tube is cooled down and the metal is deposited in drops, which, on account of the inclined position of the tubes, run down to the central point. A small hole in the under side of the aludel occupying that position allows the metal to escape and collect in vessels set to receive it. So much of the vapor as escapes condensation in the aludels passes into the second set of chambers, where another portion is liquified, and the remainder passes out into the air and is lost.

Besides the metallic quicksilver another product is condensed, called soot. Its composition varies, but it contains flour of mercury, i. e., quicksilver in exceedingly minute globules; undecomposed sulphur of mercury, for cinnabar is itself volatile, and, when air is not brought in contact with it, may be distilled unaltered; calomel, when there has been any salt in the ore, and soot proper, formed by the imperfect combustion of the fuel. This product is collected and worked over by hand with lye to cleanse the minute globules of the metal from impurities, whereupon a large portion of them unite to drops and are thus recovered. The remaining matter is added to the ore at the next charge.

The mixing of fuel and ore, as practiced in this furnace, has one great disadvantage. If at any time there is more fuel than there should be, too great a heat is produced, and if there are easily fusible compounds in the ore, such as silicate of iron, a glaze is produced, which in this, as in all roasting, interferes very much with the proper action of the air upon the ore.

The Aludels, too, are somewhat difficult of manipulation, and it is very hard to make the joints between them tight, and no one would now build a furnace on this plan.

The New Almaden furnace consists, in the first place, of a large square shaft, two opposite sides of which are broken through with numerous openings. This shaft is filled with lumps of ore so arranged as to leave passages through the mass, but no fuel is mixed with it. The fireplace is placed on the outside of one of the perforated walls; the flame strikes through the perforations into the ore and the gaseous products of the process pass through the opposite wall into a series of condensers. The condensers are large chambers of brick, wood, or iron, in which there are cross-walls, and these cross-walls are broken through alternately at the bottom and the top to admit of the passage of the vapor, but at the same time to compel it to take a circuitous course. This at once lengthens the distance over which it must pass, giving it time to cool and, by producing gentle eddies in the current, favors the fall of minute particles of solid or liquid matter. The floors of the chambers are curved and slope toward the outside wall, so that the metal, as it liquifies, may collect at one point in each chamber, whence it may either be allowed to run out continually through a small opening, or may be tapped when it has accumulated. As the vapor must be cooled down as far as practicable, the natural draft is very slight, and a tall chimney, generally with a small fire in it, is needed to draw in the requisite amount of air through the grate.

The working is very simple; the fire is gradually increased from the start until, after from three to four days, the mass of ore has come to a moderately bright red heat, plenty of air being admitted all the time. When this point has been reached, the distillation is considered complete, and the furnace is closed up and allowed to cool. As soon as it is cold, the exhausted ore is removed through suitable openings and the furnace is recharged.

Other Difficulties.

The necessity of allowing the furnaces I have mentioned to cool down before re-charging, involves great loss of time and fuel. The first furnace devised to allow of a continuous working was the Haehner furnace. In this the ore and fuel are charged together into a shaft, the bottom of which consists of a grate with movable bars. By removing one or more of these bars the lumps of exhausted ore can be allowed to drop from the furnace, while fresh material is added at the top. The condensation chambers are arranged as in the Almaden furnace. The continuity of the Haehner furnace is a great advantage, but not the mixing of fuel and ore. It has consequently been modified so as to resemble furnaces long in use for ores of other metals, by allowing the flame from one or more outlying

fireplaces to strike into the shaft filled with ore alone. An important advantage is gained as in the exceedingly similar Swedish roasting furnace, by placing the openings for the entrance of the flame some distance from the bottom of the shaft, and allowing the air for roasting to enter at the opening intended for withdrawing exhausted ore. In this way the air is heated by the hot worthless material, and the heat thus returned to the upper portion of the furnace.

The "Knox & Osborne" furnace of California and the latest furnace of the works at Idria Southern Austria, corresponds to this general description. The former is provided with a single fire, which draws straight across the column of ore in the shaft, and is built of heavy brick walls. The Idria furnace, of which a copy is now putting up at New Almaden, is provided with three fire-places, which draw through nearly three-quarters of the height of the column, the gases passing out through openings close to the top of the furnace. The wall area of a construction first adopted in England for iron-blast furnaces, and since applied with great success to a variety of other furnaces—comparatively thin lining of fire-brick, surrounded by an annular space filled with air, appearing admirably as a non-conductor of heat outside of which is another thin wall of brick enclosed in a shell of boiler-iron. The charging apparatus is also borrowed from blast furnace construction, and is of the kind called Pary's hell and hopper. The mouth of a circular hopper is closed by drawing up into it an upright suspended cone. When the hopper is filled the cone is lowered, and the ore enters the furnace, but its fall is broken by the presence of the cone, and it is thus necessarily distributed in all directions in the furnace. The cone is instantly raised again, and thus shot off the escape of gas.

The Condensers

Of a quicksilver roasting furnace form, of course, an exceedingly important portion of the structure, and no absolutely satisfactory construction has thus far been hit upon. Brick an exceedingly porous material, and quicksilver both filters through it and is absorbed into it by the almost irresistible force of capillary attraction. Some years ago, in piling down a old furnace at New Almaden, it was found that the metal had penetrated the foundation at the earth for over thirty feet, and down to the bed-rock. Since then the furnaces have been built on arches, and in the pillars, on which the arches rest, sheet iron plates have been placed to intercept the metal in its downward course; much metal, however, undoubtedly penetrates the outer walls of the condensers and is evaporated from the surface; for mercury evaporates more or less, at all temperatures above the freezing point of water, and the condensers, though built of a very considerable thickness, are, of course, somewhat warm on the outside. On the other hand, the thicker the condensers, the less does the vapor inside cool; and, as it must cool to condense the necessity for thick walls renders a large number of condensing chambers indispensable. It is natural, therefore, to seek some material better adapted to the work required than brick. Cast iron and wrought iron answer very well for condensers, so long as the gas is hot, but when the temperature falls below the boiling point of water, a very disagreeable action occurs. Sulphurous acid, heated with air in contact with highly porous substances, is partially converted into sulphuric acid; this condenses with the water and attacks and soon destroys the iron. Wood withstands this action tolerably well, and does not let quicksilver through like brick. It has, consequently, been much used for the later condensers of the series; but wood is a non-conductor of heat and hence, properly speaking, ill adapted to cooling apparatus. At New Almaden glass found to answer excellently, being a much better conductor of heat than wood, though not so good a one as iron, and being, of course, quite unaffected by the acid liquids. The condensers assume a great variety of forms, such as chambers of various shapes and tubes; columns of coke are also used with some success as final condensers. The draught sometimes kept up by the aid of a chimney with or without the help of a fire to give air in the stack additional buoyancy, and sometimes by a suction fan, or a "water drum," apparatus which sucks in air by means of friction of a jet of water. So far as the condensation is concerned, an artificial blast would be preferable, but the danger of blowing jets the metallic vapor through fine cracks in apparatus would be too great to admit of employment.

The Losses in Quicksilver Smelting are various and very important, though they are not all very well understood. The whole of gas passing out of the last condenser is untraced mercurial vapor. The amount of metal contained in this vapor depends on the temperature, and for low temperatures is very small per cubic foot, but its aggregate amount day is by no means inconsiderable. Another source of loss is the fine dust of mercury ponded in the gas; minute globules, so small that they fall very slowly through the air, are therefore carried away in the current gas. The rate at which a spherical body is carried through the air depends upon its specific gravity and its size, and we have, therefore, only a minute velocity of ten feet, or of one foot second. As the mercurial vapor is cooled in the condensers, the mercury is separated like mist, and the individual globules, which

(Continued on Page 102.)

SCIENTIFIC PROGRESS.

Natural Phenomena.

The store of human knowledge in the science of natural phenomena is receiving constant accessions from intelligent observers in every field of observation, whether upon land or water. Among the latest recorded cases we may instance the following which have come to hand in this locality during the last week:

On Wednesday of last week, about half past ten A. M., some topographical students who were out on the Presidio, near this city, while adjusting their instruments, suddenly heard a sharp whistling in the direction of the northwest. The sound increased, and passed overhead as if a shell or rocket, a whistle at first, increasing to a scream; then as a park of artillery rapidly rolling over a rough road, it dwindled into silence, passing to the southeast. Nothing was visible in the air. But the most curious thing about it was, that before the sound the needle pointed two and three-quarter degrees to the west of north. But, when the sound had ceased, and the students with pale faces gave their attention to their theodolite, it showed a variation of twenty-two and three-fourth degrees to the east.

A contemporary in recording the above says: "Who can explain this curious phenomenon? There is a nut for some of the members of the Philosophical Society to crack." If the facts are correctly reported a large meteor, invisible in account of the noon-day sun, must have passed over the city in a southeasterly direction. The highly metallic character of such a large body could scarcely have failed to have deflected the compass precisely as indicated. Coming from the northwest the needle would not have been deflected to the west as stated; and after its passage "overhead" it would have been as surely deflected to the east as was observed and noted by the "topographical students."

Another phenomenon, indicative of the existence of submarine volcanoes has been reported the past week by Captain McKenzie, from the South Sea Islands. While Captain McKenzie, on April 30, was sailing with his ship among these islands, about twelve miles from land, he observed a large column of water about up fully one hundred feet in the air, from this water arose a dense cloud of what appeared to be steam. The spot where this phenomena occurred is marked on the maps as shoal. As long as he was in sight of this water it continued to be sent up with equal force.

Gramme's Electric Machines.

M. Gramme has made a communication to the Paris Academy of Sciences respecting the improvements which he has made in his electric machines. The original machines ignited four inches of platinum wire three-tenths of a millimeter in diameter; the improved machines will heat to redness four times that length of the same wire, without any increase in the weight of the materials or in labor. This augmentation in the intensity of the current is principally due to the employment of the new iron plate magnets of M. Jamin. The new electro-galvanic machines have only one central magnet instead of two, and two electro-magnets instead of four in the former machines. They weigh only 177 kilograms instead of 750 kilograms. The power required to work the machines, as compared with the old, is only as 10 to 75.

They have the following advantages: They require half the space; they are three-fourths lighter; they economize three-quarters of the copper in construction; they require 30 per cent. less motive power. These improvements have been achieved by the suppression of the exciting coil, the bringing of the electro-magnet into the circuit by the current, by an improved arrangement of the copper gauze of the bars of the electro-magnets, and by a slight increase in speed. The original electric light machine fed a regulator of 900 candle burners, its weight amounted to a ton, and it occupied a space of 80 centimetres square, by one 1.20 meters in height. This machine heated itself and gave rise to sparks between the bobbins and the conductors. The new machine is composed of a frame work in cast iron, to electro-magnetic bars and a single movable central magnet, instead of six bars and three rings. It is only fifty-five centimeters square, and sixty centimeters high, and its normal power is two hundred burners.

THE VELOCITY OF LIGHT.—M. Fizeau and Cornu have been measuring the velocity of transmission of light, by experiments carried on between the Paris Observatory and Montigny. The light sent to Montigny is reflected and returns to the Observatory, the distance there and back being twenty-two thousand yards. This experiment has never hitherto been made on so large a scale, or with such precautions. Ten powerful instruments were used.

ANOTHER NEW ASTEROID.—The Smithsonian Institute has received a cable dispatch announcing the discovery, at Berlin, of a new planet, in right ascension 23°, declination 18° 16' north, of the twelfth magnitude.

Importance of Science to Industrial Operations.

The importance of the application of science to the ordinary industrial operations is becoming more and more important. The grand practical truth is now quite generally admitted that all real progress must arise from the pursuit and application of science—and of all the sciences none possess so much value as that of chemistry. Let the reader ponder the following paragraph, from a recent editorial article in one of the leading and most sterling practical journals of England. *Iron*, speaking of special education in chemistry, says of its own country:

"Chemistry is felt by those who care for science itself to be the corner stone of the natural sciences, and by those actuated by commercial considerations to be the best paying investment. In iron works, breweries, chemical works, dye works, and some other manufacturing premises, the presence of at least one chemist on the premises is now considered indispensable; so much greater is the confidence of the modern mind in scientific accuracy than in rule of thumb. This recent revolt against the 'practical man' has vastly increased the demand for skilled chemists, and even for persons possessed of a less degree of chemical knowledge. Supply has followed demand, and every smart youth now thinks a knowledge of chemistry indispensable."

THE AGE OF COAL.—INTERESTING FACTS.—Recent observations render it highly probable that vegetable matter may, under favorable conditions, be converted into coal much more rapidly than geologists are in the habit of assuming. A curious instance has been brought before the German Geological Society by Herr Hirschwald, of Berlin. In the Dorothea mine, near Clausthal—wood originally employed as timbering has become so far altered as to assume most of the characters of a true lignite or brown coal.

It appears that certain of the levels in the ancient workings of this mine are filled with refuse matter, consisting chiefly of fragments of clay-slate, more or less saturated with mine water, and containing here and there fragments of the old timbering. This wood, when in the mine, is wet and of a leathery consistency, but on exposure to the air it rapidly hardens to a solid substance, having most, if not all, the characters of a true lignite. It breaks with a well-marked conchoidal fracture, and the parts which are most altered present the black lustrous appearance characteristic of the German "pitch-coals." At the same time, chemical examination of the altered wood shows that it stands actually nearer to true coal than do some of the younger tertiary lignites. This instance seems therefore, to prove that pine wood, when placed under highly favorable conditions, may be converted into a genuine lignite within a period which, from what we know of the history of mining in the Hartz, cannot have extended beyond four centuries.—*Athenaeum* London.

PETROLEUM IN NORTH GERMANY.—The discovery of petroleum springs on the Luneburg Heaths in North Germany is an interesting scientific fact, and one which promises to convert this once barren and apparently unavailing tract into what might by comparison be designated as an El Dorado. Borings were made at Oberg, by Hanoverian and French surveyors as early as 1863, but then the measures taken failed to confirm the opinion which had been previously advanced of the presence of oil. Since 1872 petroleum has been obtained without intermission, although the process adopted for its extraction has consisted in little more than a mere washing of the sand, through which the oil was suffered to run into vessels prepared for its reception. A remarkable fact is also reported in connection with this, to the effect that this petroleum is remarkably pure and inodorous! It may not be out of place in this connection to refer to the commercial fact that manufactured petroleum constitutes, at this time, the most important item of our manufactured exports—its annual value is about \$41,000,000, of which Germany receives about \$11,500,000.

MUD BANKS IN THE OCEAN.—A curious phenomenon frequently met with in the Indian Ocean, the real cause of which has not yet been ascertained, is the existence of Malabar, and in certain spots along the Coromandel coast, of vast mud-banks, and of tracts of mud suspended in the sea, wherein many kinds of fish find abundance of food, immunity from much disturbance in the surrounding element, and a place in which to breed. The exact cause of the existence of these large tracts of the sea wherein mud remains in solution is still a mystery, but at any rate the tracts are so smooth, that, even during the height of the southwest monsoon, vessels can run for shelter into their midst, and once there are as safe as when inside a breakwater.

AGE OF THE AUSTRALIAN GOLD DRIFT.—Among some fossils recently described by Professor M'Coy, of Melbourne, is an extinct wombat from the gold drifts of Victoria. This fossil, called *Phascodomys plicatus*, is of much interest, as having enabled Professor M'Coy to show that the auriferous deposits whence it is derived, instead of being merely alluvial, should be referred to the more ancient pliocene period, thus corresponding in age with the gold drifts of the Urals.

MECHANICAL PROGRESS.

Explosives as a Source of Power.

In considering the motive power of the future, it is impossible not to reflect upon the possible utilization for this purpose of explosive agents, such as gunpowder, the picrates, etc. They all may be considered as magazines of immense power, incomparably greater than the power stored up in any of the ordinary combustibles, such as coal or petroleum. In this view of the case, the following extract from a paper by M. Champion, an excellent authority upon the subject, becomes interesting:

"It is estimated that the explosive power of nitro-glycerine is equal to ten times that of gunpowder; 1.1 pounds would lift from the ground and project a weight of 160,000 kilograms. The heat evolved in the reaction is about 1,282,000 calories for each kilogram. This same kilogram of nitro-glycerine, exploding in a closed space having a volume of one liter, develops a theoretical pressure of 243,000 atmospheres, a temperature of 93,400 degrees, and a quantity of heat equal to 19,700,000 calories.

"One liter of nitro-glycerine weighs 1.6 kilograms. In exploding in a space completely filled with it, as it happens in a blast-hole in mining operations, or when operating under water, this substance develops a pressure of 470,000 atmospheres; a pressure eight or ten times that produced by the same volume of gunpowder.

"The heat thus developed being 38,000,000 calories, the mechanical labor produced, which is the equivalent of this, rises to the enormous number of more than sixteen thousand million kilogram-meters, a value five times that of the maximum value of gunpowder."

"A kilogram of coal contains about 8,000 calories," says the *Revue Industrielle*, "each calory being equivalent, theoretically, to 120 kilogram-meters. Hence, the maximum mechanical work of 1.6 kilograms of coal would be 5,476,000 kilogram meters; a quantity 3,000 times less than is produced with the same weight of nitro-glycerine.

"Is not the imagination of the most enthusiastic inventor," it continues, "staggered in presence of these enormous numbers? What an answer, too, do these figures furnish to the pessimists who see in the exhaustion of our coal mines the extinction of the industries of the future. In a single liter of nitro-glycerine there is stored up the enormous labor of 5,500 horse-powers acting continuously for ten hours."

AMERICAN MACHINERY ABROAD.—There is a steady growing export demand for American machinery. The Burleigh Rock Drill company, of Fitchburg, Massachusetts, have just shipped three large air compressors to furnish motive power for running drills and pumps in the silver mines among the mountains of Peru and Chili. Some American locomotives and some machinery have been sent thither previously, and chiefly to Oslao and Valparaiso. Locomotives and machinery have gone to Rio Janeiro; axes and sawmills up the Amazon, sugar mills and evaporators to Buenos Ayres; gass fixtures and chandeliers to St. Petersburg; passenger railway cars and saws to England and the continent; arms to the same destination; scales and sewing machines everywhere. And, thus, step following step, a beginning is even now made in some departments sufficient to show that foreign appreciation of our manufactures is great enough to promise them a market when the condition of labor and living are such that we can fill it.

IRON WIRE—SINOULAR PHENOMENON.—In drawing certain numbers of iron wire, it often becomes necessary, in order to continue the use of the drawing bench, to anneal the iron. This is done in a hermetically closed receptacle, so as to avoid, as much as possible, the oxidation of the metal. In spite of this precaution, however, the latter becomes covered with an ochraceous film, which it is necessary to remove by an acidulated bath. It frequently happens, however, that subsequent to this process the metal becomes so brittle as to render its further drawing impossible. M. Serot, engineer of the *Société des Forges de la Frenche Compté*, has examined into this phenomenon, and finds that the iron becomes charged with a condensed gas. On breaking the wire under water in a test tube, inflammable bubbles were generated which detonated in the air. The exact nature of the gas has not yet been decided, nor that of its direct action upon the metal; but it is believed to be either hydrogen or carbonic oxide.

AN IMPROVED POWDER.—The *Baltic Gazette* says that the German Government has just adopted a new kind of prismatic powder for its heavy guns, which is far superior to that used in England and Russia. The powder hitherto used by the Germans was similar to the Russian, and was proved to be more effective than the English 8-inch Woolwich gun and a Prussian 72-pounder, on the artillery shooting ground at Tegel. The new powder consists of hexagonal prisms like the old, but the prisms are pierced with one hole, only instead of seven, and the specific gravity of the powder is raised from 1.65 to 1.68. According to the *Baltic Gazette* the results produced by this improved powder are extraordinary, and a Prussian 28-centimetre gun loaded with it is equal to an English 11-inch gun with the ordinary powder.

SMOKELESS FURNACES.—M. Foncault, in a report to the Industrial Society of Rheims, combats the idea that the smokelessness of a fire can effect a notable saving in the amount of fuel burnt. He alleges also, on the other hand that a considerable loss of economy is produced by smoke consuming apparatus. He brings in support of his opinion the long series of observations made by the Industrial Society of Mulhouse, which have proved that with the ordinary boiler furnaces it is only necessary to consume from 125 to 150 cubic feet of air for each pound of coal, while furnaces for the most part pass twice that quantity. If the draught be reduced in quantity, much smoke is evolved, but the products of combustion, circulating more slowly, part with their heat more readily to the boiler flues. It is further proved that the best means of reducing the loss of heat by the chimney is by the use of feed heaters in the flue, so as finally to reduce to 200 deg. the products of combustion, which are often discharged as hot as 400 deg. Feed water heaters will set will produce an economy of from 11 to 20 per cent., with a reduced draught. The conclusion is that furnaces with large area and suitable feed heaters are the most economical in all respects. But in order to obtain the best results, much care is needed in stoking. A little at a time and often should the coal be spread over the front of the fire, and the bright coal pushed back to the bridge. At the same time the least possible quantity of cold air should be admitted.

LITHIUM GLASS.—The following is an abstract of a paper on lithium glass, read before the American Association for the Advancement of Science, by Mr. Charles B. Dudley: The alkaline nature of lithium was evident, from the very discovery of the element. It occurred to the author by the experiment of making a glass with lithium, and of determining its properties. It was thought best to make the experiment with the most fusible materials; and the attempt was made to obtain a silicate of lead and lithium. The silica was obtained from common quartz crystals, pulverized and treated with hydrochloric acid. The lead was commercial red lead. The lithium was a carbonate precipitated by carbonate of ammonia from crude chloride. Eight fusions were made, and no attempt was made to fuse more than twenty-five grains at once. There were many difficulties in the operation of the experiment, as from the presence of iron, the small quantity of materials employed, and the lack of conveniences in the laboratory. But three pieces of glass were obtained large enough to work with. The glass is clear, quite hard, somewhat tinged with green, probably on account of the presence of iron. Its specific gravity is from 3.3 to 3.6; its index of refraction is 1.60; its dispersive power was not satisfactorily determined.

The reported (almost) malleable glass, to which we have already made frequent reference, seems to be an undoubted reality. We find the following further reference to this important discovery in a late number of the *Revue Industrielle*. The inventor of this important improvement in glass manufacture, M. de la Batie, is about to erect a factory for the production of articles of this new glass. From his patents it appears that his process consists in smelting the glass while yet in a pasty state, at the time of its fusion and in the furnaces where it is made. This annealing is effected in a liquid and under special conditions. This operation, while it does not render the glass absolutely malleable, increases its resisting power about forty times. We have seen an ordinary pane of window glass thus annealed, upon which was allowed to fall from a height of six feet a five franc piece, without causing the least damage. The importance of this discovery in all branches of glass manufacture cannot fail to be very great. The new glass works of M. de la Batie will be established at Poat-d'Ain. A company has been formed with a capital of 250,000 francs for the purpose of putting the invention into practical operation.

NEW INVENTION.—In the lower Riverside mill, Wheeling, where the iron is heated and rolled for nail plate, a valuable patent gotten up by Col. Orville C. Dewey, one of the proprietors, is in use. The improvement consists of an arrangement at the rolls whereby much labor is saved, and a decided improvement made in iron. When the plate is shoved under the rolls, a friction wheel catches it, and without requiring extra skilled labor on the part of the catcher or "shove-under," it is drawn smoothly through the rolls and comes out on a long, narrow table, from which rods slant to the lower rolls, and down which the plate easily slides. It then passes through the lower rolls and comes out on the other side on a table which turns on a pivot, and which raises it to the upper rolls, and so on to the finishing press. The nail plate made there is fifteen inches wide, which is the second widest in the United States, and shows by reason of these improvements, a polish of smoothness of edge of admirable quality. Besides the improvement on the iron we are reliably informed that the firm have effected a saving by their use of ten dollars a day, which speaks for itself of the value of the invention.—*American Working People*.

Rubber Paint.

The Pacific Rubber Paint Company, which was organized in this city a few months ago is now in running order, and the factory at 209 Sacramento street is turning out large quantities of this peculiar paint. This article is the result of investigations to produce a perfectly water-proof paint, which was accomplished by forming a chemical combination of rubber with oil paints which when applied becomes elastic enough not to crack, and has a gloss which looks like varnished work. This paint was used as long ago as 1856 in the United States. In 1870 Mr. Eaton, of San Jose, sent to Cleveland, Ohio, for some of this paint for his residence, which was the first used on the Pacific coast. His experiment gave such satisfaction that others sent for it until over 10,000 gallons of this paint was ordered for San Jose. This demand led to the purchase of the patents for the coast by the Pacific Company, who are now manufacturing pure whites and all colors in large quantities.

The particular points of superiority claimed by the company are as follows: economy, as any described surface can be covered 20 per cent. less than any other paint; durability, as changes of climate or weather does not affect it, while its greater body forms a coat so adhesive and elastic as to prevent cracking, chalking or peeling. It retains its color and gloss, and flows from the brush freely. It may be used for all kinds of painting, and especially for fine inside work, and will work well on iron, stone, wood, brick or plaster. It is claimed that no paint made will resist water equal to it, making it excellent for vessels, boats or roofs, and its peculiar character makes it retain its color throughout.

No special directions are necessary to enable any one to apply this paint; except that the first coat should be thoroughly dry before others are added. One gallon of it covers 35 square yards with one coat; 25 square yards, two coats; or 18 square yards, three coats. The same dryers are used as in other paints if found necessary. This paint is furnished mixed ready for use in all colors, comprising any number of different shades. It can be put on by any one. It is put up for shipment in cans of 1/4, 1, 2, 5, 10, 20 or 40 gallons; also in 5 gallon wooden pails and barrels. This paint can be bought as cheap as agents as at the factory. Messrs. Healy & De Forest, the principal proprietors, are introducing the product largely in this city and the interior, and already a number of buildings in San Francisco are being painted with it.

Sales at the S. F. Stock Exchange.

Last Week.		This Week.	
THURSDAY, FEBRUARY 4.		THURSDAY, FEBRUARY 11.	
MORNING SESSION.		MORNING SESSION.	
500 Alpha.....	16 1/2 @ 15 1/2	1505 Ophir.....	66 @ 70
50 b 30.....	16 1/2 @ 15 1/2	1075 Mexican.....	23 1/2 @ 24
1625 Belcher.....	34 @ 33	3315 Best & Belcher.....	32 @ 37
225 b 30.....	16 1/2 @ 15 1/2	2770 Gould.....	35 @ 39
2800 Best & Belcher.....	42 @ 40	20 Hale & Norcross.....	38 1/2 @ 42
50 b 30.....	16 1/2 @ 15 1/2	1060 Gold & Curry.....	18 @ 19
300 Chollar.....	61 @ 60	450 Chollar.....	36 @ 38 1/2
100 b 10.....	16 1/2 @ 15 1/2	170 Chollar.....	25 @ 29
985 Crown Point.....	41 @ 40	1800 Empire.....	12 @ 14
30 b 30.....	16 1/2 @ 15 1/2	530 Imperial.....	8 1/2 @ 9 1/2
3000 California.....	55 @ 57	290 Empire.....	6 1/2 @ 6 3/4
175 b 30.....	16 1/2 @ 15 1/2	300 C. Hill.....	11 1/2 @ 13
135 California.....	57 @ 56	200 Kenton.....	38 1/2 @ 42
135 Con Gold Hill.....	30 3/4 @ 30	530 Belcher.....	36 1/2 @ 37
210 Confidence.....	16 1/2 @ 15 1/2	500 Confidence.....	15 1/2 @ 17
570 Con Virginia.....	41 @ 40 1/2	50 Con Virginia.....	44 @ 45 1/2
20 b 30.....	16 1/2 @ 15 1/2	215 Alpha.....	16 1/2 @ 15 1/2
50 Daney.....	12 1/2 @ 12	175 Daney.....	16 1/2 @ 17
30 Exchange.....	16 1/2 @ 15 1/2	130 Nevada.....	12 1/2 @ 13
150 Empire Mill.....	30 @ 29	1300 California.....	55 @ 57
850 Gold & Curry.....	16 1/2 @ 15 1/2	200 Kenton.....	38 1/2 @ 42
425 Hale & Norcross.....	40 @ 39	100 S. Belcher.....	17 1/2 @ 19
1635 Imperial.....	9 @ 10	325 Overman.....	34 @ 36
120 b 30.....	16 1/2 @ 15 1/2	470 Justice.....	8 @ 9
90 Justice.....	40 @ 39	470 Justice.....	8 @ 9
985 Julia.....	5 1/2 @ 5 1/4	470 Justice.....	8 @ 9
440 Kenyon.....	12 @ 11 1/2	1850 U. Consolidated.....	5 1/2 @ 5 1/4
320 Lady Bryan.....	25 @ 24	300 Kenyon.....	18 @ 19
310 Mexican.....	25 @ 24	800 California.....	18 @ 19
50 b 30.....	16 1/2 @ 15 1/2	110 Knickerbocker.....	46 @ 48 1/2
1970 Ophir.....	38 @ 39	200 Globe.....	15 1/2 @ 16
700 Overman.....	54 @ 55	30 Baltimore.....	6 1/2 @ 6 1/4
50 b 10.....	16 1/2 @ 15 1/2		
50 b 5.....	16 1/2 @ 15 1/2		
50 b 30.....	16 1/2 @ 15 1/2		
1185 S Nevada.....	13 1/2 @ 12 1/2		
155 Seg Belcher.....	10 @ 10 1/2		
150 Superior.....	10 @ 10 1/2		
140 Union.....	10 @ 10 1/2		
650 Yellow Jacket.....	9 1/2 @ 9 1/4		
125 b 30.....	16 1/2 @ 15 1/2		
120 b 30.....	16 1/2 @ 15 1/2		
120 b 30.....	16 1/2 @ 15 1/2		
AFTERNOON SESSION.		AFTERNOON SESSION.	
390 Meadow Valley.....	72 1/2 @ 72	415 Meadow Valley.....	70 1/2 @ 71
155 Raymond & Ely.....	36 @ 35	315 Ray & Ely.....	34 @ 35
245 Eureka.....	14 1/2 @ 14	45 Eureka Con.....	42 @ 43
155 Pioneer.....	4 @ 4 1/2	210 Am Flag.....	2 1/2 @ 2 3/4
300 Wash & Creole.....	7 1/2 @ 7	45 Belmont.....	8 1/2 @ 9
880 Belmont.....	7 1/2 @ 7	300 Eureka.....	14 1/2 @ 14
100 Newark.....	3 1/2 @ 3 1/4	200 Eureka.....	14 1/2 @ 14
30 Belmont.....	1 1/2 @ 1 1/4	700 Silver Hill.....	9 1/2 @ 9 3/4
380 Ely Patch.....	3 1/2 @ 3 1/4	15 Colima.....	8 @ 8 1/2
50 Golden Chariot.....	3 1/2 @ 3 1/4	900 New York.....	3 1/2 @ 3 3/4
100 Ida Elmore.....	1 1/2 @ 1 1/4	250 Dayton.....	3 1/2 @ 3 3/4
200 Knickerbocker.....	5 1/2 @ 5 1/4	125 Rock Island.....	4 @ 4 1/2
180 Baltimore.....	6 1/2 @ 6 1/4	500 New York.....	3 1/2 @ 3 3/4
270 Globe.....	15 1/2 @ 16	300 Phil Sheridan.....	10 1/2 @ 11
15 Bacon.....	3 1/2 @ 3 1/4	225 Am Flat.....	5 1/2 @ 5 1/4
650 Union.....	10 @ 10 1/2	350 Woodville.....	5 1/2 @ 5 1/4
410 Dayton.....	3 1/2 @ 3 3/4	470 C. G. Hill.....	10 @ 10 1/2
400 Rock Island.....	3 1/2 @ 3 3/4	250 Lady Washington.....	2 1/2 @ 2 3/4
590 New York.....	3 1/2 @ 3 3/4	800 Kossuth.....	4 1/2 @ 4 3/4
300 Centennial.....	3 1/2 @ 3 3/4	200 Jacob Little.....	3 1/2 @ 3 3/4
300 Senator.....	3 1/2 @ 3 3/4	100 Leo.....	1 1/2 @ 1 1/4
190 American Flat.....	5 1/2 @ 5 1/4	330 Andes.....	6 1/2 @ 6 3/4
120 Woodville.....	2 1/2 @ 2 3/4	200 Wells-Fargo.....	5 1/2 @ 5 1/4
100 Lady Washington.....	2 1/2 @ 2 3/4	170 North Carson.....	5 1/2 @ 5 1/4
200 Kossuth.....	2 1/2 @ 2 3/4		
1700 Andes.....	5 1/2 @ 5 1/4		
200 Silver Central.....	2 1/2 @ 2 3/4		

THERE has been received at Winnemucca, from the ledge recently discovered near Greggsville, a specimen of ore weighing nearly half a pound, which is almost pure chloride of silver, resembling somewhat that found in the Hidden Treasures at White Pine in the same days.

THE Utah Southern railroad is completed to Santaquio.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No.	Amt.	Levied.	Delin't.	Sale.	Secretary.	Place of Business.
Bowery Cone M Co	Ely District	3	20	Dec 15	Jan 25	Feb 28	C E Elliott	419 California et
California and Arizona M Co	Washoe	10	30	Jan 8	Feb 12	Mar 5	T E Jewell	419 California et
Cedarburg S M Co	Cal	1	50	Dec 29	Feb 3	Mar 24	D M Bockee	215 Sansome et
Chariot Mill & M Co	San Diego Co	1	50	Dec 24	Jan 23	Feb 13	F Swift	419 California et
Confidence M Co	Cal	1	50	Jan 16	Feb 23	Mar 17	W S Anderson	210 Battery et
Cross Bay Oregon Coal Co	Oregon	1	100	Feb 14	Jan 10	Mar 10	J P Beach	424 Montgomery et
Daney M Co	Washoe	12	75	Jan 12	Feb 16	Mar 9	G A Sweeney	419 California et
El Dorado South Mines M Co	Nevada	5	75	Jan 15	Feb 19	Mar 9	W Willie	419 California et
Empire Mill & M Co	Washoe	17	50	Dec 28	Jan 29	Feb 18	W E Dean	419 California et
Empire M Co	Idaho	9	125	Jan 30	Feb 10	Mar 26	W Weiss	419 California et
Florida S M Co	Washoe	1	100	Jan 8	Feb 10	Mar 2	L Hermann	11 Pine et
Golden Chariot M Co	Idaho	12	150	Jan 4	Feb 8	Feb 28	L Kaplan	Merchants' Ex
Gold Run M Co	Cal	10	15	Feb 9	Mar 15	Apr 5	C O Palmer	41 Market et
Hale & Norcross S M Co	Washoe	45	50	Jan 8	Feb 11	Feb 15	J P Lachner	438 California et
Ida Elmore M Co	Idaho	16	100	Feb 1	Mar 8	Mar 29	W Willie	419 California et
Indus G & S M Co	Washoe	2	25	Dec 30	Jan 30	Feb 18	D Wilder	Merchants' Ex
Iowa M Co	Washoe	2	25	Jan 13	Feb 15	Mar 10	A D Carpenter	65 Clay et
Justice M Co	Washoe	1	50	Jan 15	Feb 15	Mar 10	J S Kennedy	419 California et
Knickerbocker M Co	Washoe	11	150	Dec 23	Jan 30	Feb 19	H Boyle	Stevensons' Bldg
Lady Bryan M Co	Washoe	5	100	Jan 11	Feb 12	Mar 3	F Swift	419 California et
Mahogany G & S M Co	Idaho	18	200	Jan 5	Feb 11	Mar 4	C B Higgins	402 Montgomery et
McDuff G & S M Co	Washoe	1	50	Jan 19	Feb 2	Mar 2	D A Jennings	419 California et
Newark S M Co	Ely District	18	100	Feb 2	Mar 10	Mar 31	W Willis	419 California et
North Bloomfield G M Co	Cal	31	100	Feb 3	Mar 12	Mar 30	T Derby	320 California et
Page Tunnel Co	Utah	2	5	Dec 12	Jan 20	Feb 20	J Hardy	418 California et
Pat Sheridan G & S M Co	Ely District	8	1	Dec 11	Jan 21	Feb 16	C E Elliott	419 California et
Pioneer West Ex M Co	Ely District	6	30	Dec 28	Feb 3	Feb 25	T L Kimball	409 California et
Poorman G & S M Co	Idaho	1	30	Jan 19	Feb 24	Mar 17	W Willis	419 California et
Raymond G & S M Co	Cal	2	30	Jan 18	Feb 15	Mar 15	E W Colburn	419 California et
Red Jacket M Co	Idaho	6	50	Feb 1	Mar 9	Mar 30	W Willis	419 California et
Rock Island G & S M Co	Washoe	6	100	Jan 13	Feb 17	Mar 9	J W Clark	418 California et
Silver Cord M Co	Idaho	7	100	Jan 2	Feb 5	Feb 26	Frank Swift	419 California et
South Chariot M Co	Idaho	12	100	Feb 16	Mar 17	Mar 17	W E Dean	402 Montgomery et
St Patrick G M Co	Cal	10	50	Feb 2	Mar 8	Mar 31	D F Verdenal	409 California et
Utah S M Co	Washoe	8	200	Jan 22	Feb 24	Mar 16	W E Dean	419 California et
War Eagle M Co	Idaho	9	50	Jan 25	Mar 2	Mar 23	L Kaplan	Merchants' Ex
Yellow Jacket S M Co	Washoe	19	50	Dec 10	Jan 13	Feb 13	G W Hopkins	Gold Hill

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

American Flat M Co	Washoe	5	200	Feb 8	Mar 15	Apr 5	C A Sankey	331 Montgomery et
California and Arizona M Co	Arizona	4	100	Jan 15	Feb 16	Mar 5	J W Tripp	507 Montgomery et
California Cons M & M Co	Cal	1	100	Jan 15	Feb 24	Mar 17	H Knapp	Merchants' Ex
Carrie Hale Hydraulic M & W Co	Cal	3	10	Jan 15	Feb 24	Mar 17	D Wilder	Merchants' Ex
Combination G & S M Co	Panamint	1	50	Dec 23	Feb 1	Feb 23	D A Jennings	419 California et
Con Reform L S M Co	Lower Cal	2	100	Feb 5	Mar 10	Mar 31	W S Duval	402 Montgomery et
Dardanelles M Co	Washoe	2	100	Feb 5	Mar 10	Mar 31	W S Duval	402 Montgomery et
Edith Quicksilver M Co	Cal	2	20	Dec 23	Feb 3	Feb 23	W Stuart	113 Liederstorf et
Emma Hill Cons M Co	Utah	2	40	Jan 29	Mar 8	Apr 5	G J Cole	302 Montgomery et
Enterprise Cons M Co	Cal	1	125	Dec 26	Feb 15	Mar 15	K W Hermann	419 California et
Equitable Tunnel M Co	Utah	9	25	Jan 12	Feb 17	Mar 9	C S Healy	Merchants' Ex
"420" M Co	Washoe	9	100	Dec 29	Feb 2	Feb 20	E F Stone	419 California et
Gold Mountain G M Co	Bear Valley Cal	4	100	Jan 25	Mar 6	Mar 31	J P O'valier	513 California et
Golden Rule S M Co	Cal	1	50	Dec 23	Feb 15	Mar 15	A Deulberg	500 Clay et
Hale & Norcross M Co	Mariposa Cal	3	125	Jan 13	Feb 16	Mar 16	W A M Van Bokkelen	419 Cal et
Hayes G & S M Co	Robinson Dist	6	20	Jan 4	Feb 12	Mar 8	G R Spinney	320 California et
Illinois Central M Co	Idaho	1	30	Dec 24	Jan 30	Feb 23	R H Brown	402 Montgomery et
Imperial S M Co	Washoe	21	100	Feb 13	Mar 13	Feb 12	F J Hermann	418 Kearny et
Independence Cons M Co	Cal	1	25	Dec 23	Feb 8	Feb 22	J McAffee	408 California et
Kearsarge Cons Quicksilver M Co	Cal	1	20	Feb 1	Mar 4	Mar 25	G R Spinney	320 California et
Little Pancho Quicksilver M Co	Cal	1	20	Feb 1	Mar 4	Mar 25	G R Spinney	320 California et
McDuff G & S M Co	Nev	3	100	Feb 2	Mar 9	Mar 31	A K Deulberg	419 California et
Ophir G M Co	Bear Valley Cal	1	10	Jan 22	Mar 27	Mar 27	J F Cavallier	513 California et
Patten M Co	Washoe	20	30	Feb 3	Mar 5	Mar 29	L Hermann	330 Pine et
Prussian G & S M Co	White Pine	3	100	Jan 12	Feb 18	Mar 5	A K Deulberg	402 Montgomery et
Rattlesnake Quicksilver M Co	Cal	2	125	Dec 24	Jan 28	Feb 19	A Baird	316 California et
San Jose M Co	Evan Canon	6	500	Jan 27	Mar 10	Apr 13	A Carrigan	109 Front et
Silver West Cons M Co	Eureka Nev	2	50	Jan 13	Feb 10	Mar 10	R R Barker	606 Montgomery et
Union Cons M Co	Washoe	1	50	Jan 13	Feb 10	Mar 10	J M Buchanan	419 California et
Webfoot M Co	Elko to Nev	1	25	Jan 23	Mar 3	Mar 30	D A Jennings	401 California et
Wells, Fargo & Co M Co	Washoe	1	50	Jan 13	Feb 10	Mar 10	A O Taylor	331 Montgomery et
Wyoming G M Co	Cal	5	50	Jan 13	Feb 10	Mar 10	E Gunn	410 Montgomery et
Yarborough S M Co	Kern Co Cal	6	30	Dec 23	Jan 30	Feb 13	E Barry	415 Montgomery et

MEETINGS TO BE HELD.

Nams of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Athia Gravel M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 23
Bellingham Bay Coal M Co	Cal	J H Dobinson	305 Sansome et	Annual	Feb 15
Cherokee Flat B G M Co	Cal	H Picbier	603 Washington et	Annual	Feb 13
Freeno Quicksilver M Co	Cal	R Wagner	414 California et	Annual	Feb 26
Indus M Co	Washoe	D Wilder	Merchants' Ex	Annual	Mar 2
Iowa M Co	Washoe	Called by Trustees	605 Clay et	Special	Feb 16
Justice M Co	Washoe	J S Kennedy	Merchants' Ex	Annual	Feb 15
Omega Table Mountain M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 21
20 Hale & Norcross M Co	Cal	E F Flint	419 California et	Special	Feb 15
Tintic M & M Co	Utah	H C Miller	411 1/2 California et	Annual	Mar 3
Vivian G & S M Co	Nev	H S Fitch	555 California et	Annual	Mar 4

LATEST DIVIDENDS (within three months).—MINING INCORPORATIONS.

Nams of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co.	Washoe.	H. C. Kibbe.	419 California et	3 00	Jan 11
Black Bear Quartz	Washoe.	H. S. Oliver.	419 California et	25	Feb 10
Chariot M & M Co	Cal	Frank Swift	419 California et	40	Nov 16
Consolidated Virginia M Co	Washoe	D T Bazley	401 California et	3 00	Feb 11
Crown Point M Co	Washoe	C E Elliott	414 California et	2 00	Jan 12
Dams M Co	Cal	E. F. Fesset	220 Clay et	1 00	Feb 15
Eureka Consolidated M Co	Nev	W W Taylor	419 California et	50	Feb 5
Rye Patch M Co	Nevada	D F Verdenal	409 California et	50	Feb 5

Mining Stocks.

The Mining Stock Market continues in a depressed condition, the volume of business being small and prices low. The market was up a little on Monday and Tuesday, but on Wednesday and Thursday it was "off" again. It is hardly possible that prices will continue where they are for any length of time, as some of the large operators hold more stock than they care about carrying. The general supposition is that this market has touched bottom, but, of course, no one can tell about this. It is not likely, however, to remain where it is for any length of time, any more than it was to remain high during the late excitement. News from the bonanza mines continues favorable and there seems to be no diminution of confidence in them, although the prices are much lower than for the past few weeks. Ophir goes up and down as usual and seems to lead the market. Some few descriptions went up a little this week independently of the downward tendency. Small operators are waiting to see what the market is to do, and large ones are probably laying the wires for a new deal. The late break swamped some of those even on the inside as well as many on

Thomas, late of Nashville, Tenn., a practical orker in slate, has located two ledges, in company with gentlemen of capital, which promise rich rewards. One of these ledges is situated at the south end of Chili Bar bridge, about 10 miles north from this city, and has been fully opened and tested, and proves to be first class. Some eight or ten men have been employed upon it for some time. We were shown samples of it on Tuesday that were very fine. One lot that would square about 8x10 inches, consisting of twelve sheets, were placed together as they were before splitting, were just inch in thickness, being one-twelfth of an inch the sheet, and each sheet was nearly as even and perfect as a pane of glass. Another lot, but larger, were equally perfect, though all were in rough.

YO COUNTY.

FROM COSO.—*Inyo Independent*, Jan. 30: *News*. Colby, Jewett and Brundage bring favorable news from New Coso. Several hundred men are on the ground and new discoveries are constantly being made. About two miles from the first locations some leads of bling ore have been found similar to those of Mammoth. The specimens shown by Mr. Brundage look quite as well as any ore we have seen from that place. Those familiar with the ores of the celebrated Union mine at Cerro Gordo say it is impossible to distinguish it from ore of that mine. The formation in which this mine is found is precisely similar, it is more favorably situated for work and is larger. The measurements of the U. S. Deputy Mineral Surveyor give it a width of 196 ft. A cut or tunnel is now being run across with a view to better ascertain the solidity and continuity of the vein and character of the ore.

CERRO GORDO.—There is not much doing in the way of mining. Mr. Hamilton, of the Inshy Company, with Thos. Pasmore, came up in the storm to pay Mr. Crapo for the Inshy Tunnel and some seven or eight other things on Buena Vista Hill, the titles of which could seem to have been involved in a dispute. The Potosi Tunnel is still progressing slowly. PANAMINT.—*Cor. White Pine News*: Jones & Stewart are putting up concentrating works, which will reduce their shipping ores from ten tons to one, and the concentrated metal will weigh as high as one dollar per pound, or \$2,000 per ton. Their present shipping ore, assorted, weighs \$500, consequently the concentrated concentrates will certainly reach \$4,000 per ton. There are a great number of mines here showing prospectively as well as the best, (always excepting the Jacob's Wonder), owned by parties here and in San Francisco. I look for some New York capital to be invested here as soon as Jones & Co. prove the country a success.

MINING CONTRACTS.—*Panamint News*, Jan. 30: Several contracts have been entered into by different parties on the Stewart's Wonder, one of the series of the Wonder Consolidated mines lately put upon the San Francisco Stock board. Cullen & Co. have contracts Nos. 1 and 2, and began work on the 21st of January. They employ eight men. In the upper tunnel (No. 1) they have run a distance of forty feet, are in good ore, the vein being the 10th of the tunnel and looking well. Four men are employed in this tunnel. In the middle tunnel (No. 2) four men are employed, but they have run only twenty-two feet, the rock being much harder than in No. 1. Contract No. 3 is taken by Peak & Connelly, and they are at work in the lower tunnel of the Wonder employing fifteen men. We understand a number of other contracts have been entered into by other parties on the Company's mines.

LAKE COUNTY.

NEW DISCOVERY.—*Lake County Bee*, Feb. 4: M. Davis and D. W. Lilly have discovered a new mine in Mysterious Valley, near the boundary line between Lake and Napa counties. In assay of the rock shows 26 per cent. copper, 10 per cent. gold, and 12 per cent. silver. They are taken up claims on the lode.

MENDOCINO COUNTY.

POTTER VALLEY MINES.—*Mendocino Dispatch*, Feb. 6: The mining excitement in Potter Valley is running high. They have found gold, silver, and may be, quicksilver. It is said there is not a foot of the hills surrounding the valley north, east, west, or south—but what has been staked off for a mining claim.

NEVADA COUNTY.

MANZANITA MINE.—*Transcript*, February 6: We made a visit to the Manzanita mine yesterday, and found everything progressing nicely. Any one desiring to see the bed of an ancient river can do so by visiting the Manzanita. There is over 600 feet of the channel now opened out and ready for work. A hundred feet of this channel used to yield \$50,000. It is thought the ground at present is as rich as it was in early days; but the Superintendent, to be within bounds, estimates 100 feet will yield \$30,000. At that rate—and there is no doubt that it will be greater—the ground now uncovered will pan out \$200,000. On the south end of the mine there are two pipes running, and over a thousand inches of water used. On the north end workmen are engaged in drifting. It is intended to drift through the gap east of the Sugar Loaf hill, instead of washing the whole surface. In these drifts the gravel is very rich. The gravel taken out in running one foot will yield \$50. Over a thousand dollars was taken out in going ahead ten feet. The tunnel and drifts are now in about 160 feet. The Manzanita mine is without doubt to-day the best gravel mine in the country. It is just being opened and beginning now to show what it is,

and it is also proving what others are most interested in—which way the channel runs.

NEW YORK HILL MINE.—We believe the late A. Delano owned 800 out of 1,000 shares in the New York Hill mine. The estate was badly involved, but there is no doubt now but the mine will bring everything out right. We hear it is the intention of the executors to put enough stock on the market to pay off the indebtedness. It is sending out the richest rock ever taken out in the district, and there seems to be any quantity of it.

MINING SITUATION.—*Grass Valley Union*: The mining situation of Grass Valley district, is magnificently improving. The prospectors are out and are busy, and general success will stimulate them to a continuance of enterprise throughout the coming summer. The older mines are generally doing well.

The Idaho is opening on the 8th level in good ore and a large ledge.

New York mine continues to have splendid ore. The ledge is from two and a half to three ft in thickness.

In the Omaha mine the pumps were started up on Thursday last, and in about two weeks the mine will be clear out of water.

The Pittsburg is still sending out rich ore. The best judges estimate that the ore will pay not less than \$100 to the ton by mill process. The owners are now preparing to put up steam hoisting and pumping machinery.

The Empire has greatly improved. The yield last month was about \$22,000 in gold, which gives a profit to the owners.

Machinery for hoisting and pumping purposes is being put up by the Orleans company. The machinery is heavy enough to sink more than a thousand feet.

RICH GRAVEL.—We understand the Nebraska has struck rich dirt. The mine is on the north side and adjoins the Manzanita claim. The Manzanita is on the ancient river channel. The owners are now following that channel through the gap east of the Sugar Loaf. Very rich dirt has been found in the drifts during the past two months. The Nebraska Company has been trying to get on the same lead, and we believe have now accomplished it. The gravel found will pay twelve dollars to the ton.

THE MINES.—There is plenty of water for mining purposes just now, and the weather is favorable to mining. We understand that all the mines on the ridge are running and doing well. The same is the case about here, in Little York Township, and other places we hear of. Thus far the usual amount of gold has not been taken out, and unless more rains come between now and Spring, the season's yield will be much less than usual. Quartz mines are all doing well, for what is unfavorable to the hydraulic claims is the contrary with them. There is work going on in nearly all of them, and the proceeds are generally satisfactory. Prospecting is going on in different parts of the county, and some good things have been struck. Much more of the kind will be going on when the weather becomes settled. We are ready and anxious to chronicle any rich discoveries.

PLACER COUNTY.

\$6.75 CHINK.—*Placer Herald*, Feb. 6: While Road Master Burke was engaged in repairing the damage done to the bridge on Grass Valley street, this last week, he found, while digging the dirt from the bents, a lump of the root of evil, worth \$6.75. Who says the dirt in our streets is not mixed with gold?

SALE OF MINING GROUND.—We understand that J. B. Hobson, who owns a fine farm about three miles northeast of Auburn, has sold a gravel mound on his place, to some San Francisco parties for about \$5,000. The parties have bought the mound for its mineral value, and intend to mine it by the hydraulic process, as soon as they can dig ditches, build flumes, etc., to carry water to the ground. This mound has been prospected in years gone by, and is known to be rich, and would doubtless have been mined out long ago, only for the great expense of getting water. The ground lies high and dry, and water has been the obstacle; but as in this case, as in many others, this obstacle will disappear before the power of capital. The cost of the ground is but a small fraction of what the cost to bring in water will be; but the purchasers seem satisfied that the richness of the ground will fully warrant them in making all necessary outlays for its successful working.

IOWA HILL.—*Cor. Placer Argus*, February 6: Already the benefits of the canal are to be seen. Barwell, Fuller & Co., the Enterprise Co., S. R. Kidder, and the Morning Star Co. have all been working, and are apparently well satisfied with the result of their work. The Morning Star claim is undoubtedly the star claim of Iowa Hill. It has all of the modern improvements, and is fixed up in a style second to none in the State. It has a pressure of 500 feet, which forces 1,000 inches of water through a five inch nozzle. The sound of this powerful stream as it strikes the bank resembles the rumbling of distant thunder, and it crushes the cemented gravel apparently as easy as if it was ordinary dirt. The main flume across the cañon, belonging to this company, commenced settling the night before last, when it became blocked with dirt. The water ran over the sides, undermining the flume almost its entire length, and precipitating it into the cañon below. This will delay the company about a week, and put them to considerable expense. We felt two shocks of an earthquake in this vicinity between 3 and 4 a. m., on the 24th of the present month; the vibrations were from south to north. The shock cracked the day of the

Iowa Hill Canal Company's reservoir at Fish and Brown's ranch, and the water trunk was crushed in the same night, so badly that they cannot get no water out of their reservoir except by digging a ditch through the upper portion of the dam, and lowering the reservoir by degrees. This makes it bad for the canal company and the miners. Mrs. Hill has commenced suit against the canal company for damages (the amount I have not learned), claiming that the reservoir obstructs her water rights in Shirt-Tail Cañon. The suit will not only be of local interest, but it will attract the attention of miners throughout the State. Should Mrs. Hill get judgment against the company for damages, the ground that has lately been located by J. H. Neff & Co., for the retaining of surplus water, will have to be abandoned, and all similar enterprises will have to come to a standstill.

PLUMAS COUNTY.

ITEMS.—*Plumas National*, Jan. 30: The East Branch Ditch Company came out lucky, the flood having damaged them but little.

Tom. Jolly & Co. lost part of their flume in Willow Creek by the high water.

The Baker mine, at Cherokee, is producing some good rock. Greig is at work on the Kettle ledge at Round valley.

The Indian Valley company, at Greenville, have suspended operations for the present.

The Taylor Brothers struck a vein of quartz, about eighteen inches wide, directly back of their house at Crescent, which is very rich in free gold. The specimens, it is said, show splendidly.

SISKIYOU COUNTY.

MINING ON THE KLAMATH.—From Supervisor Pickens we learn that there will probably be a great deal more mining done the coming season at Oak Bar and between there and the mouth of Horse Creek, than there has been any season yet. Quite a number of claims have been taken up and prospected enough to justify their owners in going ahead and opening them. The stretch of river from the mouth of Horse creek to the mouth of Scott river, along which several claims were opened in the summer of 1873, has been abandoned entirely. The claims taken up and opened that season, did not pay.

SONOMA COUNTY.

OUR MINING INTERESTS.—*Sonoma Democrat* Feb. 6: There is an activity beyond expectation in developing the mines in this county. Inyo district, within a few miles of Healdsburg, of which a notice appears elsewhere, is proving very rich. In Pine Flat important works are in progress. Near Cloverdale and at Gnerneville there are new discoveries and work is being vigorously prosecuted on old locations.

THE STAR MINE.—We met on Tuesday, Samuel Foster, President of the Star quicksilver mining company, Inyo district. The owners of this promising mine organized the company in December last, purchasing afterwards an adjoining claim, which gives them 3,000 feet upon the ledge next adjoining the Chepman mine. Capt. in Eastman, the Superintendent, is now working two shifts of men in a tunnel on the ledge. We were shown by Mr. Foster, rock of excellent promise from this tunnel. A quantity of boulders and float, carrying ore in paying quantity, has been broken and is now on the dump. There is no difficulty in the matter of titles in Inyo district, a fact which adds greatly to the value of its mines.

TUOLUMNE COUNTY.

THE MINE.—*Union Democrat* February 6: Reports from the Bonita and other mines in that locality of the North Fork of the Tuolumne river continue to be favorable. The prospect is that large and continuous ledges of gold bearing ore of sufficient richness to pay a handsome profit will be developed. One of the same character has been found in several claims which goes to show there is one large lead of a very valuable character running through that region. Our best mining men think very highly of the prospect and predict that the district will attract much attention the coming season. The effect of proper development is the cause, in a measure, for bringing these mines to notice. If the same course was pursued on other leads in the county it is not unreasonable to presume similar results would be obtained, and our mining interests given a status to which they should be entitled.

We understand the "Tom Evans" mine is about to change hands as negotiations are pending for its sale. Our opinion is that when this property passes out of his hands Mr. Evans will have "let a valuable bird go," and the idea, no doubt, striking him in the same place, may account, in a measure, for his indifference as to sale.

Nevada.

WASHOE DISTRICT.

OPHIA.—*Virginia Enterprise*, February 6: The usual quality and quantity of ore is being extracted from the stopes on the 1465, 1366 and 1300-ft levels and the mills are all in full operation. The cross-cut going east near the California line, on the 1366-ft level is passing through alternate strata of porphyry and very rich ore. This appears to be the west side of an ore body lying a considerable distance east of where any ore has yet been found in the mine.

CALIFORNIA.—The work of cross-cutting in No. 2 on the 1500-ft level is progressing slowly, as the rock passed through is very hard blasting and will take some time to reach the ore body. Cross-cut No. 3 on this level is now in the ore vein, which looks very flattering and is of high

grade. Cross-cut No. 1 from the southern boundary still continues in high grade ore. The same can be said of the north drift on the 1550-ft level, which is now in the vein over 80 feet. Cross-cut No. 1 on the 1400-ft level has got into the east portion of the vein. The face of the drift is in splendid ore. The vein is firm, hard and well-defined, and indications are very flattering. All of the various drifts of development are looking well.

CONS. VIRGINIA.—Notwithstanding the depression in the market, the "Pet of the Comstock" continues to hoist her 400 tons of ore daily, with assays of such richness as to surprise the world, and producing in bullion for the month just ending over \$1,000,000. The work of sinking the double winze is progressing as fast as circumstances will permit. Cross-cut No. 1 on the 1000-ft level is now in nearly 110 ft and still in ore of great value. The ore breasts on all the levels continue to improve, and everything about the mine runs smoothly. The new mill works well, crushing about 230 tons daily. The joint C. and C. shaft has now attained a depth of nearly 160 ft, and is being substantially timbered.

BECKER.—Very fair progress is being made at sinking the main incline, notwithstanding the hard rock in the present bottom. The drift east on the 1500-ft level is still in the west country rock. The winzes on the 1400-ft level are still in ore. The new air shaft will be finished to the 850 ft level next week. They have also begun raising on the shaft at the 1000-ft level. The work is being pushed as rapidly as possible. The daily yield of the mine is 500 tons of ore.

DAYTON.—Sinking the main shaft, three compartments, is progressing at the rate of two ft per day. The south drift, near the Kossuth line, is still going ahead in ore, but it is of a grade too low to pay for milling. This drift is being advanced at the rate of four ft per day. The mill is running as usual on the reserve of ore hauled to it before the storms had rendered the roads impassable.

LADY BYRON.—The main west drift from the new shaft is fast approaching to the old works, as also are its two branches. The distance to the old works is now about 60 ft. At the 80-ft level some good ore has been found in cross-cutting west from the main south drift. This ore is of the same character as that mined from the open cut on the surface and will mill \$30 to \$35 per ton.

HALE & NORCROSS.—The west drift on the 2100-ft level has been extended several ft and is now in nearly 150 ft, passing through low grade quartz. The south drift on this level is passing through nearly the same material as that found in the west drift. A fair quantity of ore is being found on the 11th station.

CALENORIA.—The working station at the 1076-ft level is making good progress and is now in a distance of 80 ft, all the way in vein material. The two-compartment ore and waste chute started from this level is up 30 ft and is being pushed upward to the point where it will intersect the incline.

OVERMAN.—The main drift at the 1100-ft level is being pushed west for the vein as rapidly as possible. The winze to connect with this drift is making good progress.

JULIA.—Promising bunches of quartz are still being cut in the main south drift on the 1000-ft level.

SENATOR.—Are drifting south on the 400-ft level in quartz of a favorable character, with some water coming in at the face of the drift.

PHIL. SHERIDAN.—Main west drift going ahead, and a winze is being sunk below it to develop the good ore streak already met with.

WOODVILLE.—There has been a considerable improvement in the north drift on the 300-foot level. The ore body has now attained a width of five feet. Sufficient ore is being extracted to keep the mill steadily employed.

JUSTICE.—It is expected that good bodies of ore will be found when cross-cutting shall have been commenced.

UNION CONSOLIDATED.—The crosscut east from the main north drift is steadily advanced in favorable material.

MEXICAN.—The face of the north drift on the 1465-ft level is still in ore from which assays of from \$40 to \$50 are obtained. The indications are that a body of ore will be reached by this drift at no distant day.

COLUMBIA.—Are putting up their hoisting works and will have their engine running about the last of next week.

GOULD AND CURRY.—Good progress is being made in the work of raising the two unfinished compartments from the eighth to the tenth stations. The drift south from the double winze has been extended several feet, and is now in 70 feet.

IOWA.—The main shaft is down 208 ft., which is as deep as it will be sunk until hoisting machinery is obtained. The required machinery has been ordered and is now ready to be shipped.

BEST AND BELCHER.—The drift on the 1,700-ft level is being pushed forward as fast as possible, and it is expected to soon connect with a drift on the same level with the Gould and Curry, when better ventilation can be had and the work of development commenced in earnest. The material passed through is still clay, porphyry, and quartz of a low grade.

CHOLLAR-POTOSI.—Nothing is now being done in the ore-producing sections, as the roads are in such a condition that no hauling can be done. The drift south on the 1,100-ft level is being advanced in hard porphyry.

YELLOW JACKET.—The main incline is down 190 ft. below the 1,740-ft level, at which point some water is encountered.

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are too small to fall rapidly and which do not collide and aggregate with others, are to a great extent carried off as a dust. Nothing is more difficult than to filter very fine dust effectually on a large scale from a current of gas, as has been proved over and over again in the attempts made to catch the fume from silver-smelting furnaces. How much such fume is formed in quicksilver smelting must depend on various circumstances, but the formation of soot in the condensers is sure to be accompanied by a loss in this way, for the metal which is separated out at the same time as the soot will, to some extent, be coated by non-metallic impurities and rendered incapable of running together into larger drops.

The metallic mercury obtained from the condensers rarely needs any refining. Dirt mixed with it is readily extracted by filtering through cloth or leather, and it is then simply weighed out and bottled up in flasks ready for market.

The metallurgy of quicksilver is thus, as you perceive, comparatively simple, consisting essentially of but a single and by no means complicated process. The working of quicksilver ores is unquestionably susceptible of great improvements, but it is only lately that a sufficient number of cinnabar mines have been known to give employment to more than an exceedingly small number of technologists. In the future emulation and competition will probably produce rapid advances.

I shall finish the hour with a few remarks on Fuel.

Fuel is of enormous importance in metallurgy. In other branches there is, of course, a choice in fuel, but principally with reference to its heating power; while in metallurgy its chemical composition, its purity, its specific gravity, the firmness of its texture, are all matters of the greatest weight. Some fuels are used as they are found in nature, such as wood, peat, brown coal or lignite, soft coal, anthracite and petroleum. Others are artificially prepared, such as charcoal, coke and gas. All these species of fuel are originally derived from vegetable fiber, except such petroleum as has arisen from the decomposition of animal matter, and are, consequently, composed of the same constituents as wood fiber, though the proportion of those constituents depend on the conditions to which the material has been exposed. Wood fiber consists of carbon, hydrogen and oxygen. One-half the fiber by weight is carbon and the remainder consists of oxygen and hydrogen in the same proportions in which they exist in water, which, of course, is the oxide of hydrogen. When wood fiber is heated without the access of air these relations are altered; a portion of the hydrogen and oxygen unite, forming water; the remainder of each forms compounds with a small part of the carbon, and, if the process is carried far enough, almost perfectly pure carbon or charcoal is left behind. When wood fiber is buried in wet ground, changes exceedingly similar take place, though vastly more slowly, the oxygen and hydrogen leaving the carbon, but at different rates, the oxygen going much faster. This appears to be because the compounds of oxygen and carbon are either gaseous or soluble in water, while the greater proportion of those of carbon and hydrogen are tarry substances, neither volatile at the ordinary temperatures nor soluble. Nevertheless, in time the carbon is left almost pure. It does not, indeed, resemble charcoal in appearance as closely as in chemical composition, for ages of pressure, during its formation, have compacted it into a very dense mass, which we call hard coal or anthracite. Between the wood fiber and anthracite in age and in chemical composition come the other mineral fuels—peat, lignite and soft coal.

Heating Power of Fuel.

The heating power of fuel is of two kinds, quantitative and qualitative. The quantitative heating power of a fuel may be measured by the weight of water which the combustion of one pound will raise to the boiling point. The qualitative heating power is the temperature which it will give when burning. Thus we might not be able to melt copper with a certain kind of fuel, no matter how much of it we burned, though the quantity of heat would depend only on the amount of it consumed, while another fuel would melt far more infusible substances. The quantity and the quality of heat stand in very close relation to one another in the following way: The heat produced by combustion is imparted directly to the products of combustion, and these products must have the temperature of the burning body. It must, for example, be just as hot on one-hundredth of an inch above the point of a flame as at the point of the flame itself. Now, when gaseous or other bodies are heated, the heat is used up in two distinct ways; physical changes, especially expansion, take place, and a portion of the heat is used up in producing these effects, while the remainder shows itself as sensible heat or temperature. Different bodies require very different quantities of heat to produce these changes, and of all bodies, except hydrogen, water uses up most heat in rising from one temperature to another. But the products of the combustion of wood fiber and the substances derived from it are carbonic acid and water, the former being the result of the union of the carbon of the fiber with the oxygen of the air, and the latter of the union of the hydrogen with the oxygen, either of the air, or of the fuel itself, when the latter contains a sufficient quantity. Hence two fuels with equal quantitative heating powers, one of which produced a larger and the other a smaller amount of water in burning, would give very different qualitative heating effects

or maximum temperatures; that which produced the least water giving the highest degree of heat. The quantitative heating power of different bodies such as carbon, hydrogen, etc., is known from experiment, and we are, consequently, in a position to say very closely from analysis, what will be the amount and the degree of heat which any untried fuel will give. The quantity of heat produced by the union of one pound of hydrogen with oxygen is four and a half times as great as that produced by the union of one pound of carbon with oxygen, but, because the product of the combustion of hydrogen, water, absorbs so much heat when raised to the temperature of combustion, compared with the amount absorbed by carbonic acid, the temperature produced by the combustion of the carbon is two and a half times as great as that accompanying the combustion of hydrogen.

Besides this amount and degree of heat which can be obtained from a fuel, several other properties have to be considered in estimating its usefulness for a given purpose. The amount of moisture which it contains when air dried is a very important consideration. Very many substances contain moisture which can only be driven out at a comparatively high temperature. That wooden cloths, for instance, though apparently dry, becomes damp when brought close to a hot fire, is a matter of common observation. Wood contains 80 per cent. of moisture, when air dried, that can only be driven out by exposure to a heat equal to that of boiling water. Peat and lignite, or brown coal, commonly contain about the same amount, while true coals contain very little, often no more than one per cent.

Amount of Ash.

The amount of ash contained in fuels is very variable. Wood contains but one per cent., while how much the mineral coals contain, depends on the circumstances under which they have been deposited. One of the commonest and most deleterious mineral admixtures in the deposits is iron pyrites—a sulphide of iron. When fuel containing this mineral is employed, for instance, in iron or copper smelting, the sulphur enters the metal to its great detriment, while in silver smelting it helps form a "matte" and thus causes loss of metal and increased complexity in the smelting operations. It has another property which has proved especially disastrous to San Francisco during the past year. Under the combined influence of air and water, it oxidizes to green vitriol. This change is really combustion, and is attended by the evolution of a large amount of heat. If, besides this condition necessary to oxidation, those necessary to the retention of heat are present—if the fuel is in a large mass, and confined, say in the hold of a ship, a temperature is reached, after a time, at which the coal will ignite. This is probably the cause of the loss of every one of the coal ships, which have failed to reach San Francisco during the past year. In a case that has come to my knowledge recently, the ship was tight, but the coal was wet when loaded. The ship just escaped by keeping the hatches open during the whole voyage. But vessels commonly leak more or less, and it is not always possible to keep the hatches open. The conditions of the oxidation point to the method of obviating these misfortunes. If the hold were built into the ship in such a way as to leave an empty space between its walls and the sides of the ship, and this space were kept well pumped out, cargoes of dry coal would be as safe as wheat cargoes. Wet coal a ship owner should shun as he would a mixed load of petroleum and matches. The climate in which a vessel sails makes little difference in the danger. This same property of pyrites has led to the ignition of many coal mines in Europe and America, to the destruction of hundreds of millions worth of property. Another important property of fuel is its coherence. Many sorts of brown coal, more particularly, falls to pieces on drying and will bear next to no transportation. Some lignites and some anthracites fall to powder when heated, thus choking the draught and causing much waste of fuel by dropping through the grate.

Flame.

One more property connected with the chemical constitution of fuels has much influence in controlling the use to which it is put—the length of the flame it gives. Fuel containing hydrogen in combination, when it is suddenly heated, evolves gaseous products, compounds of hydrogen and carbon, which are partly of a tarry nature and partly identical with illuminating gas. These gases burn as fast as they get to the air, but, as their bulk is considerable, they are swept to some distance from the solid fuel before being entirely consumed. Hence, arises a flame, such as we get from soft coal or wood. Carbon, uncombined with hydrogen, on the other hand, combines with oxygen when there is air enough present without going through an intermediate gaseous condition. If there is a want of air, as there always is in spots in a fire, the carbon combines in part with only half the oxygen which is necessary to the formation of carbonic acid. This half oxidized carbon is the poisonous gas known as carbonic oxide, but, as in ordinary fires, there is always a surplus of air present, comparatively little carbonic oxide is found and this is almost immediately burned to carbonic acid with the short blue flame we are accustomed to see in hard coal fires.

With these general facts respecting the nature of fuel in mind, it will be necessary for me to say but a few words about each separate species of natural fuel.

Wood.

Wood is the purest of fuels, and, neglecting the single per cent. of ash, contains in an air dried condition, 40 per cent. carbon, 40 per cent. combined oxygen and hydrogen, in the proportions in which they exist in water, and 20 per cent. of moisture. The hydrogen and oxygen being already in combination with each other, though, also, with a third substance, pass off in combustion as water, but produce no heat in doing so. In sudden burning, indeed, part of these elements form volatile carbon compounds, whence the flame of wood; but they ultimately unite again and the amount of heat obtained is the same as if they had existed in the wood as moisture. Hence wood has comparatively a very small heating power.

Peat.

Peat is the most recent of fossil fuels and is certainly very inferior, containing generally from 6-12 per cent. of ash and sometimes as much as 50 per cent., a larger proportion of which is often phosphorus and sulphur, the bane of the metallurgist, especially the iron master. Nevertheless, it is often of great service in regions where coal is scarce, and, by use for gas production, of which I shall speak presently, may, even when exceptionally poor, be made to do work which, but a few years since, the best of coal could not accomplish. The peats formed from the woody fiber of marsh grasses, shrubs and roots by a sort of partial decay under exclusion of the air, vary in appearance from a very light, almost white color, with unmistakable organic structure, through yellow and brown to pitch black, with no trace of organism. When firm enough the peat is simply cut out of the bog in blocks and dried in the air; when too loose in structure it is pressed or cut up by machinery and thus compacted. The hygroscopic moisture in peat is enormous, sometimes reaching 80 per cent., and when it is used for metallurgical purposes it is generally artificially dried. The substance of the peat contains more carbon than wood, and less oxygen, and the better sorts have considerably more heating power.

Lignite.

Brown coal or lignite, the only sort of coal found in this part of the United States, also varies much in appearance. It contains more carbon and less oxygen than peat, and has a considerably greater heating power. The large amount of moisture it contains, and generally its tendency to disintegrate injure its usefulness. Occasionally very small quantities of lignite are found which are indistinguishable from true coal, but these are only exceptional portions of deposits which have been particularly favored in their development. A peculiar odor accompanies the burning of brown coal, quite different from that produced by true coal, and its chemical behavior is also quite distinct. This is particularly the case with nitric acid, which turns brown coal into a yellow gum, while it scarcely affects the more completely fossilized fuel.

True Coals.

True coals are classified in a variety of ways for different purposes, such as coking and non-coking; bituminous, semi-bituminous and hard, and so on. Its most important properties to the metallurgist are its capacity or the want of it, to form solid cokes and the length of the flame it gives. In a shaft furnace we cannot use strongly coking coals, for those under the influence of heat, develop readily decomposable compounds of hydrogen and carbon, which deposit their carbon again in such a way as to ran the whole mass of fuel into a lump impenetrable by draught. In a shaft or cupola furnace, therefore, only anthracite or semi-bituminous coal can be burned. The semi-bituminous coal is, for the same reason, more convenient in a grate. The heating power of coal varies from 75-96 per cent. of that of pure carbon. Loam flaming coal is useful in reverberatory furnaces, or in any apparatus where the object to be heated is wholly or partly at some distance from the immediate coal. Inasmuch as the heat is distributed by the gradual combustion of the gases developed in the long flaming coal, of course it is less intense at the grate than where it is produced by an equivalent fuel giving but a short flame.

The necessity of having for cupola and crable furnaces a fuel which will give out as much of its heat as possible in its own immediate neighborhood, combined with a desire for a fuel possessing a great quantitative and qualitative heating power leads to the artificial carbonization of wood and coal. By subjecting these substances to a high degree of heat with the partial or total exclusion of air, the water, the oxygen and the hydrogen, are driven off and nearly pure carbon remains, which gives a great heat and little flame.

Charcoal.

Charcoal burning is usually done in rather a rough way, because, as only about 1/4 of the weight of the wood is obtained as charcoal, it is cheaper to make the coal where the trees are cut; and, of course the supply in any one spot is very limited. The sticks of wood are commonly piled on end, about a hollow box, which serves as a chimney, until a large heap of nearly hemispherical shape is formed. This is covered with sod and earth well beaten down and lighted from one or more sides. By means of holes made in the covering, sufficient air is admitted to maintain a slow combustion, a part of the wood being thus consumed to distill off the volatile matter from the remainder. The progress of the burning is easily told by the color of the smoke, etc., and regulated by closing or opening holes in the covering.

When the whole mass is turned to charcoal all openings are care fully close and the mass allowed to cool.

Since mineral coal occurs in immense masses permanent arrangements can be made for turning it into coke, commonly near the mouth of the main shaft of a mine. A great variety of furnaces have been used for this purpose, but those most approved to-day are long, horizontal passages, closed by doors at each end, and provided with flues in the sidewalls running the whole length of the furnace and opening into it. A hock of such furnaces are built together. When the furnace is in regular working, it is red hot at the time of charging. The heat develops gas in the charge of coal and the gas passes into the flues. These connect with the open air by dampers, or an equivalent, and with a chimney, as well as with the furnace. By allowing air to enter the flues the gas is burned there in the wells of the furnace, thus maintaining its heat, and the distillation is by this means continued until the coal has all become coke. The doors of the furnace are then opened and the whole mass of coke is pushed out by machinery and quenched with water. Brown coal and peat can only be coked with special precautions and at great expense, and the attempt is hence rarely made.

Fires in Grates.

The combustion of fuel on a grate is at the best but a very imperfect operation. If we admit just air enough to consume the fuel, the lumps are sure to be so arranged that an excess of oxygen is present at some points and too little at others; consequently we get imperfect combustion and smoke, and, at the same time, have unconsumed air to be heated at the cost of fuel. All the water present, either in a free or combined state, must be evaporated and heated to the temperature of the furnace, and the fire is capable of very little regulation. When the fuel is fine, or poor, these difficulties are magnified; a point soon comes when they are unsurmountable, and a material known to have great heating power in it, must be rejected for burning purposes.

Gas.

The greatest improvement of the century in metallurgy was the introduction of the use of gas to overcome these difficulties. As we have already seen, carbon combines with oxygen to carbonic oxide, if but little oxygen is present and this gas again combines with oxygen to carbonic acid, if it gets an opportunity. By piling a deep grate two or three feet deep with fuel, or what amounts to the same thing, filling a low cupola furnace with fuel and allowing no access of air from above, we get the conditions needful for the production of carbonic oxide. At the same time we avoid any superfluous supply of air; the water, however, is distilled in the same way as in an ordinary grate. By cooling the gas down, either by passage through a long pipe, or through something like a low pressure steam engine condenser, the water may be precipitated and a dry gas obtained. If this gas be now admitted into a furnace with air sufficient to burn it we get a smokeless flame, containing little or no water and capable of regulation by turning dampers just as easily as a gas jet. If in addition, we force the air and the gas, after it has been cooled to precipitate the water it carries, to go through a heating apparatus a flame of the utmost intensity can be produced—an intensity quite unattainable by the ordinary imperfect combustion of coal.

It will probably occur to you that much heat must be used up in this conversion of the carbon in the gas producer into carbonic oxide gas, and there certainly is; but the combustion of carbon to carbonic oxide develops much less than a third of the heat liberated when carbon burns to carbonic acid, and, consequently, we have over two-thirds of the potential heat of the fuel employed disposable in the furnace while the mechanical conditions in the ordinary furnace are so inferior that even with good fuel there is a large gain in reducing the carbon to a gaseous form. When when we come to inferior fuels, the advantage is simply infinite for, so far has the art been developed, not only with coal, or even with peat, but with saw dust a heat can be produced with which wrought iron can be melted like lead, while the utmost that an ordinary furnace with the very best of English coal can do is to make it come what sticky.

I recommend the subject of heating with gas most especially to your attention. California is unfavorably situated with regard to fuel, and, if, as no doubt will be the case, this becomes a manufacturing country, the use of gas will assume a greater importance here than it has as yet done in any country.

MONTANA MINING DECISION.—The Secretary of the Interior has affirmed the decision of the Land Office in the case of the application for the patent for the General Lode, situated in Montana. The decision says that all lode claims must be governed by the laws in force at the date of the location, and cannot exceed 10 feet of surface width, unless the local laws at that time will permit.

The hydraulic mines in many portions of Placer county have suspended for want of water, but the prospect now is that there will be no further trouble.

NEXT season promises to be a busy one for Humboldt. Everybody is making preparation to open a piece of mining ground.

A NUGGET weighing 68 ounces was recently taken out of the Bald Mountain mine, in Sierra county.

USEFUL INFORMATION.

The Alchemists.

What manner of men were the alchemists? How did they preserve, cultivate and transmit the wonderful delusions of their creed? We have endeavored in a former chapter to show that the idea of transmutation arose from the old Greek idea of the conversion of one element into another; and the belief in the possibility of transmutation once admitted, the pursuit of the alchemist would naturally follow in a mystical and credulous age. As to the men themselves their character was twofold; for there was your alchemist proper, your true enthusiast, your ardent, persevering worker, who believed, heart and soul, that gold could be made, and that, by long search or close study of the works of his predecessors, he could find the Philosopher's stone; and there was your knavish alchemist, a man who had wit enough to perceive that the search was futile, and impudence enough to dupe more credulous people than himself, and wheedle their fortunes out of them on pretence of returning it tenfold in the shape of a recipe for converting lead into gold. Of the true alchemist we have many pictures. The alchemist, the astrologer, the mystic, the wizard, were men of the same stamp. They often practiced the same arts side by side. The same habit and altitude of thought belonged to one and to all, and became all equally well. Take the dreamy, mandarin, semi-magical Althotas, who had been described so well by Dumas: "An old man, with gray eyes, a hooked nose, and trembling but busy hands. He was half buried in a great chair, and turned with his right hand the leaves of a parchment manuscript." Note also his intense abstraction, his forgetfulness of the hour, the day, the year, the age, the country; his absolute and intense selfishness and absorption, the concentration of the whole powers of his soul upon his one object. Or let us look at Victor Hugo's Archidiaire de St. Josias, in his search for the unseen, the unknown, and the altogether uncanny; the bitterness of his soul, his passionate musings, his conjurations and invocations in an unknown tongue; his own self, that wonderful mixture of theologian, scholar, mystic, perhaps not much unlike the diviae S. Thomas Aquinas himself.

"If we peep into Dom Claude's cell, we are introduced to a typical alchemist's laboratory—a gloomy, dimly-lighted place, full of strange vessels and furnaces and melting pots; spheres and portions of skeletons hanging from the ceiling; the floor littered with stone bottles, pans, charcoal, aludels and alembics, great parchment books covered with hieroglyphics; the bellows with its motto—'Spira, Spira'; the hour glass, the astrolabe, and over all cob webs and dust and ashes."

Chalcedony.

What boxwood is to the wood engraver—the means without which the finest art would be impossible—that chalcedony is to the engraver of gems. Hard without brittleness, susceptible of a fine and enduring polish, tinted by nature with beautiful, and at times, strongly contrasted hues, or capable of taking such colors at the hand of man, it has been from the earliest period of art not only the favorite medium but the only possible medium of the gem engraver's most striking effects. In its simplest state chalcedony is an unattractive white stone, nearly transparent, and chiefly useful for making spear-heads and arrow-tips, or there more modern representatives, gun-flints. Sometimes it has a striped or banded appearance, due to alterations of more or less translucent layers, ranging in color from very white to the white of skim milk, still not very serviceable for gems or jewelry. When stained by metallic oxides, however, chiefly those of iron, it raises to the dignity of gemstone, isard, cornelian, chrysoprase, etc., which, uniformly tinted brown, yellow, red or green, as agate, onyx, sardonyx, etc., when the colors lie in bands or strata, or are separated by layers of white. The natural formation of these flowers of the mineral world is recorded in their substance. Though commonly found in lavas and other igneous rocks, or in the debris remaining from their disintegration, gemstones are substantially an aqueous product, and require the agency of fire simply to develop their fine colors, a step in their production more the work of art than of nature.

Rosewood.—It has puzzled many people to decide why the dark wood so highly valued for furniture should be called rosewood. Its color certainly does not look like a rose, so we must look for some other reason. Upon asking, we are told that when the tree is first cut the fresh wood possesses a very strong, rose-like fragrance, hence the name. There are half a dozen or more kinds of rosewood trees. The varieties are found in South America and the East Indies and neighboring islands. Sometimes the trees grow so large that planks four feet broad and ten in length can be cut from one of them. These broad planks are principally used to make the tops of pianofortes. When growing in the forest, the rosewood tree is remarkable for its beauty, but such is its value in manufactures as an ornamental wood, that some of the forests where it once grew abundantly now have scarcely a single specimen. In Madras, the Government has prudently had great plantations of this tree set out, in order to keep up the supply.

Cement Walls and Cisterns.

With one pint of quick lime or good (new) cement, we use from one to two parts of coarse, sharp sand, to make a stiff paste. This for quality, depends on the freshness of the lime or cement, which requires less sand in proportion to its strength. Sand is useful to diminish the cracking, as the paste or mortar dries, thereby to give it "body" and help fill up. Quick mortar should be made up every day, for each day's work, which is contrary to practice in this country, but the mortar is better. It never becomes soft after use, from age. Into this, fine and coarse gravel can be worked by the trowel, as the joints are finished. For cisterns, Rosendale and Portland cement takes the place of lime, with only less sand, and makes walls as solid as Ransome stone. The magnesia of the cement seems to have a peculiar affinity for unburnt limestone and brick surfaces.

Finely pulverized soft brick, mixed with about equal parts of wood ashes and a little water in a basin, is put on the surface of a cement-laid or grouted floor of a dwelling house, with a trowel, and worked up to a finish that much resembles a glaze on pottery. This is easily swept and washed, and wears always a clean appearance. As a paste to repair old cisterns and stop cracks, with or without the addition of a small quantity of iron filings and sal-ammoniac, this is very valuable.

We wish it were possible to impress our masons with the fact that thin joints make the best walls, and require the least quantities of water and cement, both of which are chemically stronger and better for being mixed for the purpose.

To RENDER GLASS OPAQUE OR FROSTEN.—According to *Dingler's Journal*, a sheet of ordinary glass, whether patent plate or crown does not matter, is cleaned; and if only portions of it are to be frosted, those are left bare, while the others are protected by mechanical means in any simple manner. Some floor spar is rubbed to a fine powder and mixed with concentrated sulphuric acid, so as to make a thin paste, and this is then rubbed by means of a piece of lead upon those parts of the glass required to be rendered opaque. A fine frosted outline or design may thus be produced upon a sheet of smooth transparent glass. To finish the operation, the glass is gently heated in an iron vessel covered with a funnel passing up the chimney, to get rid of the noxious fumes that are given off; on cooling, the plate is washed with a dilute solution of soda or potash, to remove any acid yet remaining, and is then rinsed in water. Focusing glasses for the photo camera, and development glasses for pigment printing, can be prepared in this way at very little expense.

CHINESE VERMILION.—It is a singular fact that none of the vermilions of commerce equal in perfection of tint that made by the Chinese. They make it from fine cinnabar—sulphuret of mercury—which has been carefully unblended, and is deposited in beautiful, bright, violet-red crystals. The latter are powdered between two stones, being ground with very little water; the mass is then washed repeatedly with pure water, the purity of the water being deemed of the first importance. Immense quantities are used by the Chinese in making ink, painting on porcelain and wood, and coloring candles, paper, etc. It is put up in black papers, and forms an article of large export, the prices depending on that of mercury, it being about twenty-five per cent. higher than the latter.—*N. Y. Sun.*

GOOD HEALTH.

Organic Matter in Water.

Water enters so largely into everything that relates to life and health, that we ought never to tire of the study, especially of all the sanitary phenomena connected with that element. The *London Chemical News*, in reviewing a recent French scientific work, by Henri de Parville, makes the following interesting and suggestive extracts and remarks:

"How does organic matter become dangerous? The phenomenon is complex. The organic matter in suspension or in solution creates in the water a peculiar medium, suitable for the development of exceedingly small beings of the genus *Vibrio*. It is no longer mere water—it is a world of microscopic animals and plants which are born, live, and increase with bewildering rapidity. The infusoria find in the water calcareous, magnesian, and ammoniacal salts, and their maintenance is thus secure. Drink a drop of this liquid and you swallow millions of minute beings. There are those which are capable of eating up putrefaction in our tissues. These are our enemies; often our mortal enemies. Let water be placed in contact with organic remains capable of nourishing these malignant *vibrios*, and it at once becomes more dangerous than any poison."

The author points out that, according to the researches of the late Dr. Calvert, charcoal, lime, and permanganate of potash, contrary to the received opinion, facilitate putrefaction and actually promote the formation of animalcules. Charcoal when used for the purification of polluted waters, undoubtedly absorbs into its pores offensive gases held in solution, as well as liquid coloring and flavoring matters. It can render such waters colorless and tasteless.

But upon living animalcules and their germs it is absolutely powerless. Nay, water containing a known amount of "albumenoid ammonia" when experimentally filtered over animal charcoal has been found on analysis worse than before. Permanganate of potash may oxidise—in fact, burn up—dead organic matter suspended or dissolved in water; but upon living organisms it is almost powerless. We have seen animalcules remain in full life and apparent vigor for hours in water to which permanganate had been added in a large proportion. M. Davaine found that putrid blood after treatment with charcoal became more putrid than before. It is possible that the gases dissolved in the liquid hinder the development of the infusoria. The author considers carbolic, or better still cresylic acid, as the only agent which extricates these animalcules. According to Woehler, alumina in the gelatinous state precipitates the dissolved animal matter which serves as a pabulum for these minute animal and vegetable beings. The experiments of M. Davaine on the power of antiseptics to destroy the virus of carbuncle belong rather to medicine than to chemistry. Solution of iodine seems the most effectual remedy.

How to Distinguish Good from Poisonous Mushrooms.

So many deaths or severe cases of poisoning occur from eating poisonous mushrooms, that it is very important to know how to distinguish the good from the bad. The following is given by Prof. Bentley, which, though not full or unerring, gives the general characteristics which the edible or under trees and poisonous species of fungi may best be distinguished:

The edible mushrooms grow solitary, in dry, airy places, and are generally white or brownish; they have a compact, brittle flesh; do not change color, when cut by the action of the air; juice watery, and odor agreeable; taste not bitter, acrid, salt or astringent.

The poisonous mushrooms, on the contrary, grow in clusters in woods, and in dark, damp places, and are usually of a bright color; their flesh is tough, soft and watery, and they acquire a brown, green or blue tint, when cut and exposed to the air; the juice is often milky, the odor commonly powerful and disagreeable, and the taste either acrid, astringent, acid, salt or bitter. These characteristics are almost invariable.

For the Too Thin.

You would like to be round and rosy-cheeked. Go to bed early after having spent the evening socially. Cheerfulness and content are the best friends of healthfulness. Sleep in a pure atmosphere and in a room into which the sun has shone through the day. Don't be afraid of the night air, for there is no other air at night, and you would certainly die before morning if you did not breathe it; avoid draughts and dampness; sleep as long as you can and get up as soon as you wake, if you feel rested. Drink all the pure cold water you can swallow first and ride or walk in the open air for half an hour; then eat a breakfast of Graham bread, baked sweet apples with cream, or some other fruit, with a soft, fresh-boiled egg, or a bit of beefsteak and a baked potato, and drink a glass of new milk, if you like it.

Enjoy what you are doing, either for itself or what it will bring you. Breathe as much pure air as possible, bad food and pure air will make flesh faster than impure air and good food. For dinner, eat roast beef or mutton, or rare steak, with bread, potatoes and all vegetables that are relished, a desert of plenty of ripe fruit, with cream and sugar, but without pastry or cake. If tired, rest a little before dinner, and take a short nap after it. Don't work hard enough to produce excessive perspiration, if you can help it, or until you feel very much exhausted.

For supper eat oat-meal porridge, cracked wheat, or Graham mush, with cream and fruit, and a fresh roll; or, if you don't feel hungry, take a glass of milk and eat nothing. Drink little tea or coffee, or none at all. Bathe every day to keep the skin clean and in a surprisingly short time you will grow plump and light-hearted. But remember, you must laugh to grow fat.—*Milwaukee Magazine.*

WEAR AND REPAIR OF THE BRAIN.—The notion that those who work only with their brains need less food than those who labor with their hands has been the cause of untold mischief. Students and literary men have often been the victims of a slow starvation, from the ignorance of the fact that mental labor causes greater waste of tissue than muscular. According to a careful estimate, three hours' hard study wears out the body more than a whole day of work on the anvil or farm. "Without phosphorus, no thought," is a German saying; and the consumption of that essential ingredient of the brain increases in proportion to the amount of labor which the organ is required to perform. This wear and tear of the brain are easily measured by careful examination of the salts in the liquid excretions. The importance of the brain as a working organ is shown by the amount of blood it receives, which is proportionally greater than that of any other part of the body. One-fifth of the blood goes to the brain, though its average weight is only one-fourth the weight of the body. This fact alone would be sufficient to prove that brain-workers need more food and hotter than mechanics and farm laborers.—*Builder.*

DOMESTIC ECONOMY.

Good Food for Working Men.

How much pleasure is lost and how much material is wasted by a lack of intelligent cooking, too many think that neither science nor art has anything to do with the duties of a cook. And yet we all know from pleasant as well as sad experience, that some cooks will prepare a most tempting repast from materials, which in the hands of another, will come out to the table so ill prepared as to need a most ravenous appetite to induce one to eat.

The hard work of the farmer or mechanic so sharpens his appetite; the rugged health of the family caused by abundant exercise in the open air and the multitudinous duties of the housewife, all lead us to fall into careless habits in the selection and preparation of our food.

While we are aware that economy on every hand is necessary to the success of the farmer above every other class of working men, we can see not the slightest reason why he should not live well. There are many delicacies within his reach. He can have his varieties of fresh garden vegetables, his plentiful supply of poultry, fresh eggs, choice gilt-edge butter, milk and cream in abundance, plenty of fruit, etc. Why should he live poorly? Because in far too many instances all these resources from a lack of intelligent and pleasing cooking are not used to advantage.

The housewife does not use the material at her command understandingly. The bread will be made always in the same way. The potatoes will be boiled for every meal in stereotyped fashion; the meats ditto, and the farmer's table which could be most invitingly supplied, is generally coarsely laid.

This is not always from a lack of knowledge, as is proven by the inviting repasts which are temptingly placed upon the table when company is invited. But in such households it is due to a careless lack of forethought and a want of appreciation of good food.

Scientific economy is lost sight of in our living. How seldom do we stop to count the cost of a meal, or of any particular plan of living. We do not recommend extravagance in food, but ask the lady members of our Order to give careful intelligent thought to the preparation of their meals.—*Husbandman.*

TO STEAM A TURKEY.—All of us are used to roast and boiled turkey, but a steamed turkey is more of a novelty, while it is also a most delicious dish. Cleanse the fowl thoroughly, then rub pepper and salt well mixed into the inside of it. Fill up the body with oysters mixed with a small cupful of bread crumbs. Sew up all the apertures; lay the turkey into a large steamer and place over a kettle of boiling water, cover closely, and steam thoroughly for two hours and a half. Now take it up; set the platter in a warm place, and turn whatever gravy there is in the steamer, straining first into the oyster sauce which you have prepared in the following manner: Take a pint of oysters, turn a pint of boiling water over them in a colander. Put the liquor on to boil, skim off whatever rises to the top. Thicken it with a tablespoonful of flour rubbed into two tablespoonfuls of butter; season well with pepper and salt. Add two or three tablespoonfuls of cream or milk to whiten it, and pour it over the turkey and platter; serve boiling hot. This sauce must be made while the turkey is still in the steamer, so that it can be poured over the turkey as soon as it is taken up.

SNOWFLAKE CAKE.—Take a half cup of butter, two cups of white sugar, four cups of flour, one cup of sweet milk, three eggs, one teaspoonful of cream-of-tartar, and one-half of that quantity of saleratus. Stir butter and sugar together, add the beaten yolks of eggs, and half the flour with the cream-of-tartar in it; turn in nearly all the milk, dissolve the saleratus in what is left and add it. Beat the whites of the eggs and mix in; stir in remainder of the flour. Bake in jelly-cake tins. Grate the meat of two fresh coconuts after paring off the outer skin; add to them one cup of sugar and the beaten white of two eggs. Spread between the cakes, which should have been baked in three pans. Heap the cocoanut very high on the top of the uppermost cake and scatter sugared almonds among it.

POTATO FRITTERS.—Boil two large potatoes, mash them well, beat four yolks and three whites of eggs, and add to the above, with one large spoonful of cream, another of sweet wine, a squeeze of lemon, and a little nutmeg. Beat this batter half an hour at least. It will be extremely light. Put a good quantity of fine lard in a stewpan, and drop a spoonful of the batter at a time into it. Fry them; and serve with a sauce composed of a glass of white wine, the juice of a lemon, one desert spoonful of peach-leaf or almond water, and some white sugar warmed together, or the common wine sauce.

GERMAN APPLE PUDDING.—Take a deep tin pudding dish and cover it with a layer of the best pie crust. Have some good, tender apples cut fine, and spread over the paste; a layer of apples, with sufficient sugar for sweetening, and cinnamon and nutmeg to taste; again a layer of apples, etc., until your dish is filled, when you pour over it a tea-cup full of cream, add your cover and bake to a light brown.

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in extraordinary type or in particular parts of the paper,
inserted at special rates.

San Francisco:
Saturday Morning, Feb. 13, 1875.

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Mineral Statistics.—California's Position.

In another column we give some remarks on
the subject of bullion products and the dissat-
isfaction with which the present system of com-
piling statistics in mining matters is regarded.
Still, as will be seen by what we have said of
the product of Colorado mines in another part
of this issue, even those directly interested
disagree. It never was pretended that Wells,
Fargo & Co. gave us complete mineral statistics.
They only gave us the product of the precious
metals. Iron, coal, copper, quicksilver, borax,
antimony, lead and other mineral products are
not taken into consideration at all, although
the work done and results accomplished by
mines of this character are important. In
other countries mineral products of all kinds
are included in statistics of this character, but
on this coast only precious metals are taken
account of. In fact, we really need reliable
mineral statistics, not figures of bullion product;
but these can only be collected by the Govern-
ment itself.

What we desired more particularly to call
attention to, however, is the fact that statistics
collected yearly by Wells, Fargo & Co., refer
only to the precious metals, and by no means
give an idea of the advancement of mineral
development. It would be very interesting if
we could get at the real value of the mineral
products of all kinds of the States and Terri-
tories. That would give a better idea of what
miners are doing, and of the value of the min-
ing interests. For instance, California was
credited this year with a bullion product of
\$20,300,531, and the ore and base bullion were
estimated at \$1,715,550. Now, the Selby works
refined 12,000 tons of base bullion, mostly from
California mines, valued at about \$960,000.
The silver in this would probably bring its
value up to \$2,000,000. The copper shipped
from here in 1874 was valued at \$67,400. The
coal produced by the Mount Diablo mine was
valued at about \$1,500,000. The value of
quicksilver mined is difficult to estimate, but
the figures must be large. The export by sea
was 5,504 flasks, of 76½ pounds each. The
railroad carried from this city 432,635 pounds
and 36,444 pounds from San Jose. This alone
at \$1.50 per pound would be worth nearly one
and a-half millions of dollars. Many of the
mines in Sonoma and Napa counties have
contracts with large mines on the Comstock,
and ship direct from mine to mine; so these
shipments would not appear in the statistics of
shipments for this city.

This was not all by any means, as we know
that seven of the mines produced 1,457,488
pounds of quicksilver in 1874, and there are 42
producing mines in the State, with 49 furnaces
running. The mines which produced that

amount are leading ones, but all the rest of the
42 are producing also. This is a product of
\$2,186,232 for seven mines, calculating the
quicksilver at \$1.50 per pound. The other 37
mines have at least produced enough to bring
the product up to \$3,000,000, and more proba-
bly will bring it up to \$3,500,000 in value.

So, although, California is only credited with
a mineral product of \$20,300,531, she pro-
duced base bullion and silver worth \$2,000,000;
coal worth \$1,500,000; copper worth \$67,400,
and quicksilver worth \$3,000,000 at the lowest
estimate. This makes a total mineral product
of \$26,867,931, instead of \$20,300,531.

In the estimate of Colorado given in another
column, the coal, lead and copper are included,
and then it foots up \$6,962,383; while by sim-
ply adding our mineral products given above,
not included in the California statistics of
Wells Fargo & Co., the increase for California
comes within \$94,983 of equaling the whole
product of Colorado. The papers in that state
complain of injustice in having their product
decreased by Wells, Fargo & Co.'s statistics,
and we mention these facts to show that none
of the States or Territories are justly represented
as to their mineral development. The Califor-
nia mining interest really produced \$6,567,400
more than they are credited with, and account
is only taken of the principal mineral products.
Even at that figure the estimate is small.
Considerable copper is used by the acid and
bluestone factories, which is not considered
above. The Lincoln and other coal fields
produced large quantities of coal not taken into
consideration. We have also made a narrow
estimate in counting the quicksilver mines here
in 1874 at \$3,000,000.

The other States and Territories are all in
the same fix as far as the bullion product sta-
tistics misrepresenting them is concerned;
but we have no doubt that California suffers
the most, as the value of her quicksilver, alone
would probably exceed all the miscellaneous
mineral products of any other individual
State or Territory west of the Mississippi.
At present there is no method of collecting
these statistics, or rather no means for collect-
ing them; so each individual State must con-
tinue to be misrepresented until the Govern-
ment takes the matter in hand, and he content-
ed to know that the misrepresentation is on the
right side of truth as stating the product at less
rather than more than it really is.

The Patchen Process.

Considerable interest has been manifested in
mining circles during the past week in the new
process of amalgamation, some results of
which have been published. The process was
patented recently through the MINING AND
SCIENTIFIC PRESS Patent Agency, by Mr. Abel
Patchen. Experiments have been made by
Prof. Thomas Price and Louis A. Garnett, of
the San Francisco Assaying and Refining
Works, in order to test the process, the results
of which we give below. We may state here
that further improvements have been made, and
the necessary apparatus is now being arranged
in order to give more thorough tests of the
process. These experiments will be made in
this city.

We append the result of working eight tons
of Belcher ore by the Patchen process, in
charges of 2,000 pounds each, occupying five
hours to each charge.

Result from 8 tons of Belcher Ore, worked by Patchen Process.									
QUANTITY.		PULP ANALYSIS.		TAILINGS.		PER CENT. BULLION EXTRACTED.		AVERAGE PER TON.	
GOLD.	SILVER.	GOLD.	SILVER.	GOLD.	SILVER.	GOLD.	SILVER.	GOLD.	SILVER.
One ton.....	\$28.94	\$16.60	\$4.44	\$1.65	\$0.39	\$2.45	\$4.77	\$4.4	\$9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
One ton.....	28.94	16.60	4.44	1.65	0.39	2.45	4.77	4.4	9.4
Average per ton.....	\$209.77	\$128.72	\$38.49	\$1.26	\$0.37	\$16.07	\$30.00	\$6.5	\$9.25

Mr. Garnett says: "For the purpose of com-
parison I have examined into the milling re-
sults obtained by the process heretofore and at
present employed on the Comstock ores; and
while I find that certain mills occasionally ob-
tain 75 to 80 per cent., the average is between
65 and 70 per cent. only. For November, the
average results of the Belcher from 12,334

tons, assaying \$55 per ton, was 66½ per cent.,
and for December, from 12,200 tons, assaying
\$45 per ton, 67 per cent., being respectively
28½ per cent. and 26½ below the results given
above. [In dollars this would be \$195,443
and \$145,954 less than the result by Patchen
process.—Eds. Press.] Only two companies
seem, however, to have furnished in their an-
nual reports the gold and silver in the pulp as-
say, separately, which is necessary to deter-
mine accurately the percentage of the re-
sults obtained. These are the Hale & Norcross
and the Savage, and they confirm each other
to a remarkable degree.

We append the results of the working of ore
from the Hale & Norcross and the Savage, re-
ferred to by Mr. Garnett in the upper of the
two tables. Assuming from the data obtained
from the upper table that the present average
production of bullion from Comstock ore
does not exceed 70 per cent., and that 90 per
cent. can be produced by the Patchen process,
the difference in the aggregate yield from the
ores produced during the past year will be seen
by the lower table. Adding to this the saving
of \$2.50 per ton of quicksilver, makes the total
saving for each if the new process had been in
use.

Working Results of Hale & Norcross and Savage Mines.																
COMPANY.		TIME, YEARS.	TONS.	VALUE.	Pulp Assay—Per Ton.		Bullion produced per ton.		Per cent. produced.		Value of Tailings.					
Hale & Norcross.	Savage.	8	299,929	\$11,479,972	\$12 11	\$26 16	\$38 27	\$9 24	\$15 92	\$26 16	76	61	66.2	\$2 97	\$10 24	\$13 11
		6	211,941 <th>8,060,734</th> <th>10 94</th> <th>27 09</th> <th>38 03</th> <th>8 33</th> <th>16 89</th> <th>25 18</th> <th>76.3</th> <th>62</th> <th>66.2</th> <th>2 69</th> <th>10 26</th> <th>12 86</th>	8,060,734	10 94	27 09	38 03	8 33	16 89	25 18	76.3	62	66.2	2 69	10 26	12 86
Statement Showing Saving by Patchen Process.																
COMPANY.		TONS.	VALUE.	Bullion Produced.		Pulp Assay.		INGORES AT SAVING OF G. SILVER.		AT \$2.50 PER OUN.		TOTAL SAVING.				
			Per Ton.		Per Ton.											
Becher.			166,857	\$54 84	\$3,160,372	\$13,071,980	\$2,654,392						\$9,681,694			
Drown Point.			160,824	39 74	6,762,735	9,646,704	1,929,385						\$24,680			
Don. Virginia.			68,768	66 76	1,929,385	1,929,385	1,432,110						\$1,647,636			
Other Companies.			103,683	16 00	1,693,683	2,166,683							222,800			
Total.			677,623		\$22,400,783	\$32,001,120	\$6,000,024						\$1,319,069		\$7,719,083	

Without going into details of the process, it
may be stated that its introduction into any mill
will not necessitate the purchase of any new
and expensive machinery. As further tests
will shortly be made in this city, we will keep
track of the improvements and give our read-
ers a full account of all that is done.

Dr. BECKER'S LECTURES.—We give in an-
other part of this issue the last lecture, hut one,
delivered by Dr. Becker, on "Quicksilver and
Fuel." The last lecture delivered by him con-
cluded his part of the course. It was on
"Steel," but the crowded state of our columns
prevents even a synopsis being given. These
lectures of Dr. Becker's have been interesting
and instructive, and show that he has a thor-
ough knowledge of his subjects. We understand
that he intends remaining in the city to pursue
his profession, and as there is a fine field here
for good metallurgists, no doubt he will find
plenty to do. Although he has been here only
a short time his name has been brought promi-
nently before the mining public through his
connection with the University and the course
of lectures. There is plenty of room here for
those who understand metallurgical processes
thoroughly, and we only wish there were more
of them.

DURING the month of January, 19,747 tons
of ore were shipped over the Virginia and
Truckee railroad. Owing to storms, damage
to the railroad track and land slides, 2,254 tons
less ore were shipped than during the prece-
ding month.

Product of Colorado Mines.

The press in most of the Territories is com-
plaining that the figures given of the bullion
production of 1874, by Wells, Fargo & Co., are
entirely too small. We speak of this subject of
bullion production in another column, giving
some of the reasons why it is difficult to get at
the exact yield. Colorado complains of in-
justice in this direction and wants to be set
correctly before the miners of the coast. The
Miner, published at Georgetown, Colorado, in
stating that we have published Wells, Fargo &
Co.'s report of bullion production, protests
against misrepresentation of the Colorado min-
ing industries. We gave the yield of Colorado
in 1874 at \$4,191,405, and the *Miner* says the
lowest just estimate that can be made of Colo-
rado's yield is \$6,000,000. It says the yield of
Clear Creek and Gilpin counties alone was \$4-
413,265.

To show that even those who should be best
informed on this subject are liable to error, we
may state that the different Colorado papers
disagree as to the total bullion product. The
Miner says the product for 1874 was \$6,000,000;
the *Mining Review* says it was \$5,362,383. The
Miner says that Clear Creek and Gilpin coun-
ties alone yielded \$4,413,265; the *Mining Re-
view* gives the yield of these two counties at
\$3,835,810. The Central City Register gives the
yield of Gilpin county alone as \$2,808,803, as-
suming that the bullion shipped by the Boston
& Colorado Smelting Works was all derived
from ores from mines in that county. This
was probably not the case and the *Mining Re-
view* says the Register's figure are \$1,176,940
too large. The *Mining Review's* totals, includ-
ing coal, copper, etc., foot up \$6,962,383, as the
whole product of Colorado for 1874.

It will be seen from this that all these papers
disagree as to the exact production. The sta-
tistics of the *Mining Review* seem to have been
prepared with considerable care and are those
which will be used by the U. S. Mining Com-
missioner. The placer and gulch mining inter-
ests show a decided improvement. The ship-
ments of matte and ore abroad have fallen off.
The product as given by the *Mining Review* is as
follows:

Gold Bullion from Smelting and Amalgamat- ing Works.....	\$ 422,563
Silver Bullion from Smelting and Amalgamat- ing Works.....	1,983,207
Gold Bullion from Stamp Mills.....	1,297,425
Gold Bullion from Placer Mines.....	382,500
Ore and Matte shipped out of the Territory.....	1,102,815
Pig Lead.....	73,676
Copper.....	100,197
Total product—Coin.....	\$5,362,383
To this may be added Coal.....	1,600,000
Grand Total.....	\$6,962,383

The figures representing the value of coal
should not be taken into consideration when
comparing them with those of other States or
Territories, as the statistics are usually intended
only to embrace the precious metals. It will
be seen that the figures given above are more
favorable for Colorado than those of other
States or Territories as both lead and copper
are included as well as coal, which is not usu-
ally done. We have spoken more at length on
this subject in another column under the head
of "mineral statistics." It is extremely difficult
to get at the exact bullion product, and less in-
justice has been done to Colorado, with figures
given by Wells, Fargo & Co., than has been
done to Arizona; but still the statistics of
Wells, Fargo & Co. must be taken as a basis
for calculation until some system of collecting
them is devised by the Government.

The Burleigh Drills in Sierra County.

The Burleigh drills and air compressors have
rapidly come into use on this coast since their
first introduction here, and have given
great satisfaction. At the Sutro tunnel, in
Nevada, they have made some wonderful pro-
gress with this machinery, excelling any tun-
nelling work ever before accomplished. A
number of mines in California are now using
the drills, and we give below a summary of
the results accomplished by the Golden Star
company last month.

The superintendent furnishes the report on
the working of the machinery in the Golden
Star tunnel, near Alleghany, Sierra county,
for the month ending January 30th, 1874, of
44 shifts work. The ground is a cement mixed
with crystalline trap and granite boulders.
The machinery used is one stoping drill and a
No. 1 compressor.

Size of Tunnel.....	7x7
Total holes drilled.....	758
No. of feet drilled (in 758 holes).....	2,653
Size of holes.....	1½ inches
Actual distance tunnel driven.....	111 feet
Average depth of holes.....	3 feet 6 inches
Average speed of drilling per hour.....	10 feet
Average time occupied drilling per shift.....	3 hrs 45 min
Coal consumed per 24 hours (green cedar). 7½ of a cord	
Steam pressure.....	65 pounds per square inch
Air pressure.....	65 pounds per square inch

All this time the hoiler was standing in an
open shed without steam jacket or lagging.
The lubricants consumed for the month were
three gallons of oil, ten pounds of tallow and
one pound of kerosene. The stoppage for
repairs to the machinery for three months has
been 15 minutes; cost, 50 cts.

The first train ran through the Hoosac tun-
nel on the 9th inst. It was composed of three
gravel and two passenger cars with 100 passen-
gers. The passage was made in 25 minutes.

Economic Botany.

Lecture Delivered before the University of California College of Agriculture on Wednesday, Jan. 20, by Prof. C. E. BRASER, M. S., of the Iowa College, Ames, Iowa.

[Reported expressly for the PRESS.]

The Grasses.

Graminaceae. This is a large order of 4,000 species distributed universally over all regions and climates; in temperate or cooler climates forming a close mat or turf. In the tropics growing in bunches or tufts.

The size of plants of this species varies from one or two inches in height to 100 or more feet for example, the bamboo. (It would be well to experiment upon the culture of this last in California.) Their stems contain sugar and their seeds starch; and these contribute more to the support of man than any other of the orders. They yield abundance of food for both man and beast. But few of them have poisonous properties or principles. Very few of these have poisonous seeds.

There is a marked distinction between grasses and the allied forms,

Sedges and Rushes.

One difference is that sedges have no nonribbed stem in them and are hollow inside. Another distinction is that grasses have two-ranked stems, while sedges have three-ranked. Another distinction is the stem of sedges is usually triangular; that of the grasses is usually round or flat. A grass is then a round, hollow-jointed stem with narrow leaves which are borne upon an open sheath. The flowers are quite small in structure and on account of the small size of the parts their analysis is usually more or less puzzling to the student. The unit of the inflorescence is a spikelet. A spikelet consists of two glumes at the base, with from one to half a dozen flowers above. See Fig. 1.

This family is divided into three groups; viz: 1. Cereals. 2. Forage plants. 3. The canes. The cereals are those grasses which are cultivated for their seeds. They are all annuals. Rice, *Oryza sativa* is a native of Asia. The annual importation of this commodity into California is thirty millions of pounds, 90 per cent. of which comes from China. It furnishes food for more people than any other of the cereals. South Carolina rice is considered the best. The plant itself grows to the height of from two to three feet. It requires a good deal of moisture and unless rains are frequent, or means of irrigation are at hand, it will prove unproductive. The common variety requires for its successful cultivation a wet marsh, and matures in from four to six months. It is sown in drills and a few inches of water is alternately let on and drawn off; this being continued for some days to supply the requisite moisture. At the top it has a panicle inflorescence somewhat like that of the oat plant.

Wheat, *Triticum vulgare*, stands next in importance to rice. It has been cultivated for many thousand years; so that its nativity is doubtful. We do not know what it was when it was a wild plant. (It is probably the cultivated form of a rather weedy grass, found in the Mediterranean basin, *Egilops ovata*. Its stem contains a large amount of silica, to which is due, its strength, and on account of which it requires for its fullest development a very silicious soil. On account of its easy variability it can be grown in almost any climate; in Europe as far north as 60 degrees. It now has very many forms. The spring and winter wheats come from the same original and one can readily be changed into the other, especially on this coast. Each has a bearded and a beardless species, and each species of both has a white and a red variety. The size is variable.

Spring wheats are grown in the severer climates; the red varieties containing more nitrogenous matter, being harder than the white ones. Winter wheat grows in a mild climate. California wheats lie about midway between the two; that is, spring and winter wheats. According to the statistics of last year, ninety-five per cent. of California's wheat was exported to England, and was valued at fourteen millions of dollars. At *a*, Fig. 1, may be seen a longitudinal section of a grain of wheat, showing at *x* a representation of the germ.

Barley, *Hordeum vulgare*, is undoubtedly a native of Southwestern Asia, and has been cultivated up to 67 deg. north latitude. This plant has also for thousands of years given food to man and beast. It is less nutritious than wheat, having less gluten; hence it has passed out of use as food for man, and is now only used as the food of animals, and in the manufacture of beer and other malt liquors. Its range is wider than that of any other cereal, and it adapts itself easily to climate and soil; but thrives best on moist soils. California exports are increasing; and from present indications this grain will for the next few years be

A Valuable One for the Farmer to Raise.

Rye, *Secale cereale*, is a native of the Mediterranean basin, and is now grown in almost every place where the wheat plant is grown. It is harder than the wheat. It is grown as food

for man, and in some places for domestic animals also; but is most largely used in the manufacture of spirituous liquors; for which use it is peculiarly fitted by its chemical composition. The California crop of this grain is light and unimportant.

Oats, *Avena sativa*, is of uncertain nativity, but thought to be of some part of the Eastern continent. It is of a wide range, about equal to that of barley, and is used mostly as food for the domestic animals. In cool climates it is used by man.

Indian corn, or Maize, *Zea Mays*, is a native of America. It is now cultivated in all warm regions. There are many varieties, which allow of profitable cultivation throughout a wide range of latitude. Its uses are many, for man and beast; being used as food, and also in the manufacture of spirituous liquors. It has 88½ per cent. of fat-forming principles; 1½ per cent. of flesh-forming principles; 9 per cent. of water, and 1½ per cent. of salts. It is of most importance in the Mississippi valley. At *b*, Fig. 1, is shown a longitudinal section of a grain of corn, with (*x*) a representation of its germ.

The Forage plants, or, what are popularly called grasses. For successful growth, different climates and soils require different species. Very many differ as to their value, according to the uses to which they are to be applied. Mr. Flint says: "Some grasses contain more nutritive matter when green; others when the seed is ripe and dry. Some flourish in elevated lands; others in low lands. Some prefer clay and some light soils. Some are solitary. No one grass combines all the qualities which we want; hence, we never grow one alone." In general, that grass makes the best forage which has

The Greatest Amount of Leaf

To a certain amount of stem; though the stem must always be strong enough to prevent breaking down or lodging. The principal grasses in the United States are the following: Meadow foxtail, *Alopecurus pratensis*, grows from two to three feet high, resembles Timothy and is valuable for hay. It has an erect, smooth, cylindrical spike; grows on calcareous loam; comes early and endures cropping well. It grows well in England and would probably do well here. This grass forms a close sod after a few years. It is best for hay at the time of flowering. Timothy (often called herd's grass), *Phleum pratense*, is a native of the Eastern United States, resembles Meadow foxtail, but is longer and taller. It grows on moist, loamy soils, or even on peaty soils, but does not vegetate well on sandy or gravelly soils. It is late in growth, forms an indifferent sod and does not bear close cropping. Cattle turned upon it tread it down too much. It is most nutritious some time after flowering. Common experience agrees with chemical analysis in placing this

Among the First in the List

Of valuable forage grasses.

Red top, or fine top, etc., *Agrostis vulgaris*,

Fig. II.



a, spikelet; *b*, a single flower, both of *Poa pratensis*, i. e., Kentucky Blue Grass.

is a native of Europe, and possibly of the United States. It is a branching, panicle grass, with slender stems. It grows well in moist soils, producing valuable hay; makes a good sod and endures cropping pretty well. This grass is probably not as nutritive as some other kinds, for cattle leave it untouched when they have a choice between it and some of the other cultivated grasses.

Orchard grass, *Dactylis glomerata*, is a native of Europe. It is a tall, panicle grass, with the flowers produced in dense clusters; grows well on all soils; is rather coarse, but furnishes an abundance of quite good fodder. As it is early in blossoming, it can be advantageously mixed with the early blooming clovers. It should be cut while in blossom. In cropping it should be fed close, or the stems become too tough and wiry. This grass does not form a good sod, but is inclined to grow in tussocks. It endures drought well and it grows well in the shade and hence derives its name, being so well

Adapted to Culture Where Trees are Grown.

Kentucky blue grass, or June grass of the East, *Poa pratensis*, is a smaller grass, with spreading panicle, stem thin and fine, leaves long and narrow. It grows well on moist loam; while on sandy soils, it is small and wiry. It requires a moist climate for its full development, and then it is one of the most valuable pasture grasses. In Kentucky, it is used almost to the exclusion of other grasses; but in the drier climates and more sandy soils of the States farther to the north, it is of but little value. Where this grass thrives, it forms a close, tough sod and is

Well Adapted to Lawns.

Chemical analysis made by Professor Law of the Royal Agr. Society of England, shows the

nutritive value of the grasses just noticed to be as follows:

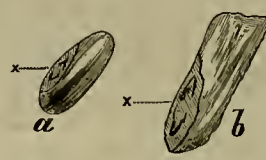
FORAGE PLANTS.	Water.	Flesh forming principles.	Fatty Matter.	Starch, gum, etc.	Woody Fiber.	Mineral substances.
*Meadow Foxtail, or (<i>Alopecurus pratensis</i> .)	80.20	2.44	.52	8.89	6.70	1.55
*Timothy, or (<i>Phleum pratense</i> .)	57.21	4.86	1.50	22.85	11.32	2.26
*Red Top, or (<i>Agrostis vulgaris</i> .)	no data	.....	.....	.....	.....	.....
*Orchard grass, or (<i>Dactylis glomerata</i> .)	70.00	4.06	.54	13.20	10.11	1.59
*Kentucky Blue grass, or (<i>Poa pratensis</i> .)	67.14	3.41	.56	14.15	12.49	1.85
*Green. †Dry	10.25	2.83	43.06	38.02	5.94	.....

This table will show the method of investigation; and yet there are so many other things to be taken into consideration, that it would be folly to decide upon the merits of a grass simply from an examination of its chemical composition. Its earliness and adaptability to soil and to climate must be taken into consideration. Still, such analysis will serve as guides to the practical experimenter. There is great need for further experiments, both chemical and "field"—to determine the value of our native grasses, such as the *Muhlenbergias*, *Diarrhena*, *Koleria*, *Eatonia*, *Bunch* grass of the plains, and many others growing both in the wooded and the open country.

The Canes

Include three, which are of special importance. Sugar cane, *Saccharum officinarum*, is a native of tropical Asia. It is a tall-growing, perennial grass, propagated by cuttings from top joints, and produces the sugar of commerce. Chinese sugar cane, *Sorghum nigrum*, a native of China, is a smaller and less valuable plant. It is now extensively cultivated in parts of the United States. Broom corn, which has panicles of such branching form as

Fig. 1.



a, longitudinal section of a wheat grain; *b*, similar section of a grain of corn. At *xx* in both the little germs are shown.

to furnish good material for brooms, is of the variety known as *Sorghum vulgare*.

Among the

Weeds

Which belong to the family of grasses, may be included Chess, or Cheat, *Bromus secalinus*, so well known by farmers as growing among wheat; Couch grass, or Quack grass, *Trisetum repens*, which has an underground spreading growth, making it hard to get rid of; Bristly foxtail, *Setaria viridis* and *Setaria glauca*, which will become weedy, especially if allowed to grow wild; Barn-yard grass, *Panicum crus galli*, and others.

Ornamental Species

Include Pampas grass of South America, *Gynerium argenteum*, which is adapted to a mild climate; Ribbon grass, *Phalaris arundinacea*; the Bamboo, *Bambusa arundinacea*, a native of India, is a remarkable grass, growing to the height of fifty or seventy feet in two or three months. This species grows to the height of 100 feet; attaining a diameter of from three to six inches.

Several kinds of grasses are beneficial to man in the manufacture of cordage and paper. Others are valuable for litter; for green manuring—that is, to plow under and enrich the soil—for holding the sands on beaches, and for many other uses.

The best book treating upon this subject is "Flint's Grasses and Forage plants," which I commend to your favorable notice.

THE JAPANESE are about to do something with the petroleum in their country, and a delegation accompanied by interpreters, have been making a tour of inspection among the Pennsylvania oil wells. They have purchased an outfit of boilers, engines etc., for sinking, to be shipped to Japan.

THE MINING excitement in Potter Valley is running high. They have found gold, silver, and perhaps quicksilver. It is said that there is not a foot of the hills surrounding the valley north, east, west or south, but what has been staked off for a mining claim.

News from Tybo, Nevada, is of an encouraging character, and appearances indicate that in a short time it will give as good an account of itself as any town in eastern Nevada.

H. L. SHANO claims to have discovered a rich cinnabar lode within one mile of Lang's station, near the mouth of Soledad cañon, Los Angeles county.

THE numerous iron mines in the vicinity of Ogden, Utah, are being developed with much vigor, and are said to be looking fine.

THE furnace at Newark, Nevada, has been shut down for repairs, and the further improvement in its construction.

THE Carson mint coined \$347,660 last month.

Saving Fine Gold.

In our issue of December 12th, 1874, we called the attention of the mining public to a new method of saving fine gold, which was shortly to be tested here practically. We refer to the apparatus invented by Mr. J. Tunbridge, and known as the "Gold Trap." At that time we gave a brief description of this simple machine, and stated that it would shortly be tested practically at one of the large quartz mills at Grass Valley. Mr. Tunbridge, the inventor, brought one of these traps from North Carolina, where it has been at work successfully on \$2 rock, thinking that he could prove to California miners that his machine would be a valuable one to them. He took the proper steps to show his faith in his "gold trap," by attaching the apparatus to a first-class mill in a prominent district, so that the miners there could see for themselves what could be accomplished.

Naturally, many miners have taken a lively interest in the working of the machine. The difficulties attending any new amalgamating process are readily understood by mill men. In this case there were some 100 square feet of metallic surface to be got into working or "taking" condition, acquiring a considerable deposit of gold. Again, quicksilver takes up from one and a quarter to one and a half per cent. of gold, that amount passing through the strainer, with the quicksilver.

The trap was placed at the end of the flumes of one of the best managed mills—the Empire—which has oscillating concentrators at the end of the battery plates, for saving fine gold and quicksilver. Many thought at the Empire mill, that no gold would be found beyond these devices. Others thought differently, and that it would prove the efficiency of the trap if gold could be caught below. Of course there are many mills which use no concentrators, and at these the percentage of gold passing the plates would be larger.

The "trap" was put into operation under these circumstances, the slimes running through it uninterruptedly without either labor or attention for eleven days, and a few short intervals. A slight clean-up was made, showing a few ounces of amalgam and considerable gold deposited on the large surface of copper, making that metal more active for future use. There was also some gold in the quicksilver which passed through the strainer.

Having shown that the trap was a success, the inventor was desirous of moving from an inconvenient distance from town to a more favorable location, and at the same time wished to give the trap a trial at some hydraulic mine. The opportunity has been afforded him by Capt. Miller, of the Dartmouth mine and Cement mill, near Grass Valley. Some necessary alterations have been made in the trap, although its capacity can be increased to carry any amount of slimes, the one in operation being able to carry 50 inches of water. After testing the process there at some of the larger gravel claims, it is the intention of Mr. Tunbridge to dispose of patent rights in the machine at terms which will be profitable to purchasers.

OREGON MINES.—Parties in from the quartz mines on Rogue river report great excitement there, occasioned by recent developments in the Hawk McNair mine. Active measures are being taken to secure a road from the mines, to intersect the stage road at Grave Creek. Numerous prospecting parties are out. Several veins have been struck, some of which promise well.

THE Consolidated Virginia company are putting up a new set of boilers at their boiling works, in addition to those already in use. They do not wish to be delayed by any accident which may happen to the boilers now in use. How nice it is to have a "honanza" to fall back on. You can get extra engines, boilers etc., even before you need them. However, in a big mine it pays to take all precautions to prevent delays and stoppage of work, if only for a few hours.

CONSIDERABLE indignation exists in mining circles in Salt Lake on the discovery that certain persons are attempting to obtain a special franchise from Congress for a toll road in Little Cottonwood Cañon. The miners and mine-owners of the district will send a remonstrance against the proposed invasion of their rights.

UTAH has in successful operation thirty-one silver-smelting furnaces, four arrastras, one separating and one refining work, four concentrating works and thirteen silver mills.

THE Inyo Independent estimates that the shipments of ores alone from that county would furnish \$15,000 worth of freight per day to a railroad extending from the mines to tide-water.

IT HAS been practically demonstrated that roofing slate of the best quality can be obtained in El Dorado county.

THE Renton coal mines at Seattle (W. T.) are again in full operation, crowding matter to full capacity.

AUSTIN shipped bullion valued at \$76,219.93 during January.

Business Directory.

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Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they
 have no equal. No effort has been, or will be spared
 to have them constructed in the most perfect manner
 and of the great number now in operation, not one has
 ever required repairs. The constant and increasing de-
 mand for them is sufficient evidence of their merits.
 They are constructed so as to apply steam directly
 into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the miller forces
 the pulp to the center, where it is drawn down through
 the aperture and between the grinding surfaces. Thence
 it is thrown to the periphery into the quicksilver. The
 curved plates again draw it to the center, where it
 passes down, and to the circumference as before. Thus
 it is constantly passing a regular flow between the grind-
 ing surfaces and into the quicksilver, until the ore is
 reduced to an impalpable powder, and the metal amal-
 gamated.

Sellers made on the same principle excel all others.
 They bring the pulp so constantly and perfectly in con-
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 completely absorbed.

Mill-men are invited to examine these pans and sellers
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"I have used one of your grindstones for some time, and
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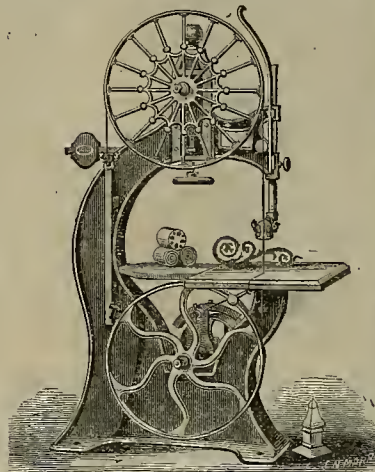
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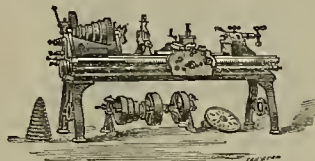
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There is but this one machine that has ever had these
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Testimonials and references will be given on appli-
 cation to the inventor, who is the sole owner of patents
 (excepting having made an assignment of the one ma-
 chine now belonging to the Central Pacific Railroad
 Company) Having resolved not to sell any rights
 unless upon a basis of actual work performed by a
 machine built by myself for the purpose of fairly es-
 tablishing the worth of the invention, I therefore offer
 to sell machines or rights on the following plan, which
 is warranting the capacity of the machine by actual
 work:

I will enter into an agreement with any responsible
 party to build and sell a machine, scows and tender,
 all complete, and right of all my improvements in
 dredging machines throughout the Pacific Coast for
 \$20,000, warranting the machine to dredge six cubic
 yards per minute (to fill a scow at that rate). \$20,000
 will but little more than pay the cost of building the
 machine, scows, etc., all complete; therefore I am pro-
 posing to ask nothing for my patents unless my machine
 dredges more than six cubic yards per minute. But
 it shall be further agreed that in case (at a fair trial to
 be made within a stated time) the machine shall fill
 a scow at the rate of more than six cubic yards per
 minute, then \$10,000 shall be added to the price above
 stated for each and every such additional cubic yard
 thus dredged per minute, and for additional fractions
 of a cubic yard thus dredged in the same ratio the
 \$10,000 is to be added to said price above stated.

I will sell any other Territorial or State rights (either
 United States or Foreign) upon the same plan and at a
 lower price proportionately than the rights for the
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I will sell a single machine with scows and all com-
 plete, and right to use the same in a limited territory,
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 of them incline it to shed
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Ayer's Hair Vigor, by
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 glossy, pliable and strengthened; lost hair regrows with
 lively expression; falling hair is checked and established;
 thin hair thickens; and faded or gray hair resumes their
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 cool, clean and soft—under which conditions, diseases
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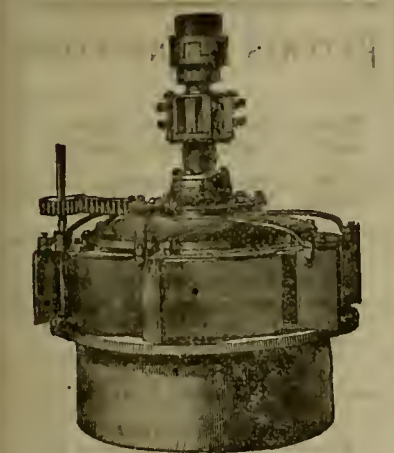
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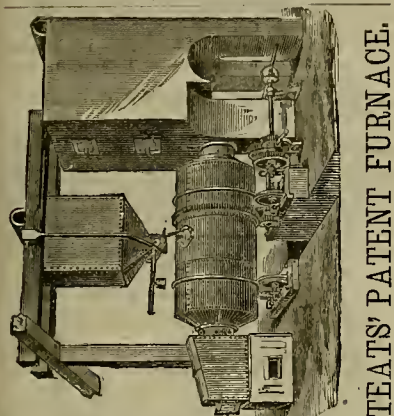
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For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces; controls them with ease; adding heat or air; stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, beating the water for amalgamation and the boilers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln," for drying ores direct from the mine or breaker, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874. For particulars address

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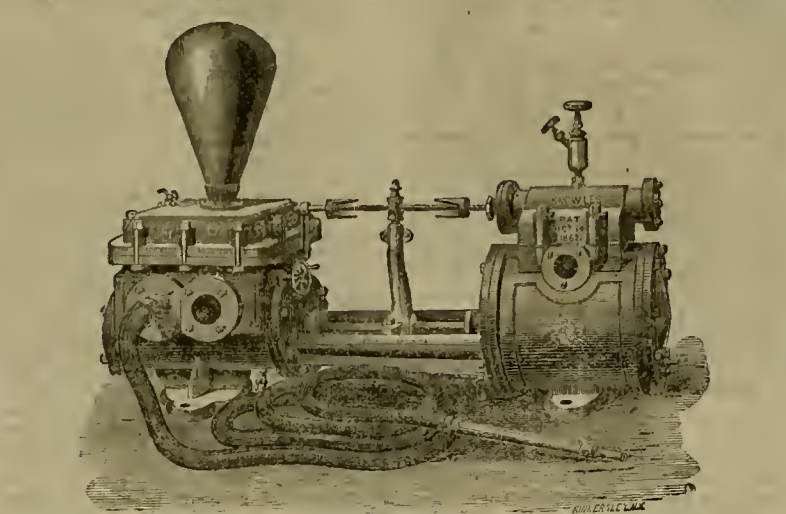
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Die. **Shoe.**

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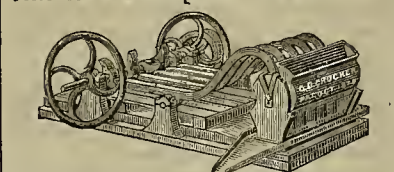
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CROCKER'S PATENT TRIP HAMMER QUARTZ BATTERY.



This machine, complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 200 blows per minute, in a mortar provided with screens on both sides, and crushes FINE 600 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$500.

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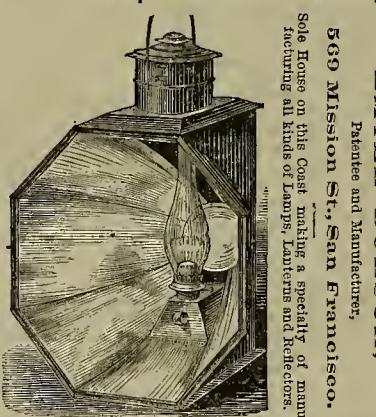
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The undersigned, owners of LESCHOT'S PATENT FOR DIAMOND-POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

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Having the Latest Improved Machinery, we can make it an object to

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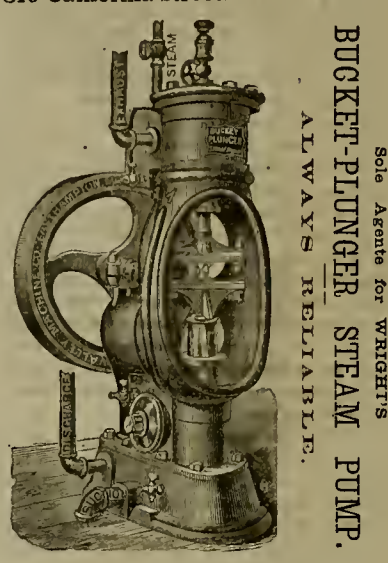
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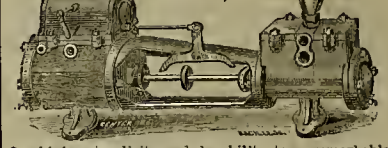
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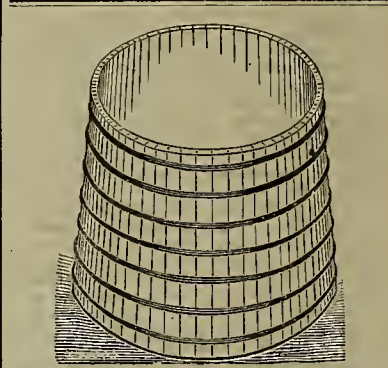
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WATER TANKS of any capacity, made entire by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Oos less than elsewhere.

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Agent for the Humboldt Company, Manufacturers of Mining and Concentrating Machinery.
For Plans and Information apply at my Office, Na. 12 Kimball Block.
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An interest in one of the best paying Patents issued within the last twelve months. Working Model can be examined at the Office of California Chemical Paint Co., Cor. Fourth and Townsend streets, San Francisco.

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ELASTIC PEN-HOLDER.

This Holder is furnished with a pair of elastic rubber air-chambers, which render a steel pen as flexible as the old-time goose quill pen.

Provide an easy hold, that does not cramp or tire the fingers.
Protect the fingers and desk from ink stains.
The fingers acquire a delicate touch that enables a person to obtain a beautiful hand-writing.
The elasticity of the pen can be adjusted to suit any hand, by simply sliding the pen up or down.
Sent by mail, on receipt of Seventy-Five Cents.

JOHN S. ORNDORFF,
Money Order Clerk,
Virginia, Nev.

Feb 13-1m-bp.

To Patent Attorneys, Contractors and Inventors.

WASHINGTON, D. C. January 1st, 1875.

I have carefully prepared a complete digest of U. S. patented Paving and Roofing Compositions, up to January 1st, 1875, in which is given the name of patentee, number and date of patent, ingredients, and, (when given in the specification) the proportions of ingredients. Also, all of English Patented Paving Compositions up to January 1st, 1874, amounting in all to over six hundred patents, a complete state of the art to date. It is my intention to publish this work at an early day in book form, and should you wish to subscribe should address

L. W. SINSABAUGH, Assistant Examiner,
Room 21, Patent Office, Washington, D. C.

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Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

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Banking and Financial.

DIVIDEND NOTICE.

French Mutual Provident Savings and Loan Society—Thirtieth Semi-Annual Dividend—A dividend of eight 4 10 per cent. per annum (net 8 4 10 per cent.) has, in conformity with the report of the Committee of Verification appointed by the members of the Society, been declared at the annual meeting, held on the 15th instant. This dividend will be payable on and after the 15th instant, at the office of the Society, 411 Bush street.

GUSTAVE MAHE, Director French Savings Bank.

DIVIDEND NOTICE.

The Hibernia Savings and Loan Society—At a meeting held on the 27th of January the Board of Directors of this Society declared a dividend at the rate of eight per cent per annum for the six months ending with the 21st instant, payable immediately and free from the Federal tax. EDW. MARTIN, Sec'y.

DIVIDEND NOTICE.

California Savings and Loan Society, 512 California Street, San Francisco, have declared a dividend of nine and six-tenths (9 6 10) per cent. per annum on Term Deposits and eight (8) per cent. per annum on Ordinary Deposits, for the half year ending 31st December, 1874, free from Federal Tax, and payable on and after Wednesday, 6th January, 1875. By order, 3-v29-1m D. B. CHISHOLM, Secretary.

DIVIDEND NOTICE.

San Francisco Savings Union, 532 California Street, Cor. Webb, for the half year ending with December 31st, 1874, a dividend has been declared at the rate of nine (9) per cent. per annum on Term Deposits, and seven and one-half (7 1/2) per cent. on Ordinary Deposits, free of Federal Tax, payable on and after January 13th, 1875. By order, 3-v29-1m LOVELL WHITE, Cashier.

DIVIDEND NOTICE.

Bank of the Western Savings and Trust Co., San Francisco, Jan. 4th, 1875. Depositors' Dividend—The Directors of this Corporation have this day declared the semi-annual dividend, at the rate of ten (10) per cent. per annum on Term Deposits and eight (8) per cent. on Ordinary Deposits, payable on and after January 10th, 1875, at the office of the Bank northeast corner of Post and Kearny streets.

F. CLAY, Vice-President and Cashier.
H. J. BOOTH, President. 3-v29-1m

DIVIDEND NOTICE.

Savings and Loan Society, 619 Clay Street. The Board of Directors have declared a dividend for the six months ending December 31, 1874, of Nine per cent. per annum on all deposits free of Federal tax, and payable on and after January 15, 1875. By order CYRUS W. CARMANY, Cashier.

DIVIDEND NOTICE.

Masonic Savings and Loan Bank, No. 6 Post street, Masonic Temple, San Francisco. At a meeting of the Board of Directors of this Bank, held January 18th, 1875, a dividend was declared at the rate of nine and one-half (9 1/2) per cent. per annum on Term Deposits, and seven and one-half (7 1/2) per cent. per annum on Ordinary Deposits, for the semi-annual term ending January 21st, 1875, payable on and after January 25th, 1875, free of all taxes. H. T. GRAVES, Secretary.

DIVIDEND NOTICE.

The Farmers' and Mechanics' Bank of SAVINGS have declared a Dividend for the half year ending December 31, 1874, at the rate of ten per cent. per annum on term, eight per cent. per annum on class one ordinary, and six per cent. per annum on class two ordinary deposits, payable on and after January 15th, 1875. By order G. M. CONDEN, Cashier.

The Merchants' Exchange Bank OF SAN FRANCISCO.

Capital, One Million Dollars.

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H. F. HASTINGS.....Manager.
R. N. VAN BRUNT.....Cashier.

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4v27m G. MAHE, Director.

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Mining and Other Companies.

Calaveras Hydraulic Mining Company—Location of principal place of business, San Francisco, California. Location of works, Central Hill, Calaveras County, California.

Notice—There are delinquent upon the following described stock on account of assessment, (No. 2, levied on the 7th day of December, 1874, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
W H Knight, trustee.....	9	1875	\$93 75
W H Knight, trustee.....	61	1875	93 75
C H Stover.....	15	500	25 00
C H Stover.....	16	500	25 00
C H Stover.....	14	500	25 00
C H Stover.....	17	375	18 75
G B Eckley.....	8	750	37 50

And in accordance with law, and an order of the Board of Directors made on the 7th day of December, 1874, so many shares of each parcel of said stock as may be necessary will be sold at public auction at the office of the Company, 321 Battery street, San Francisco Cal., on Monday, the twenty-fifth day of January, 1875, at 12 o'clock, m., to pay delinquent assessment, together with costs of advertising and expenses of sale.

ABRAM SHEAR, Secretary.
Office, 321 Battery street, San Francisco, California, (office of U. S. Internal Revenue Collector.)

POSTPONEMENT—By order of the Board of Directors of the Calaveras Hydraulic Mining Company, the above advertised sale is postponed to Tuesday, February 23d, 1875, at 12 o'clock m., and will take place at the office of the Secretary, No. 321 Battery street.

By order, ABRAM SHEAR, Secretary.
330-4t

California Beet Sugar Company—Location of principal place of business, San Francisco, California. Location of works, Soquel, Santa Cruz County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of January, 1875, an assessment of Five Dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, at the office of the Company, 314 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 1st day of March, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on the 22d day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

LOUIS FRANKLIN, Secretary.
Office, No. 314 California street, San Francisco, Cal.

California Consolidated Mill and Mining Company—Location of principal place of business, San Francisco, California. Location of works, Nashville, El Dorado county, California.

Notice is hereby given, that at a meeting of the Directors, held on the 14th day of January, 1875, an assessment of \$1 one dollar per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 408 California street, room 15, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the sixteenth day of February, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Friday, the 5th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary.
Office, room 15, 408 California street, San Francisco, California.

Confidence Mining Company—Location of principal place of business, San Francisco, California. Location of works, Tuolumne County, State of California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of January, 1875, an assessment of thirty (30) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 210 Battery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on Tuesday, the twenty-third day of February, A. D. 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the seventeenth day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

W. S. ANDERSON, Secretary.
Office, 210 Battery street, San Francisco, Cal.

Geneva Consolidated Silver Mining Company—Principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, Nevada.

Notice is hereby given that at a meeting of the Board of Directors, held on the 24 day of January, 1875, an assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the Company, Room 14, 302 Montgomery street, San Francisco.

Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the first day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

I. T. MILLIKEN, Secretary.

Office—Room 14, No. 302 Montgomery street, S. F.

POSTPONEMENT—The time when the above assessment will become delinquent is postponed to the eighth (8th) day of March, and the sale of stock for delinquency is postponed to Wednesday, the thirty-first (31st) day of March, 1875, at the same hour and place above mentioned. By order of the Directors.

I. T. MILLIKEN, Secretary.
San Francisco, Feb. 2, 1875.

"Golden Rule" Silver Mining Company—Location of principal place of business, San Francisco, Cal.

Notice—There are delinquent upon the following described stock, on account of assessment levied on the 8th day of December, 1874, the several amounts

set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
J Wertheimer, Trustee.....	1	25	\$1 25
J Wertheimer, Trustee.....	2	25	1 25
J Wertheimer, Trustee.....	3	25	1 25
J Wertheimer, Trustee.....	4	25	1 25
John P Sanders, Trustee.....	8	50	2 50
A Meyer, Trustee.....	16	5	25
F A Bond, Trustee.....	17	25	1 25
John P Sanders, Trustee.....	22	100	5 00
John P Sanders, Trustee.....	23	100	5 00
Jacob Sunstatt, Trustee.....	31	20	1 00
Jacob Sunstatt, Trustee.....	41	40	2 00
Wm Small, Trustee.....	42	100	5 00
A Meyer, Trustee.....	58	100	5 00
A Meyer, Trustee.....	59	100	5 00
A Meyer, Trustee.....	60	100	5 00
A Meyer, Trustee.....	61	100	5 00
A Meyer, Trustee.....	62	100	5 00
A Meyer, Trustee.....	63	100	5 00
A Meyer, Trustee.....	64	100	5 00
A Meyer, Trustee.....	65	100	5 00
A Meyer, Trustee.....	66	100	5 00
A Meyer, Trustee.....	67	100	5 00
A Meyer, Trustee.....	unissued	11625	581 25
F Uri, Trustee.....	unissued	3375	168 75

And in accordance with law, and an order of the Board of Directors, made on the 15th day of December, 1874, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, in front of the office of said Company, 530 Clay street, San Francisco, on the 15th day of February, 1875, at the hour of 2 o'clock, P. M., of said day, to pay delinquent assessments thereon, together with costs of advertising and expenses of sale.

K. WERTHEIMER, Secretary.
Office, 530 Clay street, San Francisco, Cal.

Gold Mountain Mining Company—Location of principal place of business, San Francisco, California.

Notice—There are delinquent upon the following described stock, on account of assessment levied on the fourth day of January, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
W A Knapp, Trustee.....	13	500	\$125 00
W A Knapp, Trustee.....	15	100	25 00
W A Knapp, Trustee.....	75	200	50 00
Thomas Bennett.....	9	2,500	625 00
T B Kent, Trustee.....	44	4,125	1,031 25
E A Richardson, Trustee.....	37	6,000	1,500 00
J F Woodman.....	51	100	25 00
D M Hooper, Trustee.....	49	400	100 00

And in accordance with law, and an order of the Board of Directors, made on the fourth day of January, 1875, so many shares of each parcel of said stock as may be necessary will be sold at public auction at the office of the Secretary, W. Aug. Knapp, at 116 Leidesdorff street, on the twenty-first day of February, 1875, at the hour of one o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

W. AUG. KNAPP, Secretary.
Office, 116 Leidesdorff street.

Kearsarge Consolidated Quicksilver Mining Company.

Notice is hereby given that at a meeting of the Board of Directors, held on the 28th day of December, 1874, an assessment, No. 1, of 30 cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, No. 408 California street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the eighth of February, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 22d day of February, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

JAMES McHAFFEE, Secretary.
Office Rooms, 10 & 11—No. 408 California street, San Francisco, Cal.

Kincaid Flat Mining Company—Location of principal place of business, San Francisco, Cal. Location of works, Sonoma, Tuolumne county, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of February, 1875, an assessment of thirty cents per share was levied upon the capital stock of said Company, payable immediately, in United States gold coin, to the Secretary, at his office, 210 Battery street.

Any stock upon which this assessment shall remain unpaid on the 9th day of March, 1875, shall be deemed delinquent, and will be duly advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 29th day of March, 1875, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Directors, E. H. OGDEN, Secretary.

Office, 210 Battery street, San Francisco.

Manhattan Marble Company of California.

Location of principal place of business, San Francisco California. Location of works, Oakland, Alameda County, State of California.

Notice is hereby given, that at a meeting of the Directors, held on the 8th day of January, 1875, an assessment, (No. 6) of two dollars per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary of the company, at his office, Nos. 13 and 15 Fremont street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 20th day of February, 1875, shall be deemed delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the 13th day of March, 1875, at 12 o'clock m., to pay the delinquent assessment, together with costs of advertising and expenses of sale.

L. L. ALEXANDER, Sec'y.

Office—Nos 13 and 15 Fremont street, San Francisco, California.

Martin & Walling Mill and Mining Company.

The annual meeting of the Martin & Walling Mill and Mining Company, for the election of a Board of Directors, and such other business as shall properly come before the meeting, will be held at the office of the Company, room 16, 408 California street, San Francisco, California, on Thursday, the 26th day of February, 1875, at the hour of 12 o'clock, m.

J. W. TRIPP, Secretary.

Orleans Mining Company—Location of principal place of business, San Francisco, California. Location of works, Grass Valley Township, Nevada County, California.

Notice—There are delinquent upon the following described stock, on account of assessment No. 2, levied on the fourth day of January, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
William G Grant.....	11	119	\$119 00
A Delano, Trustee.....	4	100	100 00
A Delano, Trustee.....	5	100	100 00
A Delano, Trustee.....	6	100	100 00
A Delano, Trustee.....	7	100	100 00
A Delano, Trustee.....	8	100	100 00

And in accordance with law, and an order of the Board of Directors, made on the fourth day of January, 1875, so many shares of each parcel of said stock as may be necessary will be sold at public auction, at the office of the Company, No. 315 California street, room 8, San Francisco, California, on Tuesday, the second day of March, 1875, at the hour of one o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. F. NESMITH, Secretary.
Office—Room 8, No. 315 California street, San Francisco, Cal.

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San Francisco Boiler Works,

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F. I. CURRY,

Late Foreman of the Vulcan Iron Works, Proprietor

High and Low Pressure Boilers of all Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED SPIRAL BOILER.

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All kinds of JOBBING and REPAIRING promptly attended to. 17v25-3m

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24v17-qy

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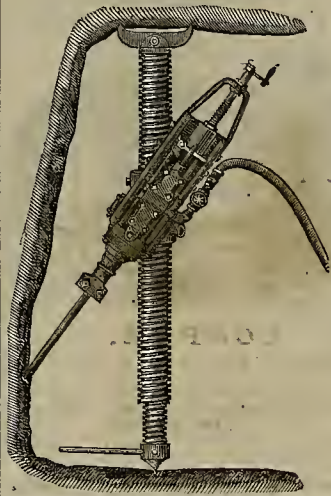
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Machinery and Castings of all kinds.



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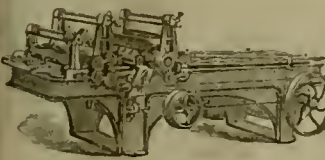
DAVID STODDART, Agent. 114 BEALE ST., SAN FRANCISCO.

NUMBERS.	0	1	2	3	4	5	6	7	8	9
Diameter of Steam Cylinder, in inches.	4	5	6	7	8	10	12	14	16	18
Diameter of Pump Cylinder, in inches.	2	2 1/2	3	3 1/2	4	5	6	7	8	9
Stroke of Piston, in inches.	10	12	14	16	18	20	22	24	26	28
Capacity per minute, in gallons.	1	1 1/2	2	2 1/2	3	4	5	6	7	8
Maximum Capacity, in gallons.	1	1 1/2	2	2 1/2	3	4	5	6	7	8
Boilers in horse power they will supply.	1	1 1/2	2	2 1/2	3	4	5	6	7	8
Size of Exhaust Pipe, in inches.	1	1 1/2	2	2 1/2	3	4	5	6	7	8
Size of Discharge Pipe, in inches.	1	1 1/2	2	2 1/2	3	4	5	6	7	8
Weight of Pump, in pounds.	100	150	200	250	300	400	500	600	700	800
Height over all, in feet and inches.	1-6	1-8	2-0	2-2	2-4	2-6	2-8	3-0	3-2	3-4
Width over all, in feet and inches.	1-6	1-8	2-0	2-2	2-4	2-6	2-8	3-0	3-2	3-4
PRICE.	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$

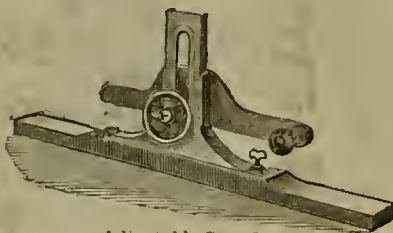
The above data apply to the Regular sizes only. All these pumps have Brass Valve Seats and Brass Water Pistons. Pumps when lined with brass cost extra. We have many supplementary sizes. LONG STROKE PUMPS. { No. 4, 24-in. Stroke, \$ No. 6, 30-in. Stroke, \$ No. 8, 36-in. Stroke, \$ No. 10, 42-in. Stroke, \$ No. 12, 48-in. Stroke, \$ No. 14, 54-in. Stroke, \$ No. 16, 60-in. Stroke, \$ No. 18, 66-in. Stroke, \$ No. 20, 72-in. Stroke, \$ No. 22, 78-in. Stroke, \$ No. 24, 84-in. Stroke, \$ No. 26, 90-in. Stroke, \$ No. 28, 96-in. Stroke, \$ No. 30, 102-in. Stroke, \$ No. 32, 108-in. Stroke, \$ No. 34, 114-in. Stroke, \$ No. 36, 120-in. Stroke, \$ No. 38, 126-in. Stroke, \$ No. 40, 132-in. Stroke, \$ No. 42, 138-in. Stroke, \$ No. 44, 144-in. Stroke, \$ No. 46, 150-in. Stroke, \$ No. 48, 156-in. Stroke, \$ No. 50, 162-in. Stroke, \$ No. 52, 168-in. Stroke, \$ No. 54, 174-in. Stroke, \$ No. 56, 180-in. Stroke, \$ No. 58, 186-in. Stroke, \$ No. 60, 192-in. Stroke, \$ No. 62, 198-in. Stroke, \$ No. 64, 204-in. Stroke, \$ No. 66, 210-in. Stroke, \$ No. 68, 216-in. Stroke, \$ No. 70, 222-in. Stroke, \$ No. 72, 228-in. Stroke, \$ No. 74, 234-in. Stroke, \$ No. 76, 240-in. Stroke, \$ No. 78, 246-in. Stroke, \$ No. 80, 252-in. Stroke, \$ No. 82, 258-in. Stroke, \$ No. 84, 264-in. Stroke, \$ No. 86, 270-in. Stroke, \$ No. 88, 276-in. Stroke, \$ No. 90, 282-in. Stroke, \$ No. 92, 288-in. Stroke, \$ No. 94, 294-in. Stroke, \$ No. 96, 300-in. Stroke, \$ No. 98, 306-in. Stroke, \$ No. 100, 312-in. Stroke, \$ No. 102, 318-in. Stroke, \$ No. 104, 324-in. Stroke, \$ No. 106, 330-in. Stroke, \$ No. 108, 336-in. Stroke, \$ No. 110, 342-in. Stroke, \$ No. 112, 348-in. Stroke, \$ No. 114, 354-in. Stroke, \$ No. 116, 360-in. Stroke, \$ No. 118, 366-in. Stroke, \$ No. 120, 372-in. Stroke, \$ No. 122, 378-in. Stroke, \$ No. 124, 384-in. Stroke, \$ No. 126, 390-in. Stroke, \$ No. 128, 396-in. Stroke, \$ No. 130, 402-in. Stroke, \$ No. 132, 408-in. Stroke, \$ No. 134, 414-in. Stroke, \$ No. 136, 420-in. Stroke, \$ No. 138, 426-in. Stroke, \$ No. 140, 432-in. Stroke, \$ No. 142, 438-in. Stroke, \$ No. 144, 444-in. Stroke, \$ No. 146, 450-in. Stroke, \$ No. 148, 456-in. Stroke, \$ No. 150, 462-in. Stroke, \$ No. 152, 468-in. Stroke, \$ No. 154, 474-in. Stroke, \$ No. 156, 480-in. Stroke, \$ No. 158, 486-in. Stroke, \$ No. 160, 492-in. Stroke, \$ No. 162, 498-in. Stroke, \$ No. 164, 504-in. Stroke, \$ No. 166, 510-in. Stroke, \$ No. 168, 516-in. Stroke, \$ No. 170, 522-in. Stroke, \$ No. 172, 528-in. Stroke, \$ No. 174, 534-in. Stroke, \$ No. 176, 540-in. Stroke, \$ No. 178, 546-in. Stroke, \$ No. 180, 552-in. Stroke, \$ No. 182, 558-in. Stroke, \$ No. 184, 564-in. Stroke, \$ No. 186, 570-in. Stroke, \$ No. 188, 576-in. Stroke, \$ No. 190, 582-in. Stroke, \$ No. 192, 588-in. Stroke, \$ No. 194, 594-in. Stroke, \$ No. 196, 600-in. Stroke, \$ No. 198, 606-in. Stroke, \$ No. 200, 612-in. Stroke, \$ No. 202, 618-in. Stroke, \$ No. 204, 624-in. Stroke, \$ No. 206, 630-in. Stroke, \$ No. 208, 636-in. Stroke, \$ No. 210, 642-in. Stroke, \$ No. 212, 648-in. Stroke, \$ No. 214, 654-in. Stroke, \$ No. 216, 660-in. Stroke, \$ No. 218, 666-in. Stroke, \$ No. 220, 672-in. Stroke, \$ No. 222, 678-in. Stroke, \$ No. 224, 684-in. Stroke, \$ No. 226, 690-in. Stroke, \$ No. 228, 696-in. Stroke, \$ No. 230, 702-in. Stroke, \$ No. 232, 708-in. Stroke, \$ No. 234, 714-in. Stroke, \$ No. 236, 720-in. Stroke, \$ No. 238, 726-in. Stroke, \$ No. 240, 732-in. Stroke, \$ No. 242, 738-in. Stroke, \$ No. 244, 744-in. Stroke, \$ No. 246, 750-in. Stroke, \$ No. 248, 756-in. Stroke, \$ No. 250, 762-in. Stroke, \$ No. 252, 768-in. Stroke, \$ No. 254, 774-in. Stroke, \$ No. 256, 780-in. Stroke, \$ No. 258, 786-in. Stroke, \$ No. 260, 792-in. Stroke, \$ No. 262, 798-in. Stroke, \$ No. 264, 804-in. Stroke, \$ No. 266, 810-in. Stroke, \$ No. 268, 816-in. Stroke, \$ No. 270, 822-in. Stroke, \$ No. 272, 828-in. Stroke, \$ No. 274, 834-in. Stroke, \$ No. 276, 840-in. Stroke, \$ No. 278, 846-in. Stroke, \$ No. 280, 852-in. Stroke, \$ No. 282, 858-in. Stroke, \$ No. 284, 864-in. Stroke, \$ No. 286, 870-in. Stroke, \$ No. 288, 876-in. Stroke, \$ No. 290, 882-in. Stroke, \$ No. 292, 888-in. Stroke, \$ No. 294, 894-in. Stroke, \$ No. 296, 900-in. Stroke, \$ No. 298, 906-in. Stroke, \$ No. 300, 912-in. Stroke, \$ No. 302, 918-in. Stroke, \$ No. 304, 924-in. Stroke, \$ No. 306, 930-in. Stroke, \$ No. 308, 936-in. Stroke, \$ No. 310, 942-in. Stroke, \$ No. 312, 948-in. Stroke, \$ No. 314, 954-in. Stroke, \$ No. 316, 960-in. Stroke, \$ No. 318, 966-in. Stroke, \$ No. 320, 972-in. Stroke, \$ No. 322, 978-in. Stroke, \$ No. 324, 984-in. Stroke, \$ No. 326, 990-in. Stroke, \$ No. 328, 996-in. Stroke, \$ No. 330, 1002-in. Stroke, \$ No. 332, 1008-in. Stroke, \$ No. 334, 1014-in. Stroke, \$ No. 336, 1020-in. Stroke, \$ No. 338, 1026-in. Stroke, \$ No. 340, 1032-in. Stroke, \$ No. 342, 1038-in. Stroke, \$ No. 344, 1044-in. Stroke, \$ No. 346, 1050-in. Stroke, \$ No. 348, 1056-in. Stroke, \$ No. 350, 1062-in. Stroke, \$ No. 352, 1068-in. Stroke, \$ No. 354, 1074-in. Stroke, \$ No. 356, 1080-in. Stroke, \$ No. 358, 1086-in. Stroke, \$ No. 360, 1092-in. Stroke, \$ No. 362, 1098-in. Stroke, \$ No. 364, 1104-in. Stroke, \$ No. 366, 1110-in. Stroke, \$ No. 368, 1116-in. Stroke, \$ No. 370, 1122-in. Stroke, \$ No. 372, 1128-in. Stroke, \$ No. 374, 1134-in. Stroke, \$ No. 376, 1140-in. Stroke, \$ No. 378, 1146-in. Stroke, \$ No. 380, 1152-in. Stroke, \$ No. 382, 1158-in. Stroke, \$ No. 384, 1164-in. Stroke, \$ No. 386, 1170-in. Stroke, \$ No. 388, 1176-in. Stroke, \$ No. 390, 1182-in. Stroke, \$ No. 392, 1188-in. Stroke, \$ No. 394, 1194-in. Stroke, \$ No. 396, 1200-in. Stroke, \$ No. 398, 1206-in. Stroke, \$ No. 400, 1212-in. Stroke, \$ No. 402, 1218-in. Stroke, \$ No. 404, 1224-in. Stroke, \$ No. 406, 1230-in. Stroke, \$ No. 408, 1236-in. Stroke, \$ No. 410, 1242-in. Stroke, \$ No. 412, 1248-in. Stroke, \$ No. 414, 1254-in. Stroke, \$ No. 416, 1260-in. Stroke, \$ No. 418, 1266-in. Stroke, \$ No. 420, 1272-in. Stroke, \$ No. 422, 1278-in. Stroke, \$ No. 424, 1284-in. Stroke, \$ No. 426, 1290-in. Stroke, \$ No. 428, 1296-in. Stroke, \$ No. 430, 1302-in. Stroke, \$ No. 432, 1308-in. Stroke, \$ No. 434, 1314-in. Stroke, \$ No. 436, 1320-in. Stroke, \$ No. 438, 1326-in. Stroke, \$ No. 440, 1332-in. Stroke, \$ No. 442, 1338-in. Stroke, \$ No. 444, 1344-in. Stroke, \$ No. 446, 1350-in. Stroke, \$ No. 448, 1356-in. Stroke, \$ No. 450, 1362-in. Stroke, \$ No. 452, 1368-in. Stroke, \$ No. 454, 1374-in. Stroke, \$ No. 456, 1380-in. Stroke, \$ No. 458, 1386-in. Stroke, \$ No. 460, 1392-in. Stroke, \$ No. 462, 1398-in. Stroke, \$ No. 464, 1404-in. Stroke, \$ No. 466, 1410-in. Stroke, \$ No. 468, 1416-in. Stroke, \$ No. 470, 1422-in. Stroke, \$ No. 472, 1428-in. Stroke, \$ No. 474, 1434-in. Stroke, \$ No. 476, 1440-in. Stroke, \$ No. 478, 1446-in. Stroke, \$ No. 480, 1452-in. Stroke, \$ No. 482, 1458-in. Stroke, \$ No. 484, 1464-in. Stroke, \$ No. 486, 1470-in. Stroke, \$ No. 488, 1476-in. Stroke, \$ No. 490, 1482-in. Stroke, \$ No. 492, 1488-in. Stroke, \$ No. 494, 1494-in. Stroke, \$ No. 496, 1500-in. Stroke, \$ No. 498, 1506-in. Stroke, \$ No. 500, 1512-in. Stroke, \$ No. 502, 1518-in. Stroke, \$ No. 504, 1524-in. Stroke, \$ No. 506, 1530-in. Stroke, \$ No. 508, 1536-in. Stroke, \$ No. 510, 1542-in. Stroke, \$ No. 512, 1548-in. Stroke, \$ No. 514, 1554-in. Stroke, \$ No. 516, 1560-in. Stroke, \$ No. 518, 1566-in. Stroke, \$ No. 520, 1572-in. Stroke, \$ No. 522, 1578-in. Stroke, \$ No. 524, 1584-in. Stroke, \$ No. 526, 1590-in. Stroke, \$ No. 528, 1596-in. Stroke, \$ No. 530, 1602-in. Stroke, \$ No. 532, 1608-in. Stroke, \$ No. 534, 1614-in. Stroke, \$ No. 536, 1620-in. Stroke, \$ No. 538, 1626-in. Stroke, \$ No. 540, 1632-in. Stroke, \$ No. 542, 1638-in. Stroke, \$ No. 544, 1644-in. Stroke, \$ No. 546, 1650-in. Stroke, \$ No. 548, 1656-in. Stroke, \$ No. 550, 1662-in. Stroke, \$ No. 552, 1668-in. Stroke, \$ No. 554, 1674-in. Stroke, \$ No. 556, 1680-in. Stroke, \$ No. 558, 1686-in. Stroke, \$ No. 560, 1692-in. Stroke, \$ No. 562, 1698-in. Stroke, \$ No. 564, 1704-in. Stroke, \$ No. 566, 1710-in. Stroke, \$ No. 568, 1716-in. Stroke, \$ No. 570, 1722-in. Stroke, \$ No. 572, 1728-in. Stroke, \$ No. 574, 1734-in. Stroke, \$ No. 576, 1740-in. Stroke, \$ No. 578, 1746-in. Stroke, \$ No. 580, 1752-in. Stroke, \$ No. 582, 1758-in. Stroke, \$ No. 584, 1764-in. Stroke, \$ No. 586, 1770-in. Stroke, \$ No. 588, 1776-in. Stroke, \$ No. 590, 1782-in. Stroke, \$ No. 592, 1788-in. Stroke, \$ No. 594, 1794-in. Stroke, \$ No. 596, 1800-in. Stroke, \$ No. 598, 1806-in. Stroke, \$ No. 600, 1812-in. Stroke, \$ No. 602, 1818-in. Stroke, \$ No. 604, 1824-in. Stroke, \$ No. 606, 1830-in. Stroke, \$ No. 608, 1836-in. Stroke, \$ No. 610, 1842-in. Stroke, \$ No. 612, 1848-in. Stroke, \$ No. 614, 1854-in. Stroke, \$ No. 616, 1860-in. Stroke, \$ No. 618, 1866-in. Stroke, \$ No. 620, 1872-in. Stroke, \$ No. 622, 1878-in. Stroke, \$ No. 624, 1884-in. Stroke, \$ No. 626, 1890-in. Stroke, \$ No. 628, 1896-in. Stroke, \$ No. 630, 1902-in. Stroke, \$ No. 632, 1908-in. Stroke, \$ No. 634, 1914-in. Stroke, \$ No. 636, 1920-in. Stroke, \$ No. 638, 1926-in. Stroke, \$ No. 640, 1932-in. Stroke, \$ No. 642, 1938-in. Stroke, \$ No. 644, 1944-in. Stroke, \$ No. 646, 1950-in. Stroke, \$ No. 648, 1956-in. Stroke, \$ No. 650, 1962-in. Stroke, \$ No. 652, 1968-in. Stroke, \$ No. 654, 1974-in. Stroke, \$ No. 656, 1980-in. Stroke, \$ No. 658, 1986-in. Stroke, \$ No. 660, 1992-in. Stroke, \$ No. 662, 1998-in. Stroke, \$ No. 664, 2004-in. Stroke, \$ No. 666, 2010-in. Stroke, \$ No. 668, 2016-in. Stroke, \$ No. 670, 2022-in. Stroke, \$ No. 672, 2028-in. Stroke, \$ No. 674, 2034-in. Stroke, \$ No. 676, 2040-in. Stroke, \$ No. 678, 2046-in. Stroke, \$ No. 680, 2052-in. Stroke, \$ No. 682, 2058-in. Stroke, \$ No. 684, 2064-in. Stroke, \$ No. 686, 2070-in. Stroke, \$ No. 688, 2076-in. Stroke, \$ No. 690, 2082-in. Stroke, \$ No. 692, 2088-in. Stroke, \$ No. 694, 2094-in. Stroke, \$ No. 696, 2100-in. Stroke, \$ No. 698, 2106-in. Stroke, \$ No. 700, 2112-in. Stroke, \$ No. 702, 2118-in. Stroke, \$ No. 704, 2124-in. Stroke, \$ No. 706, 2130-in. Stroke, \$ No. 708, 2136-in. Stroke, \$ No. 710, 2142-in. Stroke, \$ No. 712, 2148-in. Stroke, \$ No. 714, 2154-in. Stroke, \$ No. 716, 2160-in. Stroke, \$ No. 718, 2166-in. Stroke, \$ No. 720, 2172-in. Stroke, \$ No. 722, 2178-in. Stroke, \$ No. 724, 2184-in. Stroke, \$ No. 726, 2190-in. Stroke, \$ No. 728, 2196-in. Stroke, \$ No. 730, 2202-in. Stroke, \$ No. 732, 2208-in. Stroke, \$ No. 734, 2214-in. Stroke, \$ No. 736, 2220-in. Stroke, \$ No. 738, 2226-in. Stroke, \$ No. 740, 2232-in. Stroke, \$ No. 742, 2238-in. Stroke, \$ No. 744, 2244-in. Stroke, \$ No. 746, 2250-in. Stroke, \$ No. 748, 2256-in. Stroke, \$ No. 750, 2262-in. Stroke, \$ No. 752, 2268-in. Stroke, \$ No. 754, 2274-in. Stroke, \$ No. 756, 2280-in. Stroke, \$ No. 758, 2286-in. Stroke, \$ No. 760, 2292-in. Stroke, \$ No. 762, 2298-in. Stroke, \$ No. 764, 2304-in. Stroke, \$ No. 766, 2310-in. Stroke, \$ No. 768, 2316-in. Stroke, \$ No. 770, 2322-in. Stroke, \$ No. 772, 2328-in. Stroke, \$ No. 774, 2334-in. Stroke, \$ No. 776, 2340-in. Stroke, \$ No. 778, 2346-in. Stroke, \$ No. 780, 2352-in. Stroke, \$ No. 782, 2358-in. Stroke, \$ No. 784, 2364-in. Stroke, \$ No. 786, 2370-in. Stroke, \$ No. 788, 2376-in. Stroke, \$ No. 790, 2382-in. Stroke, \$ No. 792, 2388-in. Stroke, \$ No. 794, 2394-in. Stroke, \$ No. 796, 2400-in. Stroke, \$ No. 798, 2406-in. Stroke, \$ No. 800, 2412-in. Stroke, \$ No. 802, 2418-in. Stroke, \$ No. 804, 2424-in. Stroke, \$ No. 806, 2430-in. Stroke, \$ No. 808, 2436-in. Stroke, \$ No. 810, 2442-in. Stroke, \$ No. 812, 2448-in. Stroke, \$ No. 814, 2454-in. Stroke, \$ No. 816, 2460-in. Stroke, \$ No. 818, 2466-in. Stroke, \$ No. 820, 2472-in. Stroke, \$ No. 822, 2478-in. Stroke, \$ No. 824, 2484-in. Stroke, \$ No. 826, 2490-in. Stroke, \$ No. 828, 2496-in. Stroke, \$ No. 830, 2502-in. Stroke, \$ No. 832, 2508-in. Stroke, \$ No. 834, 2514-in. Stroke, \$ No. 836, 2520-in. Stroke, \$ No. 838, 2526-in. Stroke, \$ No. 840, 2532-in. Stroke, \$ No. 842, 2538-in. Stroke, \$ No. 844, 2544-in. Stroke, \$ No. 846, 2550-in. Stroke, \$ No. 848, 2556-in. Stroke, \$ No. 850, 2562-in. Stroke, \$ No. 852, 2568-in. Stroke, \$ No. 854, 2574-in. Stroke, \$ No. 856, 2580-in. Stroke, \$ No. 858, 2586-in. Stroke, \$ No. 860, 2592-in. Stroke, \$ No. 862, 2598-in. Stroke, \$ No. 864, 2604-in. Stroke, \$ No. 866, 2610-in. Stroke, \$ No. 868, 2616-in. Stroke, \$ No. 870, 2622-in. Stroke, \$ No. 872, 2628-in. Stroke, \$ No. 874, 2634-in. Stroke, \$ No. 876, 2640-in. Stroke, \$ No. 878, 2646-in. Stroke, \$ No. 880, 2652-in. Stroke, \$ No. 882, 2658-in. Stroke, \$ No. 884, 2664-in. Stroke, \$ No. 886, 2670-in. Stroke, \$ No. 888, 2676-in. Stroke, \$ No. 890, 2682-in. Stroke, \$ No. 892, 2688-in. Stroke, \$ No. 894, 2694-in. Stroke, \$ No. 896, 2700-in. Stroke, \$ No. 898, 2706-in. Stroke, \$ No. 900, 2712-in. Stroke, \$ No. 902, 2718-in. Stroke, \$ No. 904, 2724-in. Stroke, \$ No. 906, 2730-in. Stroke, \$ No. 908, 2736-in. Stroke, \$ No. 910, 2742-in. Stroke, \$ No. 912, 2748-in. Stroke, \$ No. 914, 2754-in. Stroke, \$ No. 916, 2760-in. Stroke, \$ No. 918, 2766-in. Stroke, \$ No. 920, 2772-in. Stroke, \$ No. 922, 2778-in. Stroke, \$ No. 924, 2784-in. Stroke, \$ No. 926, 2790-in. Stroke, \$ No. 928, 2796-in. Stroke, \$ No. 930, 2802-in. Stroke, \$ No. 932, 2808-in. Stroke, \$ No. 934, 2814-in. Stroke, \$ No. 936, 2820-in. Stroke, \$ No. 938, 2826-in. Stroke, \$ No. 940, 2832-in. Stroke, \$ No. 942, 2838-in. Stroke, \$ No. 944, 2844-in. Stroke, \$ No. 946, 2850-in. Stroke, \$ No. 948, 2856-in. Stroke, \$ No. 950, 2862-in. Stroke, \$ No. 952, 2868-in. Stroke, \$ No. 954, 2874-in. Stroke, \$ No. 956, 2880-in. Stroke, \$ No. 958, 2886-in. Stroke, \$ No. 960, 2892-in. Stroke, \$ No. 962, 2898-in. Stroke, \$ No. 964, 2904-in. Stroke, \$ No. 966, 2910-in. Stroke, \$ No. 968, 2916-in. Stroke, \$ No. 970, 2922-in. Stroke, \$ No. 972, 2928-in. Stroke, \$ No. 974, 2934-in. Stroke, \$ No. 976, 2940-in. Stroke, \$ No. 978, 2946-in. Stroke, \$ No. 980, 2952-in. Stroke, \$ No. 982, 2958-in. Stroke, \$ No. 984, 2964-in. Stroke, \$ No. 986, 2970-in. Stroke, \$ No. 988, 2976-in. Stroke, \$ No. 990, 2982-in. Stroke, \$ No. 992, 2988-in. Stroke, \$ No. 994, 2994-in. Stroke, \$ No. 996,

California Planers and Matchers, and Wood Working Machinery of all Kinds,


For Sale at TREADWELL & Co. Machinery Depot, San Francisco.



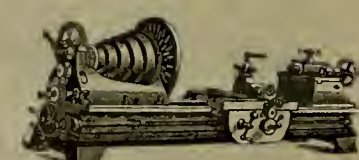
The CALIFORNIA PLANNER and MATCHER is gotten up from new patterns specially for this Coast. It has Cast Steel Slotted Cylinder Head, running in patent self oiling boxes; Matcher Spindles also of the best cast steel. The gears are all protected with iron covers. Will plane 24 in. wide and 6 in. thick, and tongue and groove 14 in. wide. Will make rustic and stick gutters, or heavy mouldings, etc., and is the best Job Machine ever built.




Adjustable Saw Gauge.




Improved Saw Arbors.



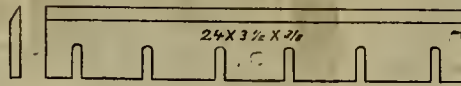
Iron Working Machinery.




Foot Power Jig Saws.



Improved Band Saws.



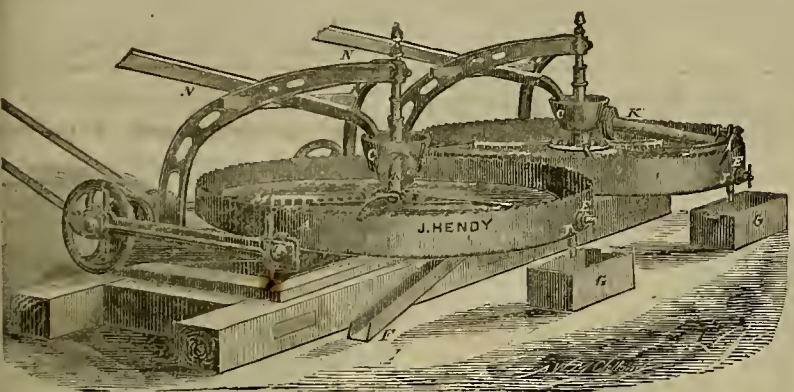
Planer Knives of all sizes on hand.



Lathes, Planers, Drills, etc.

TREADWELL & CO.,
2319-cow-11
San Francisco

OVER \$3,500 PER MONTH SAVED
BY THE USE OF
Hendy's Improved Amalgamator and Concentrator



Can be seen at the Manufactory, No. 32 Fremont Street, San Francisco.

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JOSHUA HENDY, Esq.—Dear Sir:—As a practical miner and millman, I take pleasure in recommending the use of your Concentrators in all mills where gold or silver ores are reduced. No mills should be without them, for the following reasons:

1st. They are good sizers (no perfect concentration in pulverized ores can be effected without first sizing).

2d. The best Concentrator I have ever known—(the concentrated stuff only containing 5 per cent. of sand).

3d. They are good amalgamators, light (feathery) particles of amalgam and particles of coated gold by attrition are brightened, and from their specific gravity and the action of the pan, fall to the bottom and adhere.

4th. They require but little power and attention to run them, and with ordinary care will last for years.

I have been familiar with the workings of your Concentrators for four years past; have run them myself in the North Star Mine, Grass Valley; am familiar with their practical workings on the Empire Mine, Grass Valley; St. Patrick, Placer Co.; St. Lawrence, El Dorado Co.; Oaks and Reese, Mariposa Co., and most cheerfully give you this testimony. For further information you are at liberty to refer to,

Yours respectfully,
JAS. H. CROSSMAN, M. E.

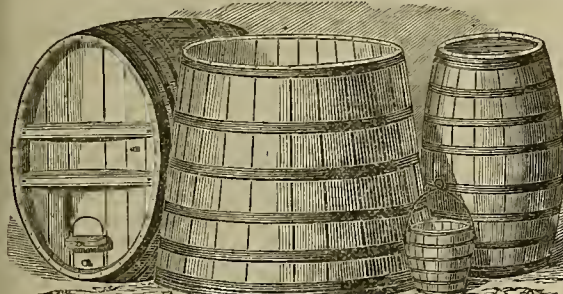
409 California street, or Cosmopolitan Hotel.

OFFICE SUPERINTENDENT OF KEYSTONE CON. M. CO., AMADOR, AMADOR COUNTY.
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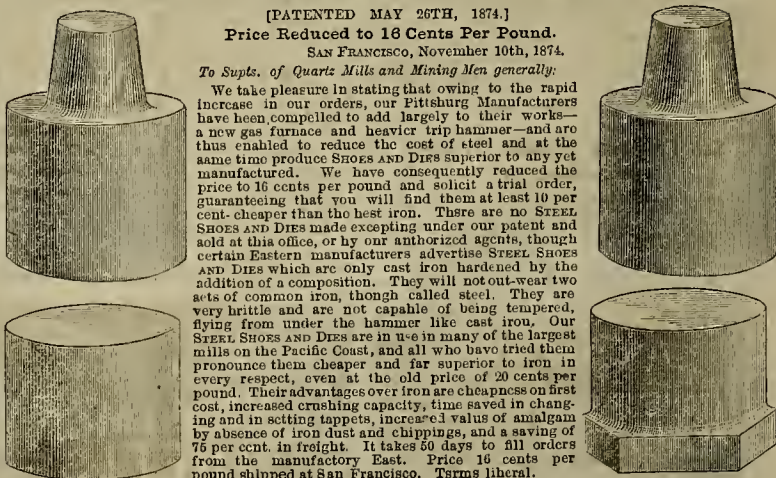
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Price Reduced to 16 Cents Per Pound.
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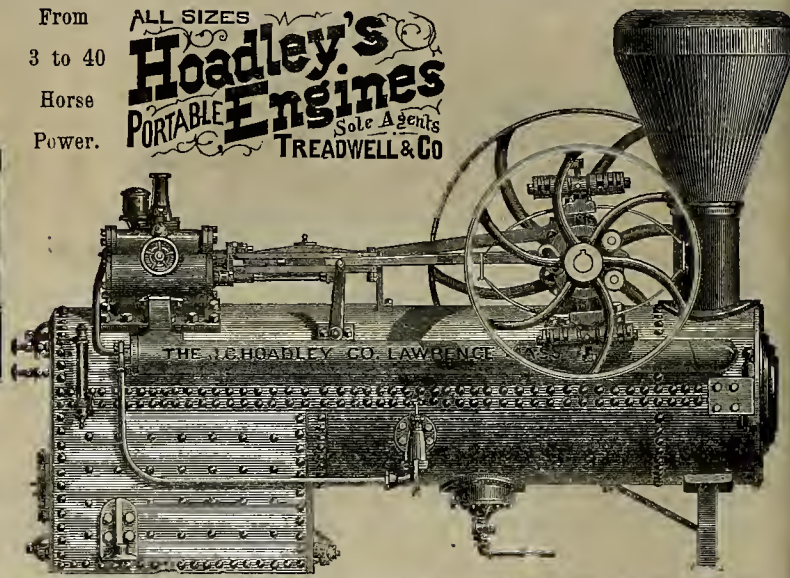
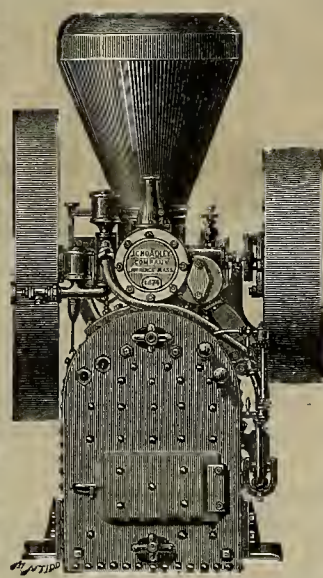
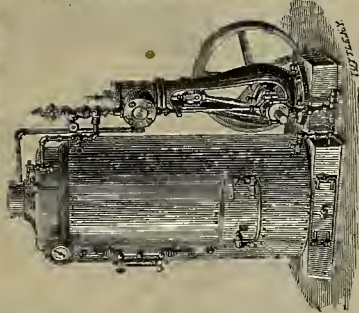
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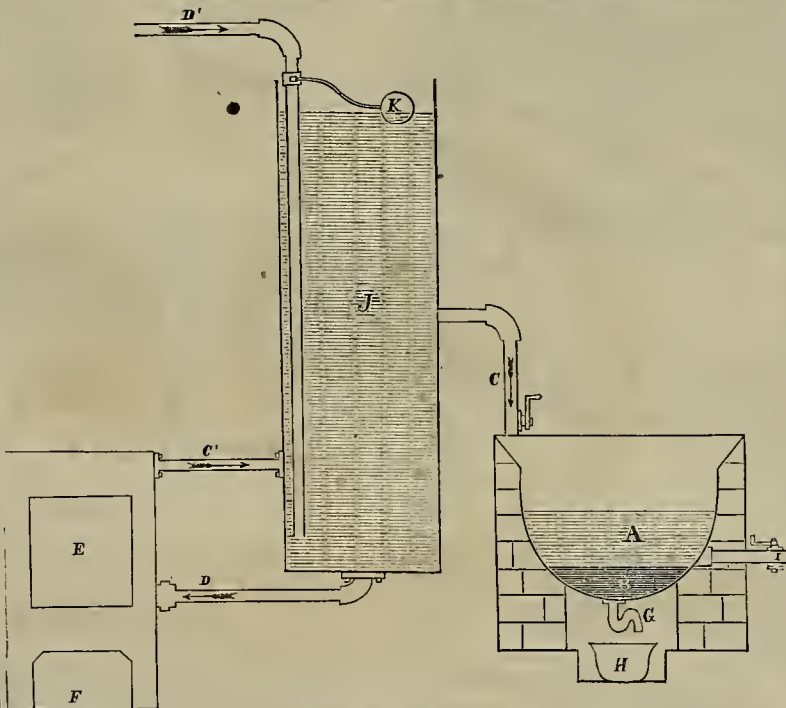
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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.



PATENTED NOVEMBER 25th, 1873.

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[Covered by Letters Patent of July 2d, 1872, and recent applications.]

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Added to a battery of stamps these machines consti-
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, FEBRUARY 20, 1875.

VOLUME XXX
Number 8.

Hydraulic Mining in California. No. 13.

Excavation.

In digging the ditch along the mountain slopes the safety of the ground as to slides must be well examined, and the real body of the ditch must be always dug in solid soil, and far enough in the side of the mountain to leave at the outside or lower bank a level surface on which to place a part of the soil of the bank and the ditch.

The bank on the mountain side must be carried on a good slope at once, so as to prevent slides from it, which, during the rainy season, would otherwise occur, not only filling the ditch but causing great and dangerous breaks, since the water, checked in its course, would run over the lower bank, causing damages which would take much time and money to mend.

No operation connected with hydraulic mining needs greater care and foresight than the building of a ditch. The best constructed ditch will cause a great deal of trouble for the first year or two, but an indifferently constructed ditch will cause not only as much repairing as the first costs amount to, but be forever after a second hand affair.

Deep ditches are preferable to shallow ones, as the evaporation during the summer heat is far less in the former than in the latter. Still, before deciding on the depth of a ditch—whether two or three feet deep—it will be well to examine the soil through which it has to be dug. If the country bed-rock is covered only with a little soil, and if a ditch two feet deep would avoid the bed rock, economy dictates the two foot ditch made wider.

All ravines or small water courses crossed by the line of ditch must be secured in such a way that their water can either be admitted into the ditch or carried over it, as it is wanted or not. Regard must be had in this respect for the increasing volumes of water during the rainy season. It is a notorious fact that the quantity of water carried by established ditches during the summer season is reduced by nearly one-third in its volume by the time the point is reached where the water is to be used. It may be true that in many cases the low state of the river from which the water is drawn is partly the cause of this reduction in volume; but in other cases, where the river affords an unlimited amount, the diminution of the water must be ascribed altogether to evaporation and leakage.

The question arises whether it would not be advisable to counteract this lessening of the water by building the ditches wider at their head and reducing their width for a distance of a few miles till the normal size is reached. In the winter season only a quantity answering the size of the lower part of the ditch would be admitted at the head. In summer all the water the upper part of the ditch could carry would be admitted and brought along, even filling the ditch to the top of the lower (artificial) bank—which would be safe enough in summer. This plan seems well calculated to practically increase the capacity of ditches.

Trees.

Trees found on the line of the ditch, the removal of which is necessary, must never be cut down so that only the stumps remain. To grub up these stumps is a most difficult, tedious, and expensive work, and can be avoided by undermining the tree on the lower side, cutting its supporting roots and felling it down the hill, tree, stumps, roots, and all.

Flumes.

The flumes on the line of the ditch may be built either on a little less grade, or a little smaller, than the ditch, as the smoothness of the boards causes less friction than a rough ditch, and the water, therefore, runs faster.

Flumes are generally built of one and a half

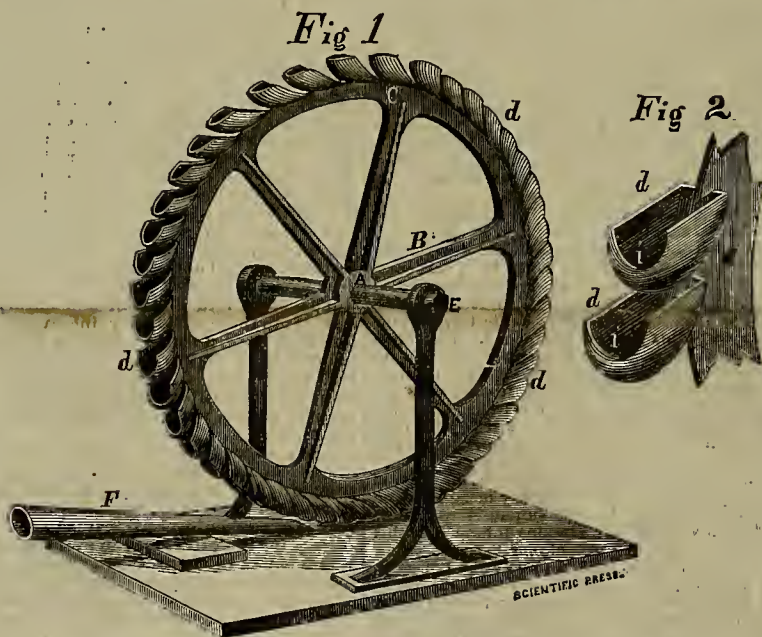
inch plank, with a framing of four by four and three by four scantling for every two and a half or three feet. The strength of the scaffolding for the flumes must be conditioned by their height, and left to the discretion of the builder. The foundation of this scaffolding ought to be on very solid ground, and, if possible, little exposed to water in puddles, coming and going, as the season changes. Moreover, the bottom part of the supporting posts, or the sleepers, ought to be well charred, as mentioned before, to prevent rot and subsequent settling of the flume. High flumes ought to be well anchored with strong wire, or wire rope, to protect them against winds.

Where a flume is to be built, the underbrush, fallen trees, etc., ought to be cleared away—by ax, or fire, or both—to protect the flume against the conflagrations which occur in our forests from time to time during the dry season.

Flumes of sheet iron are highly recommended.

thousand vertical feet, formed by the gorge through which the West Branch of the North Fork of Feather river flows. This enterprise was a complete success, and found as such a deserved publicity, which makes its particular description at this place unnecessary. For the sake of handy reference, however, it may here be said that the pipe is made of the best sheet iron, as follows: No. 14 iron was used for 150 feet pressure; No. 12 iron was used for 275 feet pressure; No. 10 iron was used for 350 feet pressure; No. 7 iron was used for 425 feet pressure; one-fourth iron was used for 600 feet pressure; five-sixteenths iron was used for 850 feet pressure; three-eighths iron was used for 900 feet pressure.

A cistern with sand boxes, which serves as receptacle for sand and gravel carried from the ditch, is constructed at the receiving point. An elbow of the pipe dips here in the water, to prevent, as much as possible, the entrance of



S. N. KNIGHT'S IMPROVED HURDY-GURDY WATER WHEEL.

ed. The iron could be protected against corrosion by immersion in Dr. Angus Smith's preparation of coal-tar, and would certainly afford a very durable and incombustible material. When the present high price of iron shall have fallen to near its former rate, this material will undoubtedly be used with great advantage.

The building of flumes should be avoided as far as possible, since, under the most favorable conditions, using the best kind of sugar pine lumber, a flume will only last from ten to twelve years; and the cost of its repair is computed to be 75 per cent. higher than that of a ditch.

A flume carrying a constant stream of water is far less exposed to decay than one which carries water periodically. The alternate swelling and shrinking of the wood in the latter not only destroys the fiber of the wood, but also draws the nails, and thus injures the structure.

Iron Pipes.

The use of iron pipes as aqueducts is not a novelty in California. As early as 1856 or '57 an iron pipe of 40 inches diameter was laid across a small depression at Timbuctoo, near Smartsville, Yuba county. The city of San Francisco is supplied by the Spring Valley Water company, which has 17 miles of 30 inch iron pipe, conducting the water across depressions of from 200 to 250 feet vertical depth.

During the summer and fall of 1870 the most important enterprise of this kind was carried out by the Spring Valley Canal and Mining company, of Cherokee, Butte county.

Under the direction of Joseph Moore, Esq., Superintendent of the Risdon Iron and Boiler works in San Francisco, an iron pipe 30 inches in diameter and 14,000 feet long was manufactured and laid across a depression of nearly a

air. A stand-pipe is adjusted 50 feet from the inlet, to permit the ready flow of water and the escape of air which may have entered the pipe. The pipe is laid in pieces 23 feet in length, riveted together, and in a trench five feet deep, and covered with soil to save it from thermal influences, causing expansion and contraction. The rivets used were for No. 14 iron, one-fourth wire, for No. 12, one-fourth; for No. 11, three-sixteenths; for No. 9, three-eighths; for No. 7, three-eighths. A steam riveting machine was employed. Air-valves, with floats, are used at different places, not only to allow the escape of air, when the pipe is filled, but also to prevent a collapse from atmospheric pressure, in case a vacuum should be created by some foreign matter (for instance, a plug of dry leaves accumulated in the ditch) stopping suddenly the supply of water.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

The Virginia and Truckee railroad company carried in the month of January 19,747 tons of ore from the Comstock mines to the mills. This light shipment is due to the stormy weather in January, when the dumps of several mines became filled, and they were obliged to stop hoisting.

The Amador Ledger thinks the gold yield of the quartz mines in that county for 1875, will be greater than the product of any preceding year.

One day last week twenty twelve-mule teams were at Spadra, loading with freight for Panamint.

Improved Water Wheel.

Mr. S. N. Knight, of Sutter creek, California, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an improved form of bucket for use in hurdy-gurdy wheels. The invention also comprises an improved method of fastening buckets to the wheel, so as to materially increase the effectiveness of the wheel and reduce the cost of construction.

The accompanying cuts show the design in detail. Figure 1 is a perspective view of the invention, and Figure 2 is an enlarged view of some of the buckets. A represents the hub, B the spokes, and C, the felloe of a cast iron wheel. Around the rim C, of the wheel, are secured wrought iron or equivalent pressed, or forged buckets d, d, d. In this class of water wheels, the wheel is secured upon a horizontal shaft E, as that it rotates in a vertical plane; and the water is delivered upon the buckets by a nozzle F, which may be arranged to deliver the stream upon the buckets at any desired point in the circumference of the wheel rim. The comparative effectiveness of the wheel will, therefore, depend on the capacity of the buckets to utilize the force of the water as it leaves the nozzle; it being necessary that the buckets be not only capable of receiving the force of the entire stream, but also that they free themselves easily the moment the force of the water is expended.

The buckets d, d, d, are made of wrought iron, or they can be with forged or pressed into the desired shape. These buckets are made scoop-shaped, and the base of the scoop or outer side of each bucket which is farthest from the wheel rim, is cut out in a semi-circular form, as at i, so as to provide a sufficient opening for the entrance of the stream of water into the buckets, while the sides extend upward close to the bucket next above. These buckets are secured very close together, so that as the outer edge of each bucket commences to pass the stream from the nozzle, the water will strike into the next bucket. Each bucket is firmly secured to the rim of the wheel so that the bottom of the scoop will stand at an angle to the rim as shown.

The stream of water will strike into the buckets, and, in its reaction, will be discharged, thus giving the wheel an impetus which is not affected by "dead" water; and this action being continuous, on account of the arrangement of the buckets, the full force of the water will be expended to the greatest advantage. Parties desiring further information may confer with the inventor at the address given above.

Washington's Birthday.

The date of this week's PUES is close upon the heels of the anniversary of the birthday of America's greatest man. The eulogies on Washington have probably been as numerous as those that have been bestowed upon any man that the world has seen; and they will never cease; for the most brilliant eulogists will never fail to find something in his character or record to praise, and his more humble admirers will realize more and more the greatness and goodness of America's model man. Our indebtedness to Washington as a soldier and statesman has been duly acknowledged by the present and past generations; but it will not be until many generations have passed away that the nation fully realize its indebtedness to Heaven, through him, in furnishing us with a model which, lofty as it is, presents more incentive to popular imitation than any other hero of history; and in the character of Washington we see this important truth demonstrated, that greatness and goodness are not incompatible.

The recent caving of the Indian Valley (Plumas county) mining company's grounds near Greenville, closed up the chute and made it necessary to have a new one before operations could be carried on successfully.

MINING matters in the Reville District, Nev., are looking up. It is the intention of those interested in the mines there to have the mill running this spring.

CORRESPONDENCE.

The Sale of American Ores.

ENRORS PRESS:—In the interest of many of my acquaintances who send their ores to Swansea, London and Liverpool, and of American ore-shippers generally, I beg to call attention through the columns of your paper, to a few facts in connection therewith. As the result of personal observation I have ascertained that there exists a "private contract" system, by which many lots of auriferous and argentiferous ores are disposed of at rates, much below those which would be otherwise obtained, were the ores sold by public ticketing, and the sample fully and impartially distributed. Noticing that several lots had been disposed of rather quietly, I took occasion to compare what I afterward learned to be the prices paid with the rates offered by the Swansea agent of the Royal United Smelting Works of Germany (Mr. F. W. Dahne), and found that his prices would have netted the owners from \$30 to \$50 more per ton. As the tariff rates of these works seem to represent the maximum prices offered, I will mention in this connection that Mr. D. pays, in cash, the full tariff rates up to 1s. 11d. per oz. of silver, and 75s. per oz. of gold. I found, however, that three firms—Richardson & Co., and Elford, Williams & Co., of Swansea, and Lewie & Sons, of Liverpool—were honorable exceptions in the matter of this private contract system; but I would advise our ore shippers that if they expect fair prices they must make it a condition that the ores shall be sold by public ticketing, and that the printed circulars containing the lists of bidders should be sent to them so that they may see if the concerns paying the maximum prices are properly represented. We have heard a great deal about American windmills in connection with English mining matters, but the existing facts, as I have stated them, would seem to indicate that a counter charge might not be wholly unsustained.

NEVADA.

Petroleum in Russia.

The production and refining of petroleum, which, until recently, was almost exclusively an American industry, appears to be fast gaining a foothold in many other portions of the world. We made brief mention last week of the inception of this business in Germany; to-day we allude more fully to the enormous proportions which it is assuming in Southeastern Russia. Mineral oil is found in immense quantities near Baku, a city about midway of the eastern shore of the Caspian sea, and from which it can readily be shipped by water through the river Volga to near the center of European Russia. Some eighty refineries have already been established near the city of Baku, and systems of pipes are being laid down to convey the oil from the springs and wells to the refineries which are built along the sea shore. A large additional number of refineries have recently been projected. Steamers are being built especially for the traffic to carry oil in bulk, and railroads are in contemplation to connect with the general railway system of the Empire. It is altogether probable that Russia will soon become a large exporter of petroleum, and a rival of America in that business in European markets.

Description of the Oil Regions.

The interest which is beginning to attach to this locality makes opportune some description of its chief characteristics. Baku is located at the southeast end of the Caucasian mountains where they push out into the Caspian sea forming a peninsula or huge headland. The town, located at the foot of a steep declivity by the sea, is a very ancient one, and up to the inception of this new business contained a population of about 5,000 people. It is now rapidly increasing. Its business, heretofore, has been confined chiefly to raw silks, rich carpets, shawls, rice and naphtha. The peninsula upon which it is located is called Apsheron. It has always been celebrated for its mud volcanoes and naphtha springs. Near these springs is a locality known as "The Field of Fire," about half a square mile in extent, from which inflammable gas is constantly escaping. In ancient times this locality was held in the highest veneration by the Eastern fire worshippers and is even now frequented by great numbers of pilgrims every year. They have also several temples there at which some of the more rigid devotees spend most of their time in constant worship, and penitential exercises which often terminate the lives of the poor deluded wretches.

At one locality not far distant from this, there is a huge jet of inflammable gas escaping from the calcareous rocks, and constantly burning which is especially worshiped as representative of the divine principle of fire. This utilitarian spirit which has now so forcibly invaded the region, will probably lead to a gradual overthrow of the peculiar religious sentiment which has reigned here with so much intensity from the earliest period of recorded history.

Canadian Reciprocity—What it Means.

The pending treaty for reciprocity with Canada, it is suspected with much reason, is simply designed to make a way for the transfer of British capital to that province instead of to the United States, whether it must soon come direct, unless let in indirectly, through the back door, by way of Canada. It is proposed that the treaty shall continue for the term of twenty years. With the advantages of such a length of time Canada would become the workshop of England, where cheap labor could be utilized, with an abundant and free market just across the line. However injurious such a policy might prove to the industries and revenue of the United States, there would be no way of abrogating it short of the sword. Congress would be bound hand and foot, and sold to a British dependency for a term of years. Bearing none of the burdens of our debt, receiving the goods produced of our soil and mines, free of duty, employing the cheap labor of England, the Canadian manufacturer would enjoy such advantages as would utterly preclude all possibility of competition on the part of our own manufacturers.

If Canada desires to build up a better trade with the American Union let her come into it and help bear its burdens. Until she thinks fit to do this, let us endeavor, by a cheap, honest and stable government, a sound currency and cheap rate of interest, to so reduce the cost of living that our mechanics and manufacturers can furnish what we want as cheaply as can those of Great Britain. We can do all this if we will, without working any hardship to either our moneyed men or to our producing classes. Reciprocity with Canada means starvation at home. It might furnish a limited market for our breadstuffs there, but it would, by just so much, diminish our breadstuffs market at home. Free trade is certainly a most desirable end; but it would be a ruinous policy to adopt until we have put our own house in order.

The Champion Mine.

The Calaveras Citizen says: We visited recently the Champion mine at West Point, and as it is the mine they "swear by" up there, we thought it of interest to obtain the following particulars: It is located three-quarters of a mile northwest of the town, and is owned by Haskins and Hadley. They claim 1,500 feet and have applied for a patent. The ledge runs nearly north and south, and has been prospected and tested for the distance of 700 feet. This north and south vein varies from 18 inches to 3 feet in width, and where rock has been crushed, taken from the vein, it has averaged \$100 per ton. Where their working shaft is now located, at the depth of 75 feet, an east and west vein intersects the north and south vein; this cross vein had steadily lengthened as they went down, till now, at the depth of 140 feet, it has grown from mere nothing to 25 feet as tested, and how much further is to be determined. This cross vein will average something over one foot in thickness and pays from \$140 to \$200 per ton. The last rock crushed taken from both veins paid \$140 per ton, and it is claimed that the rock now being taken out will pay \$200 per ton; it looked to us as though it would pay \$2,000, for the dump is "yaller as saffron." The gold is distributed through the mass of the rock and not, as in many instances, confined to seams. It is a sulphuretted rock of a bluish cast, and Mr. Haskins informed us that a tea saucer full of sulphuretted, reduced by means of acids, yielded a teaspoonful of gold, this being the only test they have ever made. The mine is worked by means of water-power hoisting works, and the same power is employed in pumping the shaft from a tank built at the depth of 100 feet, where the most of the water is collected. The water, though, is no obstacle worth mentioning, as an hours pumping will keep the shaft dry for the day. We believe, from what we saw and what we were told, that this mine is equally as good as the far famed "Sheep Ranch mine," and it may be safely claimed that Calaveras has two "bonanzas" well developed, and better property, for the amount invested, than feet in the California Consolidated.

THE MARIPOSA ESTATE.—We are informed from a reliable source that the estate which was sold at sheriff's sale at Mariposa on the 26th of January last, to justify judgment against it amounting to the sum of \$66,667, and the title to be got at under it by an arrangement with the re-incorporated Mariposa Land and Mining company, the purchaser is to sell and transfer all to it. It is well understood that all incorporations are enabled, through their own resources by assessments where under the authority of California law, to provide and furnish means to protect, develop and make valuable their property, that this will really be the first real chance this much abused property has had since it was floated upon the New York market, with millions of stock and bonded debt—and outstanding titles to afford endless litigation; this is now arranged to be settled, and Mariposa will, we hope, assume a name and reputation which she deserved long since. We now see an end to all litigation, and the company being under California law, and under the jurisdiction as the estate, there can be no more conflicts used to depress and ruin all in interest as has been heretofore. It has been a terrible load for a few to carry, but the concern will now carry itself, and the system will be upon the cash principle—pay as they go.

—Calaveras Chronicle.

Work and Wages in California.

The following was compiled for the *Resources of California*, by a gentleman who is very thorough and painstaking, and we are able to vouch for the general correctness of his statements and figures. Herein is an infallible index to the industrial condition of the State:

Among the most vital questions to which the world-be-citizen of California early and rightly demands definite, reliable, and satisfactory answers, before taking as serious and important a life-step as that of breaking away from the associations of earlier life, and deciding to identify the fortunes of himself and family with those of the Golden State, those pertaining to work and wages naturally stand foremost in interest and uppermost in importance.

"Is there plenty of my kind of work in your city and your State? Is the demand for it permanent and steady? Are wages good? Is the pay sure? Is it prompt? In what do we receive our pay? What is the price of board? How are rents? What are the prices of provisions, of fuel and of clothing? How much will it cost me a month, or a year, to keep a family of two, of four, of six?" These and scores of kindred inquiries, closely connected with them or immediately growing out of them, form the chief burden of hundreds of letters, public and private, from individuals, families and companies, weekly addressed to private citizens, prominent officials and, especially, to ourselves.

They are wholly right and proper. No sane man, even if single—certainly no head of a family, in his right mind—unless, indeed, he be independently rich—could seriously contemplate an enterprise as important as that of wholly removing his earthly home, with all its memories, associations, and the myriad life-interests inseparably involved; certainly should never finally decide that most vital of life questions—without having fully collected, carefully balanced and deliberately considered all reliable evidence possibly obtainable.

To answer just such questions, and to provide others with the means of answering them; to furnish just such evidence in a form at once complete and compact, critically exact and thoroughly reliable in every particular, and, in point of recency, brought down to the very beginning of the new year—1875—is the especial purpose of this paper. To place in the hands, or within easy reach, of our numerous subscribers, as well as to furnish our own citizens with the readiest possible facilities for immediately returning full and authentic answers to these constantly increasing letters from eastern friends, we have for some months been contemplating, and, for several weeks, carefully collecting facts and comparing statistics in preparation for the present article, which we now confidently present as a recent, authentic and reliable; including all the essential facts personally obtained from original sources, and patiently prepared with the utmost care.

We have taken especial pains to get both sides of the case, in regard to every calling, where it was in any way practicable. We have not only asked the employer what he pays, but inquired of the employee what he gets. At first thought, this might seem superfluous. We have a habit of considering this a thing so simple that a single inquiry, and that upon only one side, had generally appeared quite sufficient. Unlikely as it may have been considered, however, it is, nevertheless, a simple fact that this balancing of inquiries has occasionally revealed quite considerable and even remarkable discrepancies. In more than one case the employer, as if anxious to gain credit for liberality, represented himself as paying higher wages than the unhesitatingly unanimous testimony of the employees assured us that they received. On the other hand, the employees in several instances understated their pay, as was subsequently proven by the concurrent testimony of their mates, and of themselves, even, when carefully and separately cross-questioned. In matters of this kind more than in almost any other interest of life, human vanity and human selfishness sometimes sadly interfere with the veracity and consequent reliability of human testimony. Hence, in attempting to ascertain the facts about any one calling, it frequently became necessary to visit and interview from five to ten different employers in various parts, not only of the city, but, also, of neighboring cities and even of the State at large, and to very carefully question and consider the evidence of from two to three times as many employees.

In the tabulated results hereto appended we have tried to show, as far as practicable the highest, the lowest, and especially the average wages paid to the different kinds, grades, or kinds of operatives employed in the various departments of each calling; to give the daily, weekly or monthly pay, according to the particular method or pe-

riod of payment, generally prevalent in that business, and to state the number of hours a day generally exacted.

In arranging those which we have selected, we have adopted the alphabetic order, as that which, upon the whole, obviously involves the fewest objections, and presents the greatest convenience.

ARCHITECTS.—Work as usual, either by special rate or by commission. The supply so fully equals the demand that their commissions or compensations but little exceed the ruling rates in the larger Eastern cities. The unprecedented activity in building, in which San Francisco has far surpassed herself, even during the last six months, has correspondingly increased the fees and wages of all artisans concerned in the erection, completion and furnishing of public or private buildings.

ARTISTS.—Are finding increased appreciation and obtaining proportionally better prices. Diversities of talent, genius, or reputation cause such an almost endless variety of reward that one can hardly venture upon even an approximate statement of average compensation. Painters of landscapes, marine views, theatrical scenery, panel work, etc., are in full force, and possess an unusual aggregate of talent. Retouchers and colorers of photographic obtain from \$3 to \$15 a day. Skilled workers in water-colors command fully as much.

BAKERS.—These workers of the staff of life receive from \$40 to \$60 a month, and board. Foremen get \$60 with board and lodging; in rare cases they command \$100, while in a few first-class hotels, or extra fashionable restaurants, the chief baker makes even \$250 a month. In ordinary bakeries, second hands have \$40, and third hands \$30, with board and lodging in both cases.

BARBERS.—Good journeymen barbers may depend upon an average pay of from \$15 to \$20 a week, without board. The usual wages, in the cities and larger towns, range from \$15 to \$25, depending, of course, upon the skill of the workman and the amount of custom which the establishment enjoys.

BLACKSMITHS.—Readily command from \$3 to \$4 a day, and generally work ten hours a day. In the mines they receive an average of \$60 a month, without board. Foremen get from one-fifth to one-fourth more.

BOAT-BUILDERS.—Work ten hours a day for \$3. This business employs hardly a hundred men in all, but they turn out excellent work and are steadily increasing in numbers.

BOILER-MAKERS.—command \$3.75 a day; generally working ten hours. *Flange Turners* receive \$4.

BOOK-BINDERS.—May depend upon from \$2.50 to \$5 a day; boys from \$3.50 to \$12 a week.

BOOK-KEEPERS.—All the way from \$60 to \$200 a month. In some banking houses or large importing or commission houses, book-keepers receive from \$250 to \$300 a month, but these are so rare as not to affect the general average—which we may safely set at \$125 a month.

BOX-MAKERS.—\$2.50 a day, for ten hours, upon either paper or wooden boxes.

BRICKLAYERS.—From \$4 to \$5. Foremen, \$6 to \$8.

BUTCHERS.—\$40 to \$75; average, \$50 a month.

CABINET-MAKERS.—Average \$4 a day. More than half of those employed in the city work by the piece, in which, of course, their earnings depend directly upon their own skill and dispatch.

CARPENTERS.—House-carpenters command \$3.50; foremen from \$4.50 to \$6. Ship carpenters or joiners, \$4.50; foremen, from \$5 to \$7.50.

CARRIAGE-MAKERS.—Body-makers and wheel-wrights average \$3; trimmers, \$4 painters, \$2.50 to \$3; strippers, \$4.

CARTERS.—\$2, when the employer furnishes the team; when they furnish and keep their own horse and cart, they get from \$3.50 to \$4.

CARVERS.—In wood easily command \$3.50 a day; when they work by the piece and upon fine work, some make as high as \$7.50 or even \$8.

CAULKERS.—\$5 a day for nine hours and a half.

CHAMBERMAINS.—In families average \$2 a month and board; in hotels, from \$25 to \$30.

CIGAR-MAKERS.—Are nearly all Chinese men. They get 90 cents a day; some as low as 75 cents, and even 50 cents.

CLERGYMEN.—Receive all salaries from one to seven or eight thousand dollars a year. Taking city and country together the average salary is not far from \$1,500. That of San Francisco is about \$2,300.

CLERKS.—No calling includes greater diversity of talent and occupation, and consequent inequality of compensation. Wage range from 75 cents a day, for good boys; writing a good hand, possessing fair knowledge of business computation, and hav-

(Continued on Page 116.)

MECHANICAL PROGRESS

Rollway vs. Railway.

Another Single Track Railway Device.

A highly interesting paper was recently submitted to the Civil Engineer's Club, of Chicago, by S. A. Clemens, on the substitution of a roll way for the railway system now employed on the great thoroughfares of the country. The novelty of the idea will attract the attention of all railway mechanics, and the question of its possibility will no doubt awaken much discussion. As described in the *Railway World*, this new device appears to be a modification of the single track railway, which has of late attracted so much attention in this city. The roadway consists of a series of pairs of small wheels or rollers, each supported by journal boxes, or equivalents, bolted to timbers, like railroad ties, which are placed side by side and set fast in the ground. The way-rollers of each pair are placed parallel—from three to five feet apart, according to any determined gauge—and the pairs of rollers may be eight to sixteen feet apart on the line. Midway between the rollers thus arranged in two parallel rows, is a single guide-rail, the top of which is three or four inches above the level of the rollers, and its connected sections are strongly fastened to the ground timbers to which the rollers are secured, thus tying the entire superstructure longitudinally together.

The way-rollers, made of chilled iron, or converted steel castings, are of about five inches diameter, with three-inch faces, and have on each side journals of two and a half inches in diameter and length, which revolve on small steel, anti-friction rollers, in chilled iron journal boxes, so closed as to exclude both dust and rain. Or, preferably, the way-rollers may be steel or wrought-iron tubes about five inches long by four inches outside diameter, and five-eighths of an inch thick, revolving on steel, anti-friction rollers, of about three-eighths of an inch diameter, which encircle and roll around a short fixed steel shaft, two inches in diameter, the ends of which are held in supports of hard wood or iron, bolted to the ground timbers. These tubular way-rollers are designed of three-fold capacity to safely endure the train weights at highest speed to which they are to be subjected, while combining low resistance from friction and inertia. For the purpose of obtaining favorable grades and curves, the ground-line is prepared like the ordinary road-bed, with the exception that the grade is not necessarily required to be continuous.

The cars are to be from thirty to fifty feet in length, with timber-runners shod with steel, and elastic rubber cushions to run over the rollers, while a system of guide rollers provided with flanges run along the central or guide rail, to keep the cars from flying the track. The outside rollers are placed at intervals, so that the runners of the car overlap at least three of them at the same time, while they may be laced closer together if it is found to be desirable.

The locomotives have an under construction similar to the cars, with steel shod runners upon the outer lines of rollers, and secured to the central or guide rail by flanged rollers. The driving wheels of the locomotive are horizontal, in pairs, and bear on opposite sides of the double-headed guide-rail. Adjustable pressure for tractive adhesion of the driving-wheels on the guide-rail is obtained by spring-cushioned screw or eccentric rolling pressure, at the control of the engineer.

The rollway car-brakes are arranged to act directly on opposite sides of the guide rail, and they may be made on any operating principle now approved by railway usage. At road crossings, a section of the two-guide rail is left out, and the space between adjacent pairs of the way-rollers is open and unobstructed. This is made practicable by providing flanges on two or three pairs of the way rollers on each side of the crossing, to guide the car-runners in straight lines over the crossing, on the further side of which the driving-wheels and guide-rollers again come into position.

But how about switching this style of cars and locomotives? The inventor has provided for this by having a section of guide-rail on the line, which being pivoted at one end is swung outward at the opposite end, to meet in line with an outside section of switch guide-rail which is swung inwardly, both moving simultaneously, by mutual connection to the same switch-lever.

This very general description of the new roadway presents a problem in engineering which is probably worth more than a passing consideration. For underground and elevated lines of transit the system is especially urged for its cheapness and security. It is claimed that the cost of constructing the rollway is from one-half to two-thirds less than the ordinary railway, while the cost of equipment is proportionally smaller.

STEAM TOWAGE ON CANALS.—According to the *Moniteur Industriel Belge*, a system of steam towage is about to be established on the Bourgoigne canal, over a distance of about 150 miles. The tow path will be laid with a single rail weighing some 16 lbs. to the yard, and fixed on reverse placed 3 1/2 ft. apart. The locomotive has four wheels, two of which are placed di-

rectly along the axis of the vehicle, one in advance of the other, and two, one at either side. The former pair are directing, the latter driving wheels. The directing wheels are grooved, and fit the rail; the others have rubber tires which give purchase on the macadamised road, and which press thereon only to the extent of 0.07 lb. per square inch. By means of simple mechanism, the weight of the machine may be thrown either upon the driving or directing wheels at will. In the first case the maximum and in the last the minimum of adhesion is obtained, to suit the conditions of a loaded or an empty boat. A single road is to be used, with r-lay engines provided at suitable distances. Each locomotive tows one boat; and when a meeting takes place of two travelling in opposite directions, the engines change boats and retrace their paths. This single rail system has already been satisfactorily tested for short distances on the Belgian canals, and the projector, M. Larmangat, has obtained a Government concession for its extended construction for forty years. The locomotives are to weigh four tons each, and will travel at the rate of 3.1 miles per hour, with full boats carrying a cargo of 150 tons each.

COMPETITIVE PROPELLERS.—A recently published report of comparative tests, made by the English line of steamers, between the Hirsch and the Griffiths propellers, shows, says the *Scientific American*, a strong preponderance of advantages in favor of the screws of the former system. The steamship "Herder," was fitted with a Hirsch screw, built for an increased speed and also with a Griffiths propeller. The mean results of ten voyages between Hamburg and New York show for the Griffiths a speed 11.59 knots; time under steam, 10 days, 17 hours, 30 minutes; coal consumed on passage, 572 tons; and 519.05 miles run on 100 tons of coal. For the Hirsch, 13 knots; 9 days and 13 hours; 505 tons and 582.79 miles; a gain of 12 knots per hour, and an economy of 67 tons of coal. The Goethe, of the same line, the engines of which, like those of the Herder, are of 600 horse power nominal, was fitted with a Hirsch screw designed for saving coal. The saving effected was four tons per 24 hours, and this, although the draught of the vessel was one foot seven inches more than when the Griffiths screw was in place. On board the Leasing, another vessel belonging to the same company, the Hirsch propeller caused a gain of 14.7 per cent. in speed. The official reports of the engineers state that the engines driving the Hirsch screw worked exceedingly smoothly, and that there was a noticeable absence of any vibration.

AN IMPROVED FREIGHT CAR.—The expense of hauling so large a proportion of dead weight to the paying load, as is now carried on railroads, has of late years attracted a great deal of attention, and has been the subject of much discussion among railroad managers. Many of our readers will, therefore, be interested in the reported fact that Mr. Richard Eaton, late master of motive power of the Grand Trunk railroad, has devised a car of much less weight than those generally in use, but with the strength and capacity for carrying about one-third more weight.

If this object is attained, the advantages which will result therefrom are, of course, very great. The usual load for ordinary cars is 20,000 pounds, their weight being about the same. A train of 30 cars will, therefore, carry 600,000 pounds of freight. The cars will be of about equal weight, and, with that of the locomotive, the total weight of the train will be 1,300,000 pounds. A train of the improved cars, of equal weight, would consist of 20 such loaded cars. They will, however, each carry 40,000 pounds of freight, or a total of 800,000 pounds, or one-third more than the other train. Three trains of the improved cars will, therefore, transport as much freight as four with ordinary cars. The saving resulting therefrom is, of course, very apparent. These cars are especially intended for the grain traffic of the East and West roads, and their use, it is claimed, will reduce the cost of transportation very materially.

EFFECT OF FROST ON RAILROADING.—Many experiments, says *Nature*, have been tried in France to test the effects of cold on railway axles. Many engineers suppose that accidents to wheels do not result from any diminution of tenacity of the metal, but merely from the road losing all its elasticity owing to the frost hardening the surface of the earth. A fact which can be adduced as a strong argument in favor of that theory was observed by the inhabitants of Montmartre during the last period of frost. The passing of the trains which run so frequently through the Batignolles tunnel at a distance of half a mile, was heard by them day and night, which is never the case in ordinary circumstances. As soon as the thaw set in the trains ceased to be heard; the earth having resumed its former elasticity, the sounds were dissipated as before. It has been observed by French railway engineers that thaws are apt to lead to the breaking of axles and chains. The elasticity being only partially recovered, many shocks affect the trains when running at a fast rate, and are apt to lead to catastrophes.

BLAST FURNACE PROGRESS IN THE NORTH OF ENGLAND.—Notwithstanding that there has been no increase in the production of either iron ore, pig iron, or finished iron, still the smelting capabilities of the north of England have during 1874 made substantial progress, by the erection of twelve new blast furnaces in that region. This will give a possible yield of at least 200,000 tons in excess of twelve months ago.

SCIENTIFIC PROGRESS.

The Future of Telegraphy.

The improvements which have been made during the past five years upon the Morse system of telegraphing are but little less wonderful than the original invention. Ten years ago any operator would have considered a piece of absurd folly the notion that two messages going in opposite directions could be simultaneously sent upon one wire, but the Stearns' instruments have not only succeeded in accomplishing this, but they have also made it possible to use one wire to send four messages at the same moment.

The duplex instrument was followed by the quadruplex, and it is now only a question whether the capacities of a single wire cannot be further multiplied. Mr. Stearns' inventions were simply extensions of the Morse system, and in the view of many practical electricians there are other systems which will prove to be of far greater advantage than it. The automatic telegraph is yet crude, and presents several opportunities for improvement, but it cannot be doubted that with the addition of certain mechanical aids it would approach nearly to the perfection of cheap and rapid telegraphy. The competition between the Morse and the automatic system is developing both, and as successive discoveries increase the speed and diminish the cost of transmission, we approach the period when the telegraph shall be as facile a servant of the public as the mails now are.

All these inventions tend to secure the great object of cheap telegraphing. By the use of the improved methods that are now being worked up the cost of the transmission of messages can be reduced to something near the *pro rata* charged in England, where the telegraph is made a department of the Government, and the tariff placed at a rate above the actual cost. To this end the need of men of large practical experience is most necessary, and it is a matter of no small interest in this direction that Col. Eckert has recently resigned his position in the employ of the Western Union Telegraph to devote his time exclusively to working out to its fullest extent the problem of cheap telegraphy.

The progress of telegraphy in England is far behind what has been achieved in this country. Their systems are so slow and inefficient, as compared with the more advanced systems employed on this side of the Atlantic, that it is claimed our companies may reduce their tariffs to the cost price in England and still realize a profit which shall afford a fair interest on their investments.

AN EXTRAORDINARY CHANGE IN TEMPERATURE.

A correspondent of the *Germantown Telegraph* writes to that journal as follows:

I had an extraordinary experience on the 8th and wish to relate it to you. The morning was cloudy and the temperature mild and pleasant—suitable to go to the interior, one mile and a half distant for firewood. While on the way down to the woods snow commenced falling, the wind being from the south, and continued to snow until within one mile of my home on my way back with the load of wood, when all of a sudden, the wind shifted to the northwest with a perfect fury of snow, cold and dust from the dry roads and fields. The scene was a fearful and an interesting one, and having read of a similar change somewhere in Nebraska, winter before last, I could not but query about my own prospective fate, "am I to perish here from cold when only a mile from home?" The thick clothing seemed to be of no more account than one thickness of linen.

Well, I succeeded in getting home, it was about 11 o'clock, a. m. and the mercury in the thermometer at zero. Before the change of the wind it was at about 30 degrees, and the fall of the mercury was 30 degrees while I was traveling one mile. There was no stoppage on the way and the horses quickened their walk, seeming to be as anxious to get home as I was. Allowing 25 minutes for my traveling one mile, on a good road, the mercury sunk 30 degrees in 25 minutes—a little more than one degree to each minute. The range of the mercury after 11 o'clock was as follows: 12.2 degrees below zero; 1.5 degrees below zero; 3.8 degrees below zero; 4.10 degrees below zero; 5.12 degrees below zero next morning at 6, 20 degrees below zero, and shortly after began to rise, but kept below zero all the time until to-day, the 10th, when at 9 o'clock it got above, and thus has ended an experience such as people in the Atlantic States never see, and only now and then that we do.

[The sudden change in temperature noticed was, no doubt, the result of a sudden down pour of snow from a great height in the atmosphere. —ENS. PRESS.]

DIFFUSIBILITY OF ODORS.—A curious fact, well worthy of attention, is the remarkable diffusibility and degree of subdivision exhibited by some odorous substances. Ambergis just thrown up on the shore spreads a fragrance to a very great distance, which guides the seekers after that precious substance. Springs of petroleum oil are scented at a very considerable distance. Bartholin affirms that the odor of rosmery at sea renders the shores of Spain distinguishable long before they are in sight. So, too, every one knows that a single grain of muck perfumes a room for a whole year, without sensibly losing weight. Haller relates that he has kept papers for forty years perfumed by a

grain of amber, and they still retained the fragrance at the end of that time. He remarks that every inch of their surface has been impregnated by 1-2,691,064,007 of one grain of amber, and that they had perfumed for 11,600 days a film of air at least a foot in thickness. Evidently the material quantity of the odorous principle contained in a given volume of such air is so minute as to elude imagination. We can readily conceive how philosophers cite such instances to give a notion of the divisibility of matter.—*Popular Science Monthly*.

PROGRESS OF CHEMICAL SCIENCE.—Where is the chemist who, living 50 years ago, would have believed that, taking for a starting point the elements of water, air, carbonic acid, azote and oxygen, it would have been possible to compose substances which have nothing analogous in mineral chemistry, such as the odorous principles of fruits; the irritating essences of garlic and mustard; the waxy matters known under the names of Chinese wax, and that of whals and bees; alkaloïds, similar to morphine, quinine, nicotine; the sweet scent of mint; and essence such as camphor; of cinnamon, cummin, aniseed; the acids of ants, of vinegar, butter, valerian, benzoin, sour milk and sorrel; the azotic matter contained in the bile. All these and many more, the chemist creates at his will. If he cannot fix in his retorts the vital principle, he can compose the necessary materials for a living being, and form as he pleases, a new world of immediate principles which are not met with in any known organisms. Thus the domain of organic chemistry grows wider as the functions of these composite types become better known; and yet, after gaining such a high, more extended horizon spread before it, new worlds await the bold explorer, and it is scarcely possible to assign a limit to its progress.—*Chamber's Journal*.

A CONSTANT ELECTRIC LIGHT.—A new and intensely white light has recently been invented and exhibited by Mr. William Dwyer, of Ohio. A thin ribbon of carbon is suspended between two platinum poles and covered by a glass containing dry carbonic acid gas. The ribbon receives an electric current from a battery, and while in the atmosphere of the gas becomes brilliantly incandescent. The carbon is not consumed, and the light is said to be perfectly constant. The method was invented by Prof. Osborn, of Miami University, who at first thought it necessary to use very thin strips of carbon, but the light is now produced with much larger ribbons and with little combustion. The heat generated has never as yet broken the small glass globe containing the ribbons. This light being constant, and not requiring the combustion of carbon, may prove much more useful to scientific lecturers than the ordinary electric or oxyhydrogen lights, both of which are troublesome to handle. The electric light which is so intense and so cheap, when it is produced by motion transformed into electricity by means of magnets, has not yet said its last word; on the contrary, it is still in its infancy. In the end it will no doubt be used all over the world for illuminating lighthouses, ships and workshops, nor must the immense services rendered by electricity during the siege of Paris be forgotten.

IMPORTANT AND INTERESTING TO GOLD ASSAYERS.—Mr. Dillon, the assayer to the Japanese Imperial mint at Osaka, in his report, says: I have very rarely detected iridium during the assay of the fine gold received for coinage, and never in the coins themselves. In the assay of sweep ingots from the melting room, however, it is invariably present in the cornet in such large quantities as to invalidate the accuracy of the assay. I have a piece of gold from the bottom of a pot where the iridium alloy is scattered through the metal in steel-colored crystalline grains of great hardness. As the arrangements of the refinery do not allow of the treatment I proposed for separating the iridium, my only plan has been to distribute the gold of the sweep ingots among several pots, when the iridium appears to alloy with the excess of gold; at least I have never succeeded in detecting any in the resulting bars or coins.

THE ENGLISH CHANNEL TUNNEL appears to be fast assuming shape for the early inception of the enterprise. It has evidently received a new impetus from the late visit of the Lord Mayor of London to Paris, and it is now hoped by the friends of the enterprise on both sides that the work will soon commence. It is estimated that the tunnel can be made in four years, for a million sterling (?) at the outside, and probably in less time and for less money. Experimental operations are to be commenced immediately. A shaft is to be sunk on each coast one hundred and fifty yards deep, and driven thence under the sea in ordinary drifting for a mile and a half, with a downward inclination. These driftings could afterward form the beginning of the tunnel at each end, so that at no very distant day a trip from London to Paris may be contemplated without the horror of "crossing the channel," so long the terror of the timid tourist.

WATER IN GLUE.—Some recently carefully conducted investigations have developed the unexpected fact that 16 to 18 per cent. of water may be obtained from the best of ordinary sheet glue. The presence of so much water was quite unexpected; and the quantity is nearly the same in fresh and in seasoned specimens, it is not a make-weight, although steam is very freely used in the rooms where glue is picked by the manufacturers.

Important to Inventors.—A Correct Decision.

It has heretofore been the practice of the Patent Office to reject applications for patents on former rejected cases. This has always appeared to me to be wrong, because a rejected application is not a live reference. If a first applicant did not see fit to prosecute his case after it was rejected by the office, or introduce his invention to the public, it ought to be considered as an abandoned invention as much so as when a person invents something and fails to make application for a patent within a specified time; and a subsequent and more diligent inventor steps in and secures the patent. In the latter instance the law upholds the diligent man, but in the former it rejects him. Many valuable inventions have been lost to the world, simply because the inventor became discouraged by a rejection, and failed to prosecute his case; and his rejected case would then stand as a bar to every subsequent applicant. Thus the world is deprived of the invention because no one would take the trouble to manufacture what every body else has as much right to make as himself. This rule of the Patent Office has been abandoned and rejected. Cases will not, hereafter, prevent inventors from securing their patents. We append the decision of the Commissioner of Patents in which this "new departure" is taken.

In the matter of the application of George L. Rouse and M. W. Stoddard, for a patent for an alleged "Improvement in Whisls," filed May 18th, 1874.

Appeal From the Examiners-in-Chief.

Two claims are left in the application which the Examiner rejects for want of novelty, citing as reference the patent of P. Murphy, August 12, 1873, and this application of Charles Spofford, filed August 2, 1871, and rejected the 8th day of the same month. The Examiner-in-Chief has affirmed the decision of the Examiner below, on the ground that the patent of Murphy is a good and sufficient answer to the claims of applicants. They have not discussed the pertinency of the rejected application of Spofford, as a reference.

After a careful examination, I have come to the conclusion that the Murphy patent is not a sufficient answer to the claims of Rouse and Stoddard, which are limited to the special construction shown and described by them. It is admitted, however, that this construction of wheel hubs shown and described in the application of Spofford is almost identically the same as that of appellants. More than two years having elapsed since the final rejection of Spofford's claim, his application is regarded as abandoned under the 32d section of the Patent Act.

It is insisted on the part of applicants that, in view of the recent decisions of the courts, a rejected and abandoned application does not constitute a bar to the grant of the patent sought by them. It becomes necessary, therefore, to examine this question and determine the practice of the office in view of the decisions referred to.

Within a few years, several decisions have been rendered in the United States Circuit Court, in which the effect on patents of prior rejected applications has been discussed; but the question did not receive the attention of the Supreme Court, until the case of Brown vs. Guild came up on appeal during the October term of 1873. One of the defenses set up against the Brown patent was an old application filed by Remy and Kelly in June, 1850, which was rejected and withdrawn the August following. The evidence showed that only one machine was ever made by them, and this merely for experiment in the year 1849. In discussing the effect of this application on the validity of Brown's patent, the Court uses the following language:

"The experiment made in 1849, when Remy worked it by hand, was a mere experiment, which was never repeated. It may have presented one or two ideas in advance of other machines, but it can hardly be said to anticipate the machine which we have described as Brown's. Were it not for the application for a patent it would justly be regarded as an abandoned experiment, incapable of being set up against any other claim. Can the fact that such an application was made and afterward voluntarily withdrawn, and never renewed, make any difference? We think not. Had a patent been actually granted to Remy and Kelly, it would have been different. The case would then have come directly within the seventh section of the act of 1836, which makes a 'patent,' or a 'description in a printed publication' of the invention claimed, a bar to a further patent therefor. But a mere application for a patent is not mentioned as such a bar. It can only have a bearing on the question of prior invention or discovery. If, upon the whole of the evidence, it appears that the alleged prior invention or discovery was only an experiment, and was never perfected or brought into actual use, but was abandoned and never revived by the alleged inventor, the mere fact of having unsuccessfully applied for a patent therefor cannot take the case out of the category of unsuccessful experiments." Brown vs. Guild, 6 Off. Gaz., 392.

There can be no mistake as to the meaning of this language; the doctrine is distinctly enunciated that a mere application is not a legal bar to the grant of a patent to a subsequent applicant. This decision must be heeded by the

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Adams Hill Cons M Co	Eureka Nev	6 15 Feb 16	Mar 24	April 16	W W Taylor	408 California st
Alps S M Co	Ely District	8 25 Feb 10	Mar 22	April 12	O D Squire	Cor California & Mont
American Flat M Co	Washoe	5 200 Feb 8	Mar 15	Apr 5	C A Sankey	331 Montgomery st
Belleview M Co	Cal	11 50 Feb 17	Mar 23	April 14	D F Verdenal	409 California st
Bowery Cons M Co	Ely District	30 Dec 15	Jan 25	Feb 28	C E Elliott	419 California st
California S M Co	Washoe	10 300 Jan 8	Feb 12	Mar 5	R Wegener	414 California st
Cedarburg G M Co	Cal	55 Dec 20	Feb 3	Feb 24	D M Boker	215 Sansome st
Cherry Creek M & M Co	Nevad	2 35 Feb 17	Mar 22	April 12	D F Verdenal	409 California st
Confidence M Co	Cal	30 Jan 16	Feb 23	Mar 17	W S Anderson	210 Battery st
Coos Bay Oregon Coal Co	Oregon	1 100 Feb 5	Mar 10	Mar 31	T P Beach	424 Montgomery st
Danby M Co	Washoe	12 100 Jan 12	Feb 16	Mar 9	G R Spinnay	320 California st
Dardanelles M Co	Washoe	2 100 Feb 5	Mar 10	Mar 31	W G Dean	402 Montgomery st
Devon G & S M Co	Washoe	2 100 Feb 16	Mar 20	April 13	W G Dean	419 California st
El Dorado South Cons M Co	Nevada	5 45 Jan 15	Feb 19	Mar 12	W Willis	419 California st
El Dorado Water & D G M Co	Cal	10 100 Feb 16	Mar 19	April 3	H Elias	416 Montgomery st
Empire M Co	Idaho	9 100 Jan 30	Mar 9	Mar 24	W Willis	419 California st
Florida S M Co	Washoe	1 100 Jan 8	Feb 10	Mar 2	L Herman	11 Pine st
Golden Chariot M Co	Idaho	12 150 Jan 4	Feb 8	Feb 23	K Kaplan	Merchants' Ex
Gold Run M Co	Cal	10 100 Jan 5	Feb 15	Mar 10	C Palmer	438 California st
Hale & Norcross S M Co	Idaho	45 500 Jan 8	Feb 11	Mar 5	J F Luchner	419 California st
Ida Elmore S M Co	Idaho	16 100 Feb 1	Mar 8	Mar 29	W Willis	419 California st
Ida Elmore S M Co	Washoe	21 100 Feb 10	Mar 17	April 7	W E Dean	419 California st
Iowa M Co	Washoe	2 100 Jan 12	Feb 15	Mar 10	A D Carpenter	419 California st
Julia G & S M Co	Washoe	21 200 Feb 12	Mar 18	April 6	A Noel	419 California st
Justice M Co	Washoe	13 500 Jan 12	Feb 13	Mar 2	J S Kennedy	Merchants' Ex
Lady Eran M Co	Washoe	5 100 Jan 11	Feb 12	Mar 3	F Swift	419 California st
Madogay G & S M Co	Idaho	1 100 Jan 12	Feb 11	Mar 2	J P Cavalier	402 Montgomery st
Meadow Valley M Co	Ely District	8 100 Feb 11	Mar 23	April 20	J W Colburn	418 California st
Mint G & S M Co	Washoe	9 200 Jan 19	Feb 24	Mar 14	D A Jennings	401 California st
North Bloomfield G M Co	Ely District	18 100 Feb 2	Mar 10	Mar 31	W Willis	419 California st
North Bloomfield G M Co	Cal	1 100 Feb 2	Mar 10	Mar 31	J P Cavalier	419 California st
Page Tunnel Co	Utah	1 50 Dec 12	Jan 20	Feb 20	J Hardy	418 California st
Pbl Sheridan G & S M Co	Washoe	2 75 Jan 21	Mar 2	Mar 30	W R Townsend	330 Pine st
Piech West Ex M Co	Ely District	6 100 Dec 28	Feb 3	Feb 25	T L Kimball	409 California st
Poorman G & S M Co	Idaho	2 100 Jan 12	Feb 15	Mar 17	W Willis	419 California st
Raymond & Ely S M Co	Pioche	3 300 Jan 18	Feb 26	Mar 26	T W Colburn	418 California st
Red Jacket M Co	Idaho	6 50 Feb 1	Mar 9	Mar 30	W Willis	419 California st
Rock Island G & S M Co	Washoe	6 100 Jan 13	Feb 17	Mar 9	J W Clark	418 California st
Silver Cliff M Co	Idaho	1 100 Jan 2	Feb 15	Mar 17	J P Cavalier	419 California st
Silver Hill M Co	Washoe	5 200 Feb 10	Mar 19	April 9	W E Dean	419 California st
South Chariot M Co	Idaho	12 100 Jan 9	Feb 16	Mar 9	CH Bogart	402 Montgomery st
St Patrick G M Co	Idaho	10 50 Feb 17	Mar 8	Mar 31	D F Verdenal	409 California st
Sutro M Co	Washoe	8 200 Jan 22	Feb 24	Mar 16	W E Dean	419 California st
Utah S M Co	Idaho	9 100 Jan 25	Mar 2	Mar 23	L Kaplan	Merchants' Ex
War Eagle M Co	Idaho	2 100 Jan 25	Mar 2	Mar 23	J M Buntington	Merchants' Ex
Ward Ellis S M Co	Robinson District	3 5 Feb 10	Mar 18	April 12	J M Buntington	Merchants' Ex

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Alpine G M & M Co	Cal	8 125 Feb 11	Mar 23	April 14	J F Lightner	418 California st
California and Arizona M Co	Arizona	10 Jan 8	Feb 22	Mar 12	T E Jewell	567 Montgomery st
California Cons M & M Co	Cal	1 100 Jan 14	Feb 16	Mar 5	J W Trapp	408 California st
Carrie Hale Hydraulic M & W Co	Cal	3 10 Jan 10	Feb 24	Mar 17	D W Knapp	Merchants' Ex
Combination G & S M Co	Panamint	5 10 Dec 28	Feb 3	Feb 23	D W Knapp	Merchants' Ex
Con Reform L & S M Co	Lower Cal	2 30 Dec 24	Jan 30	Feb 20	A D Carpenter	635 Clay st
Edith Quicksilver M Co	Cal	2 20 Dec 23	Feb 3	Feb 23	W Stuart	113 Liedersdorf st
Emma Hill Cons M Co	Utah	2 100 Jan 29	Feb 3	Feb 20	G J Cole	302 Montgomery st
Enterprise Cons M Co	Cal	1 125 Dec 26	Feb 6	Mar 3	F J Hermann	418 California st
Equitable Tunnel M Co	Utah	9 25 Jan 12	Feb 17	Mar 9	C S Healy	Merchants' Ex
Gold Mountain O M Co	Washoe	9 100 Dec 29	Feb 7	Feb 20	E F Seane	419 California st
Hayes O & S M Co	Mariposa Co Cal	4 100 Jan 25	Mar 6	Mar 31	J P Cavalier	418 California st
Illinois Central M Co	Idaho	1 30 Dec 24	Jan 30	Feb 20	W A M Van Bokkelen	419 California st
Keams Cons Quicksilver M Co	Cal	1 30 Dec 28	Feb 8	Feb 22	R H Brown	402 Montgomery st
Little Panache Quicksilver M Co	Cal	1 20 Feb 1	Mar 4	Mar 25	W E Dean	419 California st
Occidental M Co	Nev	3 30 Feb 2	Mar 9	Mar 29	A K Denbrow	418 California st
Old M Co	Bear valley Cal	2 100 Jan 2	Mar 2	Mar 25	J P Cavalier	418 California st
Patten M Co	Washoe	20 Feb 3	Mar 4	Mar 28	L Hermann	330 Pine st
Pinto M Co	White Pine	10 Jan 9	Feb 15	Mar 8	A K Denbrow	418 California st
Prussian G & S M Co	Nye Co Nevada	3 100 Jan 12	Feb 18	Mar 12	R H Brown	402 Montgomery st
San Jose M Co	Egan Canon	6 500 Jan 21	Mar 8	April 13	A Carlgan	109 Front st
Silver Cloud G & S M Co	Cal	25 Feb 8	Mar 15	April 12	A A Enquist	71 New Market st
Silver West Cons M Co	Enreka Nev	3 100 Jan 13	Feb 20	Mar 15	R Bunker	606 Montgomery st
Table Mt Alpha M Co	Washoe	6 100 Feb 5	Mar 15	April 5	T F Cronis	433 California st
Table Mt Alpha M Co	Washoe	6 100 Feb 5	Mar 15	April 5	T F Cronis	433 California st
Webfoot M Co	Elko Co Nev	1 25 Jan 23	Mar 3	Mar 30	D A Jennings	401 California st
Wyoming G M Co	Cal	5 50 Jan 13	Feb 27	Mar 18	J M Buntington	Merchants' Ex
Yarborough S M Co	Kern Co Cal	6 30 Dec 23	Jan 30	Feb 23	E Barry	415 Montgomery st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Etina Gravel M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 23
Altona Gravel M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 23
Essex Quicksilver M Co	Cal	R Wegerener	414 California st	Annual	Feb 24
Golden Chariot M Co	Idaho	L Kaplan	Merchants' Ex	Annual	Mar 1
Haves O & S M Co	Cal	R Spinnay	320 California st	Special	Feb 25
Independence Cons M Co	Washoe	F J Hermann	418 Kearny st	Annual	Mar 3
Justice M Co	Washoe	D Wilder	Merchants' Ex	Special	Mar 18
Omega Table Mountain M Co	Cal	D Wilder	Merchants' Ex	Annual	Feb 24
Patten M Co	Washoe	F J Hermann	418 Kearny st	Annual	Mar 3
Sutro Tunnel Co	Washoe	P W Ames	329 California st	Annual	Mar 4
Tintic M & M Co	Utah	H C Miller	411 1/2 California st	Annual	Mar 4
Vivian G & S M Co	Idaho	H S Pritch	535 California st	Annual	Mar 4

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co.	Washoe.	H. C. Kibbe.	419 California st	3 00	Jan 11
Belcher M Co.	Washoe.	W. L. Oliver.	419 California st	25	Jan 11
Chariot M & M Co.	Cal	Frank Swift	419 California st	40	Nov 16
Consolidated Virginia M Co.	Washoe	D T Bailey	401 California st	3 00	Feb 11
Crown Point M Co.	Washoe	C E Elliott	414 California st	2 00	Jan 12
Ida Elmore S M Co.	Idaho	J C Cassett	220 Clay st	50	Jan 25
Eureka Consolidated M Co.	Nev	W W Taylor	419 California st	50	Feb 5
Rye Patch M Co.	Nevada	D F Verdenal	409 California st	50	Feb 5

Commissioner of Patents, and govern him in regulating the practice of the office. I have had frequent occasion to state my views on the necessity of harmony between the practice of the Patent Office and the rulings of the Courts. There can be no question about the propriety of this course. The Commissioner ought not either to issue patents which the courts will declare invalid, or to refuse the grant on grounds which have already been considered judicially and declared insufficient. But it will be noticed that the Supreme Court does not entirely ignore abandoned applications, for it is stated that they have a bearing on the 'question of prior invention or discovery,' and the effect of the application is made to depend on the question of actual use of the invention described therein.

It has been urged in argument that if no objection appears to the grant sought by Rouse and Stoddard, except the abandoned application of Spofford, the Commissioner should issue the patent and allow the question of public use to be determined hereafter in the courts. The suggestion must have its origin in a misconception of the duty of the Commissioner of Patents. The law makes him something more than a mere ministerial officer, whose function is to issue letters patent simply for the asking. The Commissioner is made the guardian not only of the rights of inventors, but also of the interests of the public. It is just as solemnly his duty to refuse to issue a patent which clearly ought not to be granted, as to grant the issue when the applicant shows an unimpeached right to the invention.

In this case, if without further inquiry the Commissioner should issue a patent to Rouse and Stoddard, and it should afterwards appear that the invention of Spofford was put into

public use, it would be invalid, as I understand the decision which has been quoted. It is his duty, therefore, to inform himself on this question, if possible, and the application of Spofford indicates the direction in which inquiry may be made. The only question in my mind is how to prosecute the investigation. The law restricts interferences to unexpired patents and pending applications. An interference, therefore, cannot be declared with an abandoned application. I have no doubt whatever, however, that the Commissioner of Patents has ample authority to institute an *ex parte* inquiry at any time, for the purpose of determining whether or not a statutory bar exists to the grant of a patent for which application is pending. This is necessary to enable him to comply with the statute. Unsatisfactory as *ex parte* evidence may be, it appears to be the only source of information open to the Commissioner in cases like the present, without further legislation, and I do not believe that in a single instance a patent should issue for an invention shown in a prior abandoned application without an attempt, at least, to settle the question of public use.

The decision of the Examiner-in-Chief, affirming the Examiner on reference to the patent of Murphy, is reversed. The application of Rouse and Stoddard is remanded to the Examiner, who is instructed to forthwith dispatch letters of inquiry to the applicant Spofford, and to his attorney or record, for the purpose of ascertaining whether the invention of the former has been brought into actual use. At the same time they will be informed that an application is now pending for the same invention, and that the inquiry is made for the purpose of determining the right of subsequent applicants to a patent therefor. Information furnished

by them should be in the form of affidavit, clearly and fully setting forth the facts in the case. Counter affidavit will also be received from applicants if they so desire. The issue of a patent will be determined by the information thus received.

Until otherwise ordered, this will be the rule and practice in the Patent Office in like cases.
J. M. THACHER,
Commissioner of Patents.

Ex. A. E. B., Jan. 28, 1875.

Mining Stocks.

The mining stock market still continues in a depressed condition; prices being low. Transactions for the past week have been few compared with the usual business of the Board. The news from the bonanza mines continues good, and a few years ago news like that now received, would send stocks to "top shelf" prices. Now, however, the atonement is so great that hardly anything can insure a rise. Everybody seems to be waiting for prices to touch bottom so that they can all get in before a rise. Some very heavy sales of Consolidated Virginia were made this week, which caused a temporary excitement. The strike in Woodville and the rise in Searge helped to enliven things a little, but the market generally has been dull.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, FEBRUARY 11.	THURSDAY, FEBRUARY 18.
MORNING SESSION.	MORNING SESSION.
315 Alpha.....150 1/2	250 Alpha.....150 1/2
3315 Best & Belcher.....51 1/2	905 Best & Belcher.....51 1/2
530 Belcher.....36 3/4	520 Belcher.....36 3/4
50 Bullion.....8 1/2	285 Bullion.....8 1/2
450 Chollar.....56 1/2	240 Bullion.....56 1/2
170 Crown Point.....28 1/2	38 Chollar.....56 1/2
100 Julia.....15 1/2	380 Crown Point.....28 1/2
50 Con Virginia.....45 1/2	270 Confidence.....15 1/2
1250 California.....25 1/2	125 Con Virginia.....45 1/2
300 California.....18 1/2	585 Con Virginia.....45 1/2
100 G. Hill.....1 1/2	210 California.....18 1/2
175 Dana.....8 1/2	210 California.....18 1/2
280 Empire.....6 1/2	700 Dayton.....3 1/2
90 Exchequer.....17 1/2	138 Empire.....6 1/2
250 Keweenaw.....14 1/2	150 Gold & Curry.....19 1/2
1050 Gould & Curry.....6 1/2	300 Globe.....16 1/2
20 Hale & Norcross.....38 1/2	45 Hale & Norcross.....42 1/2
880 Imperial.....8 1/2	40 Imperial.....8 1/2
100 Julia.....15 1/2	40 Justice.....8 1/2
180 Jack.....12 1/2	140 Justice.....8 1/2
70 Justice.....8 1/2	650 Kentuck.....16 1/2
110 Knickerbocker.....4 1/2	20 Knickerbocker.....4 1/2
250 Keweenaw.....14 1/2	50 Lady Bryan.....6 1/2
880 L. Bryan.....8 1/2	75 Lexington.....2 1/2
075 Mexican.....23 1/2	165 New York.....3 1/2
385 Overman.....25 1/2	400 Ophir.....12 1/2
470 Succor.....12 1/2	65 Occidental.....4 1/2
920 Savage.....25 1/2	200 Silver Hill.....3 1/2
180 S. Nevada.....12 1/2	225 Savage.....16 1/2
100 S. Belcher.....37 1/2	300 Sierra Nevada.....11 1/2
470 Succor.....12 1/2	400 Succor.....12 1/2
850 U. Consolidated.....12 1/2	100 Silver Hill.....3 1/2
	100 Senator.....7 1/2
	75 Union Con.....7 1/2
	150 Union Con.....7 1/2
	315 Ray & Ely.....14 1/2
	415 Eureka Con.....14 1/2
	210 Am Flag.....14 1/2
	45 Belmont.....3 1/2
	300 Newark.....30 1/2
	100 Rye Patch.....3 1/2
	370 Rye Patch.....3 1/2
	400 Prussian.....50 1/2
	70 Mansfield.....9 1/2
	200 Golden Chariot.....44 1/2
	1000 Bootle.....15 1/2
	100 Ida Elmore.....15 1/2
	300 Bullion.....28 1/2
	770 Bullion.....28 1/2
	50 Silver Hill.....3 1/2
	150 Silver Hill.....3 1/2
	150 Challenge.....6 1/2
	250 Golden Chariot.....44 1/2
	1250 California.....25 1/2
	500 New York.....3 1/2
	100 Occidental.....4 1/2
	350 Philadelphia.....10 1/2
	225 Am Flat.....3 1/2
	9500 Woodville.....52 1/2
	50 Mint.....25 1/2
	215 Washington.....3 1/2
	800 Kossuth.....4 1/2
	470 O. G. Hill.....3 1/2
	200 Jack Little.....24 1/2
	100 Peabody.....3 1/2
	330 Adams.....6 1/2
	200 Omega.....2 1/2
	925 Wells-Fargo.....50 1/2
	100 North Carson.....3 1/2
	2700 Niagara.....50 1

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE COUNTY.

GLOBE.—Alpine *Chronicle*, February 6: Good progress is being made in the tunnel of this mine, running on the banging wall of the vein. The vein carries a large amount of iron pyrites and some yellow copper. This week a cross-cut through the vein was commenced, and, as the vein is large and the indications good, pay ore may be expected at any day.

AMADOR COUNTY.

THE MILLS AT SUTTER CREEK.—Amsdor *Ledger*, February 13: We learn that the mills at Sutter creek are grinding out their usual grists of gold, and the mines at Amsdor City still keep up their former gold reputation. The Phoenix at Plymouth, is steadily turning out its treasures, and has long ranked as one of the most valuable mines in the county. The last accounts from the Alpine represents the ore as being of an excellent quality, and that the mine improves as work progresses.

MINING ITEMS.—Pleasant gravel claims in the vicinity of Jackson and Sutter creek, are still attracting attention, and active preparations are making for mining on a number of them on an extensive scale. The gravel in Downs & Co.'s claim is looking very well, and gives a fine prospect to the pan, at points far above the bed-rock. A heavy blast of powder will be let off in the mine to-day, which, it is calculated, will upheave an immense amount of gravel.

AMADOR QUICKSILVER MINE.—The reduction works of the above named mine has been completed and is now being thoroughly dried. We learn the retort will be charged with ore on Monday next and then a practical test will be had of the value of the rock, and the fact established that the Amador mine will, in a short time, have quicksilver from its reduction works in the market. The ore from this mine is remarkably rich.

BUTTE COUNTY.

MINING ITEMS.—Oroville *Mercury*, Feb. 12: We are satisfied now that there was some truth in the rumor that the Cherokee mines were not likely to prove a failure. Our belief arises from seeing some little nuggets of gold from the mines left on the counter of Ridout, Smith & Co., for shipment to San Francisco. The little ohunks have a stamped value of \$62,000, and the Superintendent of the mine, Mr. Gregory, says they had to work twenty-five days to get it.

The Thompson's Flat of an early day has passed away. Although there may be good mining ground left, still but few attempt to get a living by that method. The most of the houses have been taken down and put up again on ranches, and are now the homes of farmers. Nearly all the land in the vicinity has been entered for agricultural purposes.

CALAVERAS COUNTY.

HYDRAULICING.—Calaveras *Chronicle*, Feb. 13: Very favorable progress is being made in opening and developing the great hydraulic claim in Happy valley, owned by George Emerson. The flume, a mile in length, is now laid, and the cutting of the ground-slucice through solid bed-rock, to reach the lowest point in the mine, is nearly completed. Quite an area of surface and a large quantity of tailings have been washed away, and new ground that prospects handsomely is being uncovered. The work of opening the mine has been tedious and expensive, but it has been done in a most thorough manner. A large force of hands is at present employed. All the appliances of the mine are first-class, and when fairly opened it will rank among the most extensive mining operations in the county.

WEST POINT ITEMS.—Forty tons of ore from Miller & Co's mine yielded \$28 per ton. The ore is slightly rebellious.

At the Mina Rica four men extracted about twelve tons of ore per day. The daily yield can be increased to fifty tons per twenty-four hours if necessary. The Superintendent recently let a contract to run a tunnel to tap the quartz vein formerly owned by San Francisco parties.

The Good Faith tunnel, the most substantial enterprise in the district, is in 200 ft.

Wickman & Co. have found good pay ore near the Pascoe mine.

The main shaft of the Boston is down 90 ft, showing an eighteen-inch vein worth \$25 per ton.

The Josephine shows now ten ft wide, about five ft of this being solid ore. The mine will probably change hands in a very short time.

Some 70 tons of croppings and float, obtained at the Woodhouse, and valued at \$40 per ton, is being crushed at Harris' mill.

The Big Flat mine continues to yield ore which shows more gold than any other produced in this State. The chimney is slightly lengthening and somewhat wider.

The Onetom mills are running at full capacity.

A LARGE number of small mines are being vigorously attacked since the fine weather set in.

COLUSA COUNTY.

SILVER.—Colusa *Sun*, Feb. 13: There is considerable excitement out on the mountains over the discovery of an immense body of ore, supposed to be silver. J. W. Brim, of Bear val-

ley, discovered the body of ore eleven years ago, but, like all old miners, he did not suppose there was "anything valuable in the Coast Range!" He concluded, however, last week, that he would go out and take a look at it, and locate it "rough at a venture." He brought in some of the ore and with a blacksmith's forge run out a quantity of some kind of white metal exactly like silver, but whether it is all or any portion silver, we have not, up to going to press, been able to determine. If the metal he gets is silver, it will go many thousands of dollars to the ton. The mine discovered some time ago by Mr. Gaither, of Indian valley, assays some ten or twelve dollars to the ton in silver, and gets richer as they go down on it.

EL DORADO COUNTY.

GUKENWOOD AND GEORGETOWN.—Cor. *Mountain Democrat* (Placerville), Feb. 13: At the International mine operations are being pushed with energy, all the men being employed for whom they can find accommodations. Fine reduction works are to be erected immediately. Operations have been commenced on the Five Cent Hill mine, with a fair prospect of success.

From the famous Woodside mine, at Georgetown, come reports that the ore continues very rich. A large amount of gold will doubtless be taken from this mine within the next thirty days.

The Taylor mine is in course of successful development under the management of Walter Schmidt, the battery crushing fifteen tons a day and is never idle. About twenty men are employed at this mine at present.

The Garded valley mine has reached a depth of about 50 ft, showing a ledge of from four to six ft in width, that prospects splendidly in fine gold disseminated all through the ledge.

KERN COUNTY.

SUMNER MINE.—Kern County *Courier*, Feb. 13: Mr. Nelson, of Kernville informs us that the new hoisting works of the Sumner mine work admirably. They were not long in clearing the mine of water. A large force are engaged taking out rock. The mill will be started in six weeks. The town is growing rapidly. Lots sell at high figures, and efforts are being made to straighten up the irregularities of early times, that occurred before the great future of the place was foreseen, by conforming to a regular survey.

NAPA COUNTY.

MINING ITEMS.—St. Helena *Star*, February 11: Dr. Michel and Mr. J. J. Dickinson are in full blast on their copper ledge in Moore cañon. They are now running a tunnel in on the ledge and expect within two days to make a good showing. The last assay of their ore (made at University of California) gave \$3.50 gold, \$12.50 silver, and \$82.50 in copper.

There is a company being formed to work the Alum mine east of this place, mention of which we made last week, as having been discovered by Messrs. Hull and Bryant. The ore is fully 50 per cent., and they have hopes of striking it much richer, by going in on the bluff, where it crops out.

Mr. John Walton has, within the last week, located two deposits of chrome iron. One near the town of Calistoga, and the other near the Adobe in Chiles' cañon.

ITEMS.—Napa *Reporter*, February 13: During the storm a number of the mines had to suspend work on account of surface water, and in many instances considerable damage has been done, and it will require time and labor to put them in working condition. Of late there has been an unusual amount of activity shown in many stocks, some very important sales have been made of mines to capitalists who are making extensive preparations to work these claims in a thorough business like manner.

Capital is what we want amongst us. We have the mines, but it requires money to develop them. Pine Flat and vicinity next spring will present a lively front for many operations. The Cressus mine, near the Little Geysers, has been sold for \$200,000. The purchasers are Messrs. Carr and Ralston. It is their intention to put up extensive works for reducing their ores. This mine is considered one of the richest in Cinnabar district.

NEVADA COUNTY.

MURCHIE MINES.—Nevada *Transcript*, February 10: The mines owned by the Murchie's are all being worked to their fullest capacity and are looking first-rate. Rich rock is being taken out of the two quartz ledges, and the gravel in the hydraulic claim prospects splendidly. Hoisting works have not yet been erected at the Lone Star, but it will be done some time soon.

GOLD RUN MINE.—We took a walk yesterday out to the Gold Run mine, on Gold Flat. We found everything working in first class order. The company have put up heavy machinery of the best kind, and it is running as smoothly as it is possible to do. The incline is now down 250 ft, and drifts are being run both ways from the shaft. The ledge is eighteen inches thick and is looking pretty well. The rock is being hauled to Jones & Keith's mill to be crushed. There are eight men at work underground at Gold Run, and more will doubtless be put on as room is made for them. Superintendent Montgomery works everything to advantage around the mine, and expects, when he gets the drifts in a couple of hundred feet, to find rock that a look at will banish the blues.

NEW HOISTING WORKS.—Pothill *Tidings*, February 13: The new hoisting and pumping machinery being put up by the Orleans Company on the Wheel Betsey mine, will be ready

to start in a very few days, and is said to be of capacity to go down 1,200 ft if necessary. This claim is believed to be a good one, and the company seem determined to bring its light out from under the bushel.

The oldest mine now being worked in this district is the Empire, better known as the Opbir. It has had its ups and downs for over twenty years past; sometimes gaily prosperous, at others only fairly so; again hardly paying expenses, and several times so long under a cloud that it was thought the pumps must come up and the works be abandoned. Pluck, however, carried it over every rifle, and to-day it is one of our best mines. Last month the yield was \$22,000, and appearances underground are said to justify the expectation of its continuing a paying property for years to come. Owners of other mines, once prominent, but now idle, and, while idle, worthless, should profit by the example of the Empire and push ahead their works.

PLACER COUNTY.

A BONANZA.—We understand that a genuine bonanza has been struck at the Green mine. The old pay chute, from which about \$80,000 was realized above the 100 ft. level, when the mine was being worked some two years ago, has been struck in the drift, at a depth of some 300 ft, and the rock is as rich as ever. The rock taken out now is, from what the miners say, beautiful to behold. The new steam mill, at the mine, is fast approaching completion, and when it gets in operation on this rich rock we may look for some of the bright old cleanups that characterized this mine in the days of its youth.

BOOTH MINE.—On a short visit to this mine, yesterday, we were happily surprised to note the great improvements that have been made on the works recently, and the way the work is being pushed ahead under the supervision of R. E. Meyer. The rich character of the rock which the mine has produced and is producing, considered in connection with the width of the ledge, and the great breadth of the pay chute, which latter is already developed to the extent of about 200 ft, makes this, almost without exception, the most promising young mine in the country. The main shaft is down about 135 ft, and the most encouraging feature of all, perhaps, is the fact that the deeper they sink the better is the quality of the ore. An assay of rock from the bottom of the main shaft, made a short time ago, went \$86 per ton. A new winch has recently been erected for hoisting. Just now, besides stopping rock from between the two shafts above the 65-ft. level, to keep the mill running, a force of men is engaged in driving the west drift, and another force in sinking the main shaft. As fast as the rock is taken out it is hauled to the Eclipse mill and crushed. The mill is running now on rock from the slope above mentioned, which is turning out from \$25 to \$30 per ton.

SONOMA COUNTY.

LOCAL MINING ITEMS.—Russian River *Flag*, Feb. 11: Four tons of ore from the Georgia, reduced in the Missouri's retorts, yielded 7 flasks of quicksilver, which is about 15 per cent.

The new owners of the Socrates have 60 men at work at the mine.

A SILVER bearing ledge located about two miles from Pine Flat, between the Sausal and Calistoga roads, is attracting considerable interest in town. Assays of the rock show the precious metal in paying quantity. The mine is named the Humboldt, but its supposed richness has caused it to be spoken of as the "Bonanza," by which name it is more familiarly known. The owners are A. Wright, H. K. Brown, R. Gilbride, P. W. Sterling and Thos. Smith. Some of the ground has been sold for \$1 per foot.

There are 20 men at work on the Occidental. One tunnel is in 70 feet, another 40 and another just begun. A railroad has been put in the main tunnel.

Nevada.

WASHOE DISTRICT.

OPHIR.—Gold Hill *News*, Feb. 11: The mine is looking splendidly throughout. All the ore breast and stopes from the 1300 to the 1465-ft levels are looking splendidly and yielding the usual amount of rich ore. Sinking the north winze on the 1465-ft level is making good headway, the bottom still in ore of the richest possible character. A cross-cut has been started on the 1700-ft level, to determine the value of the ore vein in that portion of the mine. The Mexican north drift on the 1465-ft level is showing improvement. Work progressing well at all points.

IMPERIAL-EMPIRE.—Driving south along the west wall of the ledge on the 2000-ft level, to connect with the bottom of the winze for air purposes is making good progress.

DAYTON.—The face of the main south drift on the third station level is in quartz and ore of a very fine character.

SIERRA NEVADA.—Sinking the new shaft is progressing finely, the rock in the bottom working quite soft.

GOULD & CURRY.—Driving the north drift on the 1700-ft level is steadily advancing to meet the south drift from the winze on the Best & Belcher line.

SAVAGE.—Preparations are being made for soon opening the 2200-ft etation, and starting a drift to out and prospect the ore vein on that level.

CALIFORNIA.—Cross-cut No. 2, on the 1500-ft level has penetrated exceedingly rich ore within the past two days. It is now in this ore between six and eight feet, and the character of the ore is such as to show conclusively that the

main bonanza has now been reached. It is the richest description of black sulphuret and chloride ore, and assays well up in the hundreds. The drift running north from crosscut No. 1 is also in ore of the same character, and of the same great value. Crosscut No. 3, to the northward on the same level, is passing through low grade ore, but is not far enough east by 20 or 30 feet to cut the rich ore found in crosscut No. 2. In due time the rich ore will, undoubtedly, also be reached at this point.

CONSOLIDATED VIRGINIA.—The new C. & C. shaft is down 200 ft., the sinking making rapid progress. A portion of the new hoisting machinery for this shaft is being received on the ground, and will be erected, ready to take the place of a donkey engine now used for doing the hoisting, as soon as a sufficient depth is reached to render the present light machinery of no further avail.

BELOCHEN.—Daily yield, 450 tons of ore. The ore breasts show no material change during the past week, but are all looking and yielding well. The main incline is down 155 ft. below the 1,500-ft. level, the bottom in hard blasting rock. The north winze on the 1,400-ft. level is down 83 ft. The middle winze on the 1,400-ft. level is down 72 ft., and the south winze on the same level is down 91 ft. The bottom of all these winzes are in good ore.

WOODVILLE.—A very important strike has been made during the past few days, in the north drift, on the 300-ft. level. A body of rich sulphuret ore was struck, average assays of which give \$80 per ton, mostly silver. The main drift has been pushed ahead through this body of ore, a distance of 30 ft., and a cross-cut driven to the westward 25 ft., both of which drifts show the ore body to be well defined and of the same rich and even character. The mill is kept steadily running on ore from the mine.

SUTRO.—The face of the main west drift is still in hard blasting rock, interspersed with numerous seams of white crystallized quartz. The face of the drift is evidently approaching the main ledge found in the shaft, sunk on the hillside above, and abandoned on account of the heavy flow of water struck.

CAWON POINT.—The main incline is down to the 1,700-ft. level, and preparations are rapidly being completed for opening a new station and starting a drift at that point to cut the ore vein. The east cross-cut on the 1,600-ft. level is steadily approaching the ledge, the rock in the face working quite soft. The ore breasts on different levels show no particular change. Daily yield 450 tons of ore. The mills are kept steadily running on ore from the mine.

OVERMAN.—During the first part of the week a strong flow of water was struck in the bottom of the shaft, which has filled the mine and shaft to about 20 ft. above the 1,000 ft. station. This has necessarily caused an entire suspension of work in the mine.

JULIA.—The main south drift on the 1,000-ft. level is being driven rapidly ahead following the west lay wall of the ledge. A much stronger flow of water has been encountered which has somewhat retarded progress.

BUCKEYE.—The ledge has greatly straightened on during the sinking of the last 50 ft., and strong hopes are entertained of finding good paying ore when the ledge is reached.

UTAH.—Preparations for the erection of the new powerful pumping machinery is progressing finely.

IOWA.—It is the intention of soon commencing a new shaft for deep working purposes. This will necessitate the erection of good machinery and place the mine in a condition for a speedy and thorough development of its resources.

ORIGINAL GOLD HILL.—The main south drift is going ahead in fine ore indications. Another cross-cut is being made from the main north drift, which is in ore.

LADY BRYAN.—Cross-cut No. 3, on the 180-ft level, has shown a fine improvement in the character of the ore penetrated. Average assays of the ore give \$50 per ton, mostly silver, and the ore shows improvement as the drift advances.

LEO.—The ledge matter in the face of the main tunnel continues of a very favorable character, carrying many seams of quartz, some of which are rich.

LADY WASHINGTON.—The important strike of rich ore just made at the 300-ft level of the Woodville, bears directly towards the Lady Washington, being undoubtedly upon the same ledge, and only a few hundred feet distant.

JUSTICE.—Connection being made at the 400-ft level with the main Justice shaft, the air circulation through the Waller Defeat section is now excellent, and that level is being actively developed.

PHIL SHERIDAN.—The winze below the bottom of the main west drift makes good progress, with a little water coming in. It is sinking in the ore streak developed by the tunnel, and some very good assays are being obtained.

UNION CONSOLIDATED.—The face of the northeast cross-cut is still in ledge material of a very favorable character, with strong seams and streaks of quartz and low grade ore.

GENESSEE No. 2.—Some good looking streaks of quartz are being met with at present at the bottom of the shaft, some of them carrying metal.

JACOB LITTLE.—Both west drift and cross-cut are showing finely and bid fair to soon develop a good paying body of ore.

WELLS FARGO.—Sinking the main shaft is making fine progress, with strong indications of soon reaching the ore vein.

MEXICAN.—The north drift on the 1465-ft level is driven rapidly ahead, with a steady improvement in the quality of the ore.

(Continued from Page 114.)

some experience, to \$7.50, and, in rare cases, even \$10, for remarkable experience or unusual success. One may set the average at \$2.50.

CONDUCTORS—On horse cars, \$2.50 a day for from 14 to 16 hours. On steam cars, from \$3 to \$5, according to experience, responsibility and kind of service.

COPPERSMITHS—\$3 to \$4 for each work as pipe, stills, tanks, vats and kettles.

DRESSMAKERS—\$10 a week in shops; those who go to the houses of their employers receive from \$2 to \$3 a day and board.

DRIVERS—On horse cars \$2.50 a day for from 14 to 16 hours. Drays and trucks, \$2.50 to \$3 for 10 hours. Express and delivery wagons \$1.50 to \$2.50, and found. Coach and hack-drivers, \$1.75 to \$3, and found.

EDITORS—Those who are also proprietors, and manage their own affairs, have incomes not to be commonly known, or at least generally stated. Employed editors, local, commercial, etc., receive from \$100 to \$250 a month. A few surpass the figure, but not a sufficient number to seriously affect the average already stated.

ENGINEERS—For stationary engines, in mills and mines, wages range from \$2.50 to \$5 a day. On railroads, from \$3 to \$4; on steamboats and steamships, from \$2.75 to \$5.

ENORAVERS—Generally work by the piece. When employed upon salary they receive from \$4.50 to \$6. In cases of remarkable skill or of unusual urgency they command as much as \$10 and even \$12.50 a day.

FARMERS (OR RANCHERS)—This year farm hands are getting an average of about \$35 a month, with board. During harvest they receive \$40, \$50, and even \$60. This is lower than the average of former years.

FLORISTS—\$40 to \$50 a month and board. Flowers grow so naturally here and, consequently, require so much less care, that florists' wages are relatively lower than one might, at first thought, otherwise expect.

FOUNDRYMEN—Workers in iron command from \$3.75 to \$4. Some extra skillful molders get \$5; core makers, \$3.50 to \$4; stove mounters, \$3 to \$3.50. Workers in brass, cupola or furnace tenders, \$3 for 11 hours; molders, \$3 to \$3.50 for 10 hours; and finishers, \$3 for 10 hours.

GARDENERS—From \$45 to \$60 a month, with board, or from \$2.50 to \$3 a day for short jobs; the constancy and fineness of the climate rather work against them as against florists.

GAS-FITTERS—From \$30 to \$50 a month and found. Generally work nine hours a day in the shop.

GILDERS—\$3.50 to \$5, rising, in rare cases, to \$7.50.

GLAZIERS—\$2 to \$3.50 a day; occasionally \$4. Usually rank with painters.

HARNESSE-MAKERS—\$2.50 to \$5; average about \$3. Commonly classed with saddlers.

HATTERS—Command \$4. Those here are very skillful, but their number is not great.

HOTELERS—From \$30 to \$40, in large livery and horse-car stables, to \$75 and even \$100 in the private stables of wealthy citizens.

JEWELERS—\$3.50 and \$4 to \$5; diamond setters get from \$6 to \$7.50.

LAUNDRYMEN—\$30 and \$40 a month and board; women, the same. These are the rates in large laundries. In private families, women get as high as \$40; more commonly, \$25.

LITHOGRAPHERS—Draughtsmen and engravers, \$5 a day for eight hours; printers, \$4 for same time.

MACHINISTS—From \$3.50 to \$4 for from nine to ten hours. In some mills or factories, \$5.

MASONS—\$4 and \$5; foremen, \$6 to \$7.50.

MILLINERS—\$1.50 to \$2.50. Many work by the piece, and make from \$2.50 to \$4.

MINERS—In this calling, also, the extreme diversity of occupation from the merely manual labor of coal-mining to the higher and more scientific branches of gold, silver and quicksilver extraction, is so great that one can safely give no general average. Wages range all the way from \$1.50 to \$2 a day for sinking shafts, running tunnels, timbering, etc., to \$3, \$4, \$5 and even \$7.50 a day for running retorts, superintending amalgamators, separators, stamp-mills, etc. The general superintendents of some of the richest mines get from \$250 to \$500 a month, and the last figure is by no means the highest limit.

MODEL OR PATTERN MAKERS—\$4 a day. When working by the job or piece, from \$5 to \$7.50. As a rule, all over the city, pattern makers belong to the engineers' or machinists' department, and, hence, work the same number of hours a day. Boys generally start at \$2.50 a week.

MOLDERS—Loam molders for dry castings, \$5 a day; green sand-molders, \$4.

NURSES—First-class female nurses readily command from \$15 to \$20 a week. The former price is the more general.

OPERATIVES OR MILL-HANDS—Cotton factory: As the entire State contains but

few cotton factories, and those working upon a limited line of goods, there is no general demand for operatives. At present the wages average very nearly the same as those paid in the woolen mills, as subjoined:

Woolen Mills—Sorters or graders, \$2.50 a day of eleven hours; carders the same; foremen in both departments, \$4 to \$4.50; card tenders, all Chinese, 90 cents; spinners, \$2.50. In this department most of the work is done by self-operating machines, tended by Chinamen or boys at 90 cents.

Weavers—Same as spinners. Loom fixers and tenders \$2.50 to \$3.

Finishers—Four or five white men get \$2.75.

In nearly all these departments Chinamen do almost the whole, and receive the uniform price of 90 cents a day of 11 hours. Foremen in each department average \$4.50 a day.

PAINTERS—Carriage painters, \$4; house painters, \$3.50; ship painters, \$3; and sign painters from \$5 to \$15. Plain lettering brings 12½ cents a foot; gold lettering, on glass, \$1 a foot.

PAPER-HANGERS—Commonly work by the job; when paid by the day, they rank with house painters and get the same wages, \$3.50.

PIANO MAKERS—Are very few; they commonly rank with cabinet makers, getting an average of \$4 or \$4.50 a day.

PIANO TUNERS—\$2.50 for each instrument, or \$5 a day when employed at regular wages.

PLASTERERS—Generally rank with masons, and command \$4.50 a day.

PLUMBERS—\$4 to \$4.50 for nine hours, though ten hours is fast becoming their standard, as it is, generally, in most mechanical or industrial pursuits.

POLICE—Patrolmen \$125 a month.

PRINTERS—Job work \$3.50 to \$4; foremen, \$5; boys, \$1 to \$2.50. Ruling rates per 1,000 ems range from 50 to 60 cents.

REPORTERS—Ordinary reporters, writing long-hand, receive from \$15 to \$40 a week, according to experience and ability; a few get \$50. Phonographic reporters get from \$5 to \$10 a day, or a case, for reporting, and from 15 to 25 cents a folio for transcribing.

ROGERS—\$4 for nine hours; over-time or Sunday work, 75 cents an hour. Foremen, \$5.

SADDLERS—Quite variable, ranging from 2.50 to \$5; averages about \$3.50.

SAIL-MAKERS—From \$3 to \$4 for 9½ hours, in the loft. Outside and job-work, from 10 to 30 per cent. higher.

SAILORS—For long sea voyages, able seamen get from \$25 to \$30 a month. Outside coasters, \$40; and inside or boy sailors, who have to load and unload, more frequently, \$45. Third mates from \$40 to \$60; second mates from \$55 to \$75; first mates from \$60 to \$90; captains from \$75 and \$80 to \$150, and even \$250.

SALESMEN—From \$2 to \$5, according to the kind of business, and the experience and success of the party. They are quite frequently employed on commission.

SECRETARIES—The vast number of mining and other companies in California employ a small army of secretaries, who receive from \$100 to \$300 a month. Some act in a similar capacity for from three to six, eight, and even ten smaller companies.

SERVANTS—For general housework, get all the way from \$15 to \$25 a month, and board.

SHIP CARPENTERS—\$4.50 for from nine to nine and a half hours. Taking the year through, the ship-carpenter, in consequence of the weather, cannot work quite as steadily as the ship-joiner, hence, his wages are a fraction higher.

SHIP JOINERS—\$4 for same time as the ship-carpenter. In some cases their wages are equal, but, generally, the difference is as above stated.

SHOEMAKERS—Readily earn from \$2 to \$4.50 a day. The varieties of work are so great that it is almost impossible to give a general average. They generally work by the piece, or job, so that their wages depend upon their own skill and diligence.

STEVEDORES—\$2.25 for nine and a half hours. Transient work, or irregular jobs, \$2.50.

TAILORS—Generally work by the piece. For pants, they generally get from \$3 to \$5; vests, \$2 to \$4; sack-coats, \$6 to \$10; frock-coats, 10 to 16; over-coats, about the same as for frock-coats.

TEACHERS—In public schools, command all the way from \$45 to \$200 a month, according to work and position. In San Francisco, female teachers average \$75 a month, for twelve months in the year, while a few lady principals get \$150, \$175, and even \$200 a month. This is much higher than they receive anywhere else in the world, and accounts for the very great excess of the supply over the demand. Male teachers get from \$100 to \$200; only three rising above the latter figure, two of whom have \$250, and one \$225. This is, relatively, considerably lower than male teachers of corresponding schools receive in several of the larger eastern cities. San

Francisco is the female teachers' pecuniary paradise. In the smaller cities, and through the country generally, salaries range from \$40 to \$80, for female, and from \$60 to \$150 for males, and are paid during but nine or ten months of the year.

TEAMSTERS—Average from \$35 to \$60 a month, where the employer finds the team. Some of the larger city corporations pay their teamsters \$70 and even \$75, and furnish the team. Where the teamster furnishes the team himself, he gets from \$2.50 to \$4 a day.

TINSMITHS—From \$3 to \$4 for from nine to ten hours' work; generally the latter.

TRUNK-MAKERS—Average about \$3 a day.

TURNERS—In wood command about \$3.50. In ivory and metal, the rates are from \$4 to \$4.50.

UPHOLSTERS—Receive from \$4 to \$6. As one might infer from the wages, the demand for them is good.

WAITERS—In hotels, restaurants, saloons, and in private families commonly average \$45 and board.

WATCHMAKERS—Until the present time the State has had no regular factory. While we write, however, the Cornell Watch Company, having moved their expensive machinery, and many of their most skilled operatives, from their magnificent building in Chicago, are establishing themselves in this city with such dispatch that they expect to commence regular work within a month. At present, of course, the interest involves so much of experiment in nearly all of its numerous departments, that any attempted statement of wages could be nothing more than conjectural and approximate. As early as practicable we shall present a detailed account of the multiplied industries concerned in the making of a complete watch, and the compensations which they command. At present the watchmakers of the coast rank with the jewelers, and receive the same pay.

WATCHMEN—Of whom there are a larger number than one might suppose, get an average of from \$60 to \$65 per month. Night watchmen about 20 per cent. more.

WHITENERS OR CALCIMINERS usually rank with plasterers, and get the same pay; that is, an average of from \$4 to \$4.50 a day.

The foregoing list substantially includes all the leading professions, trades and occupations. Any which do not appear will generally be found to resemble some one of those given so closely that its rate of wages may be readily and safely inferred.

The individual or occasional exceptions, some higher and some lower than the rates here given, we do not deny; we are confident, however, that anyone who will take the time and pains to average as many of each calling as the preparation of this list has compelled us to do, will hardly vary a dime from the averages we have reached.

The fluctuations, also, which especially affect the wages of many callings, make it impossible that the most carefully prepared and the most exact statement should truly record the actual fact for more than a month, sometimes hardly more than a week at a time.

Bearing these considerations in mind, we present this exhibit of our chief industries and the wages they command, as thoroughly authentic and reliable at the close of 1874 and the opening of 1875.

BOARD for common laboring men costs from \$3.50 to \$5.00 per week. For cleaner occupations and average genteel quarters the usual charge is from \$5 to \$7.50 a week. Those who wish more room, more "style," etc., can gratify themselves at from \$10 to \$16 a week. Good board and lodging at first-class hotels can be regularly had for \$15 a week, and from that to \$20 or \$25. Two occupying the same room, about 20 per cent. less.

RENT—Small tenement houses, containing four rooms, of the lower kind, situated in blocks, bring from \$3.50 to \$5 a week. Of the better class, or under separate roofs a house of four main rooms—kitchen, sitting-room and two bedrooms—with usual closets, pantry and sink-room, may be had for from \$5 to \$7.50 a week; in the suburbs of the cities, or in the country, generally, larger and better accommodations may be had for the same money, or equally good ones for less.

PROVISIONS—The present retail rates of a few of the leading articles of family food indicate the necessary cost in this vital department: Apples, 2 cts.; beans, 5 cts. lb.; butter, 40 to 50 cts.; cabbage, 1 ct.; coffee, 25 cts.; dried apples, 6 cts.; dried pears, 10 cts.; dried peaches, 12 cts.; eggs, 40 cts. doz.; flour, 6 cts.; meal (corn), 3 cts.; milk, 10 cts. qt.; onions, 1 ct. lb.; potatoes, 1½ @ 2 cts. lb.; sweet potatoes, 2 @ 2½ cts.; rice, 6 @ 8 cts.; sugar (brown), 8 cts.; white, 12 cts.; tea, 60 @ 75 cts.

This may suffice to indicate the general market. Families buying in bulk or quantities, obtain the usual reduction of from ten to twenty per cent.

FUEL—Wood, from \$10 to \$12 a cord; coal from \$11 to \$14 a ton, extra kinds commanding the usual extra rates.

CLOTHING—Good working suits for men cost from \$12 to \$20; good business suits,

\$25 to \$40; dress suits of elk X beaver, from \$65 to \$80. For women's wear our markets retail calicoes at 10 and 12 cts.; delaines, from 25 to 40 cts.; empress cloth, 60 to 80 cts.; merinoes, \$1.25 to \$1.50; poplins, \$1.50 to \$2; silks, from \$2.50 to \$5; sheetings and shirtings, 20 cts.

These statements of fact, as to actual income and necessary outgo, are based upon the supposition of only average carefulness. With unusual thrift and extra economy, any family may reduce its expenses considerably within those indicated by the figures given.

Especially in the important matters of fuel and clothing, the mildness of our climate relieves one of a large part of the expense necessarily compelled by the severity of eastern and northern seasons, especially winters.

Taken for all in all, San Francisco and California have never known a time when all the actual enterprises of the present, and certain indications of her immediate, in fact we may say of her whole future, promised as much of cheer and of comfort, when the paths to prosperity and affluence appeared more open to all, than at the beginning of this year.

Quicksilver in El Dorado.

The Mountain Democrat says:—Last week Hugh T. Turnbull brought to town and submitted to our inspection some specimens of vein matter from a four foot ledge, and slate rock from the hanging wall of the same, which he had been led to believe contained or gave indications of quicksilver. We took the specimens to F. F. Bars, jeweler, who, after inspecting them closely and submitting them to several tests, decided that the whole, numbering five or six specimens, showed strong traces of quicksilver, though none of them could be called actual cinabar. These specimens are from what is known as the Tennessee ledge, Canada Flat, about three miles south of Shingle Springs, and this ledge is an extension of the Amador cinabar ledge, recently discovered. In the adjacent ravines and surface washings Turnbull and others have frequently found quantities of smoothly washed "float" specimens of high-grade cinabar. In the minds of those who are best acquainted with the neighborhood there is hardly a doubt but that there is in the vicinity an extensive stratum of rich cinabar, the certain discovery of which will prove of incalculable advantage to the industrial and business interests of our country. Messrs. Armstrong and Hinkson, of Sacramento, and D. T. Hall, of Shingle Springs, are associated with Turnbull in the ledge which the latter is exploring, and from which the specimens above referred to were taken. They feel greatly encouraged, and apparently with good reason, to believe that they are on the right track for a valuable discovery.

About one and a half miles below their claim at Agra Peak, Sam Lane is also making explorations for cinabar with encouraging results. He has sunk a shaft 120 feet, has reached the water level, and is drifting in rock which he considers very promising. We shall wait further advices from these explorations with lively interest.

EL DORADO COUNTY.—There is a vast amount of mining done in this county; in fact it is still the predominant interest, but is chiefly carried on by close corporations, and the outside world know but little really of what they are doing, and about the only means we have of knowing that they are steadily taking out the yellow ore is their continued operations, many of them night and day the year round, and frequent receipts of coin packages from San Francisco in exchange for their dust. All those extensively engaged in mining send their dust directly to the mint, and much of the money obtained therefor is deposited at the bay, thus making it impossible to gain correct information in regard to the aggregate yield of our mines. The amount of gold taken out in a small way during the year is enormous, as any one can tell by an occasional visit to the dealer in dust. But though this interest is the present life of our county, there is nothing substantial about it—that is, this interest creates no permanent improvements of itself in the mining districts. The money thus obtained does not, or has not heretofore gone toward the permanent building up of the community, as do agricultural and manufacturing industries. As we have rare advantages for all these vocations, our county being most wonderfully diversified both in climate and resources, possessing a vast area of fertile, agricultural land, vast quantities of timber, countless paying gold and silver mines, and new discoveries of quicksilver, slate, iron, copper, marble, fine whetstone ledges, etc., are being discovered; and these advantages are beginning to be appreciated. It will not be long before El Dorado county will be attracting as much attention for its superior agricultural, viticultural and other advantages, as it formerly did on account of the richness of its placer mines.—*El Dorado Republican*.

GRAVEL.—The gravel deposit at Dogtown, says the Calaveras Citizen, is furnishing some good claims. All along the channel rich gravel is being taken out. The owners of one of the claims were offered \$30,000 for their title last week, one-half cash down and the other half when taken out, but they refused to sell. Several new claims will be developed as soon as the spring opens.

Good Health.

Health and Culture.

We are in danger of becoming a nervous, uncomfortable, discontented, wretched race, unless we use our best thought and effort to bring the highest wisdom, and virtue, and order that are within our reach to bear upon our way of living. Hence the importance that more attention should be paid to the laws of health—that they should be made a study by the masses, that the principles upon which good health is founded should be taught in our common schools, and information thereupon spread broadcast by our newspapers. Hence the importance of "Health Associations" where educated men of all professions—not exclusively of the medical profession—should come together to receive and impart instructions upon this important topic.

The matter of health, in fact, should be made a part of the highest human culture, for, as recently remarked by a distinguished divine, Rev. Dr. Osgood—"Body and mind are practically inseparable, and we know nothing of the sound mind apart from sound blood and brain. I am willing to take Herbert Spencer's definition of life as the basis of our dissonance, and to allow that life is the continuous adjustment of internal relations to external relations, if by external relations we comprehend those which are social and religious as well as those which are physical. If life is the continuous adjustment of internal relations to external relations, then healthy life is such adjustment truly and fully carried out, and he is the healthy man who lives in true relations with nature, man, and God."

In this connection, we may also introduce the following remarks of Professor S. D. Gross on our sanitary deficiencies:—"As American citizens, we boast, and very justly too, of our progress in commerce, agriculture, manufacture, literature, the arts and sciences, and the general diffusion of knowledge among all classes of society, but what have we done as a nation for our sanitary condition, for those things which so vitally concern the public health, the dearest interest of every family in the land? The Government has done nothing; it has not even recognized the necessity of a great Bureau of Health, so essential in a sanitary point of view. Our local boards of health, as they are denominated, are mere shadows, the creatures for the most part of municipal authorities, who farm out our health and our lives to the highest bidder at so much a head. Surely the first, the greatest duty of a nation is to protect the lives of its citizens, by teaching them how to live, how to guard against disease, and how to improve the race. The sanitary condition of a people is intimately associated with its moral and religious welfare. People cannot be good or happy if they are not healthy. The Bible declares cleanliness to be next to godliness. Millions of people die every year from preventable diseases. Sensible men no longer ascribe the frightful outbreak of those epidemic diseases which occasionally ravage whole nations, to the wrath of an offended Deity; they know better; they know that they are due, for the most part, to man's ignorance, or man's criminal neglect?"

Bathing Children.

Some mothers think, when their children get beyond two or three years of age, the frequent entire bath can be dispensed with. If some of the main facts of physiology were well known and understood, every one would perceive that cleanliness of the skin is one of the conditions of good health. It happens when bathing is disregarded that the lungs, kidneys, or bowels have more than their own apportionment of work. If these are strong and healthy, they may bear the tax with little apparent injury, but, in most cases, a lowering of the vitality and tone of the system ensues. Large bath-tubs are pleasant and convenient, but not indispensable to the proper cleansing of the skin. A speedy sponging of the body in pure water, followed by friction in pure air, is all that is necessary. When disinclined to use water, I find a thorough application of the flesh-brush to the whole person, an admirable substitute; especially on retiring, it relieves nervousness, equalizes the circulation and induces quiet sleep. Mothers, above all, should see that their children are well bathed. If their skins are kept active and healthy, there will not be half the danger from fever, colds, and eruptive diseases. If your little one is cross or troublesome, and finds no occupation that pleases it, try the effect of a bath; sometimes the effect is magical, and if tired, he will go to sleep, and awaken bright, cheerful and happy. Do not, though, as I have seen some parents do, plunge a child in cold water when he screams and shrinks from it, thinking you are doing a good deed. Nature must be your guide; if your child has a nervous constitution, a shock of this kind is only exhausting and injurious.

COLD ON THE LUNGS.—If a cold settles on the outer covering of the lungs it becomes pneumonia, inflammation of the lungs, or lung fever, which in many cases carries the strongest man to his grave within a week. If a cold falls on the inner covering of the lungs it is pleurisy, with its knife-like pains, and its slow, very slow recoveries. If a cold settles in the joints, there is rheumatism in its various forms; inflammatory rheumatism, with its

agonies of pain, and rheumatism of the heart, which in an instant snuffs the cords of life with no friendly warning. It is of the utmost practical importance, then, to know not so much how to cure a cold as how to avoid it. Colds always come from one cause—some part of the whole of the body being cooler than natural for a time. If a man will keep his feet warm always and never allow himself to be chilled, he will never take cold in a lifetime, and this can only be accomplished by due care in warm clothing and the avoidance of draughts and undue exposure. While multitudes of colds come from cold feet, perhaps the majority arise from cooling off too quickly after becoming a little warmer than is natural from exercise or work, or from confinement to a warm apartment.—*Wood's Household Magazine.*

Cure for Corns.

A subscriber, "J. A. H.," writes from Virginia City, Nevada, as follows: "As a regular subscriber to the Press, from which I derive many valuable items of information, I wish, for the benefit of others, to speak of one which I consider has been worth more to me than the price of subscription for your paper for several years. For more than ten years I have been troubled exceedingly by corns. I was obliged to pare them as often as once a month, and had twice been to corn doctors for relief, which, however, proved to be of very transitory character. Some three months ago I saw an item in the Press taken from a French medical journal recommending peroxide of iron as a remedy. This struck me so favorably that I concluded to try it. I followed the directions, applying it morning and night with a small brush for the space of two weeks, after which I pared the tough skin away and could detect no signs of a core beneath, although before the application it could be distinctly seen every time the corn was pared. Since then I have not experienced the least pain from either of them. New flesh has formed over the places occupied by the corns which shows no disposition to harden, and from their present appearance I pronounce them radically cured. They were hard corns with cores; of its effect upon soft corns I know nothing, but our opinion is it would be just as efficacious."

USEFUL INFORMATION.

About Bricks.

Few materials for building are in more constant use than bricks. Even where stone is the principal article used in the composition of a building, bricks are wanted for linings, flues, furnaces, ovens, and a number of other purposes. The properties of bricks should vary according to the purposes to which they are to be applied. A brick intended for building should be so solid that it may be neatly cut, and baked at a temperature sufficiently high to prevent it being disintegrated by atmospheric influences. A good brick for an ordinary building will support a considerable weight without being crushed. It ought not to crumble in water nor to absorb too great a quantity of it. This question is tested by weighing the brick before and after immersion in water. Earths are often found which, without preparation, are fit for the manufacture of bricks for building purposes. Indeed, the common yellow vegetable earth will generally answer. In the construction of furnaces, the bricks to be used ought to be such as will longest resist the ashes of the combustible. Fire-bricks are made with plastic clay, containing neither gypsum, lime, or oxide of iron, which color bricks red and render them fusible. The clay is first washed to free it from the foreign substances which it contains. It is then reduced with cement of burnt clay, made expressly for the purpose, and powdered. Even the purest sand, mixed with clay, would not make infusible bricks. Bricks are formed either with the band or by manufacturing appliances. Two men, with the hand, can make from six to seven thousand bricks per day. They are burnt either with turf, coal, or wood, according to convenience, the latter being generally used in this country. The kilns are built almost entirely with the bricks intended to be burnt, the base of the kiln being the only part made of old bricks. A kiln contains about four hundred thousand bricks, and it requires about five days to burn them. The Flemish process, by which the bricks are burnt with coal, is the most economical. The manufacture of bricks in St. Louis has assumed mammoth proportions, and are becoming famous for their surpassing excellence, many persons preferring a front of them to one of stone. Milwaukee has a clay which gives a peculiar light yellowish tint to the bricks made there, which, when judiciously contrasted with trimmings of dark colors gives a very pleasing effect.—*Builders' Journal.*

WIND-MILLS.—There are said to be upwards of a hundred private mansions near New York city which employ wind-mill power for pumping water, sawing wood, grinding, thrashing grain, etc. In many instances they are superadding steam engines, water wheels, hydraulic rams, horse power, and caloric engines, being run without cost, except for lubricating oil. These mills are not only noiseless, as now constructed, but they are also self-regulating.

TO DEADEN THE SOUND OF AN ANVIL.—The *Building News* recently remarked upon this subject: "If a chain about one foot long, formed of a few large links, is suspended to the small end of an anvil, it will destroy, we are told, that sharp thrilling noise produced by striking on it with a hammer; the vibrations of the hammer are extended to the chain, which absorbs them without producing any sound. This is worth trying by any one who has a blacksmith or a coppersmith for a neighbor."

Upon the above the *American Artisan* remarks as follows: "We presume it is intended to suggest that the smith should be induced to use the chain, and not the neighbor; but with reference to this application to the head of an anvil, we may tell our contemporary that were a chain suspended in this way, the labor of the mechanic would be painfully increased; for the hammer would fall heavily and flat, without that spring or rebound that the active vibration gives to the hammer, and the brawny arm of the smith would be called upon to lift a dead weight every time he struck the iron, instead of having only to catch up the rebounding tool and direct its next blow. For our part, we think there is a very musical sound in the anvil, and certainly cannot recommend the use of the chain."

EMBALMING.—J. Hamell, of Vallée, is perfecting a process for embalming from which he expects important results. It is the result of fifteen years of study and experiment, and if we understand the principles of other embalming processes correctly, is different from any yet conceived. It differs from most methods in that no incision in the body is required. No removal of the intestines or any organs are required. The operation consists of the injection of a prepared liquid with a hypodermic syringe into the *vena cava*, and an external application of certain drugs. The effect of the process is to indurate the flesh of the corpse; making it almost as hard as marble. The features are preserved as natural as in life. In a recent case under Mr. Hamell's treatment the face had turned perfectly black; but he restored the complexion to its former color. By his method of embalming the disagreeable odor of the corpse is entirely removed. One of the bodies subjected to the conserving treatment of Mr. Hamell remained in a perfectly natural condition for three or four months. When he has further perfected his invention, he is satisfied that he can extend the period of preservation much longer.

WATER, when stored in tanks or other closed vessels, seems to undergo a sort of fining process, by which many of its impurities are thrown down as a sediment upon the bottom of the vessel. Sailors assert that water clears itself by working after the manner of wines or liquors. Though this is not strictly true, yet it is a fact that most of the impurities held mechanically suspended are thrown down and the water in time becomes fit for use.

If we can store water, exclude dust and give some time for settling, the water is pretty sure to be improved in quality. If the cistern is open there are two evils to be apprehended. Dust will find its way into the water and foul gases accumulate in the cistern. These will be absorbed by the water, and so render it unfit for both drinking and cooking. This absorption of gas by water is of much more importance than most people are aware, a very large quantity being taken up, and as the water does this with rapidity, we should not allow it to have access to foul air.

INTERESTING AND PRETTY PARLOR EXPERIMENT.—Apply a common needle to a magnet until charged, then rub dry, poise carefully between the thumb and forefinger, lay it into a tumefaction of water; if well done it will float; if it sinks try again; you will seldom fail.

No sooner is the needle afloat untrammelled when it will wheel around and point to the north pole as accurately as any mariner's compass. The tumbler can be turned around carefully, but the needle will keep its point. The common horseshoe magnet is a very interesting thing to have about a house, and can be bought for a trifle. Any common pocketknife or scissors can be charged with it, so as to draw up any small piece of iron or steel, and will retain the influence a long time.

This magnetism is a powerful element, but acts silently and unseen; one which we know the effects of, and yet know but little of its source.

AN OLD GAS WELL.—There is a gas well on Wolfe creek, about one mile from the turnpike leading from Mercer to Butler county, which was dug in 1838. This well was dug for salt, and abandoned as a salt well in consequence of a heavy flow of gas. The parties who then owned it came to Pittsburgh and had a large cast-iron cap made to cover the well, with a pipe and valve in one side. By some means they closed the valve and the salt pan and cap burst, and the works with all the apparatus was blown to pieces. Recently, Mr. Alfred Carnes, of New Castle, has leased the well, and we are informed that he is contemplating the erection of a fine flouring mill upon the premises to be run entirely with gas. It is said that gas has been flowing from this well ever since it was discovered. This information may be of use to those contemplating the utilization of natural gas permanently for manufacturing purposes.

COCOANUT husk is better than cotton waste and turpentine for taking temporary rust from iron or steel.

Domestic Economy.

Danger of Tin Vessels for Cooking Acid Fruits and Vegetables.

In a paper addressed to the French Academy of Sciences, Dr. Fordos gives the results of some experiments on tin vessels used in laboratories and hospitals, and even in private families, for infusions and similar purposes. These utensils generally contain lead in certain proportions, and it was, therefore, desirable to learn how far that poisonous metal might be injurious to health in the long run. Dr. Fordos began by introducing water acidulated with one per cent. of acetic acid into a tin can provided with a lid. After letting it stand for a few days, he observed on the inner surface of the vessel a slight white deposit, which was soluble in the acidulated water, and communicated to it all the characteristics of a lead solution; iodide of potassium yielding a yellow precipitate, sulphuric acid a white one, and sulphuretted hydrogen a black one. Nevertheless, the latter test is not reliable, since it causes a dark precipitate, with a salt of tin likewise dissolved in the liquid. The existence of a salt of lead in the white deposit is, however, sufficiently proved. It is confirmed in another way; if the inner sides of the vessel be rubbed with a piece of clean wet paper, a solution of iodide of potassium will turn it yellow. In certain experiments, a crystallized salt of lead was detected at the bottom of the jug. In other series of experiments, wine and vinegar were tried; they both became charged with lead, as they dissolved the lead salt deposited on the sides. Again, tartaric lemonade, left for twenty-four hours in the vessels, became impregnated with lead. Hence, Dr. Fordos concludes that in alloys of tin and lead both metals are attacked, the latter being generally the first, when in contact with the atmosphere and acid liquids, such as wine, vinegar, lemonade, etc.; and that consequently there may be serious danger in using such alloys, either in the shape of vessels or in tinning culinary utensils.

Bread from Sawdust.

The chief alimentary substances employed by man may be reduced to three classes, viz: Saccharine, fatty and albuminous substances, of which sugar, butter and eggs may be taken as representatives.

The saccharine principles include the majority of vegetable substances, whatever their sensible properties may be, namely: those into the composition of which oxygen and hydrogen enter, in the proportions in which they form water.

The fiber of wood is an example—it is chemically known as lignine; and by skillful manipulation Professor Anterith, of Turbingen, some years ago succeeded in making a tolerably good loaf of bread from a deal board.

The operation was as follows:

Everything which was soluble in water was removed by prolonged maceration and boiling; resinous matter was extracted by alcohol; the wood was then reduced to fiber, dried in an oven, and ground as corn, when it had the smell and taste of corn flour.

Water and yeast were added, and upon being baked it had much crust and a much better taste than bread made from bran or husks of corn.

Wood flour boiled with water furnishes a nutritious jelly; Prof. Anterith ate it in the form of soup or gruel, and in dumplings or pancakes, which were palatable and wholesome.

Prof. Brande, in his lectures, records an analogous result: "Gum and sugar may be obtained by the action of sulphuric acid upon woody fiber. Bread has been made from this substance. Seeing the close resemblance between the composition of starch and lignine, the conversion of the latter into bread does not appear so remarkable."

ORANGE JELLY.—Oranges filled with jelly is a splendid dish, which makes a pretty appearance on a supper table. Take some very fine oranges, and with the point of a very small knife cut from the top of each a round hole about the size of a silver quarter; then, with the small end of a tea or egg spoon, empty them entirely, taking great care not to break the rinds, and then throw these into cold water and make a jelly of the juice, which must be well pressed from the pulp and strained as clear as possible. Color one-half a fine rose-color with prepared cochineal, and leave the other very pale; when it is nearly ready, drain and wipe the orange rinds, and fill them with alternate stripes of the two jellies; when perfectly cold cut them in quarters and dispose of them tastefully in a dish with a few light branches of myrtle between them. Calf's foot or any other variety of jelly or blanc mange may be used at choice to fill the rinds. The colors should contrast as much as possible.

A GOOD CAKE.—Take three heaping table-spoons of powdered or granulated sugar, two of butter, one of maizeena, one egg; put with this two cups of flour, half a cup of sweet milk, a tea-spoon of cream of tartar, half a tea-spoon of soda, a pinch of salt, and Zante currants. Roll this out in powdered sugar, cut the dough in strips, and twist them as you would champagne cakes.

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Among the Foundries and Machine Shops.

Business is brisk again at the foundries and
machine shops in this city and the prospects
for a very busy season are assured. The prin-
cipal work upon which they are all engaged is
mining machinery, large quantities of which
are now being made. At the

Risdon Iron Works,

Mining machinery still keeps the engineer-
ing staff employed early and late. This de-
mand has increased so much of late that they
are gradually finding the limits of their pre-
mises quite inadequate, especially as regards the
drawing and designing department, and a con-
siderable portion of this work is prepared in
more convenient quarters outside the premises.
The transportation of the heavy work in these
shops found a serious item of expense for labor
during the construction of their heavy work,
and they are perfecting a plan for doing all the
lifting necessary in the fitting and erecting
shop by team power.

The mechanical details of the new Oil Cloth Factory,

Which we recently inspected on Mission street,
show a decided improvement upon the last
new establishments of this kind in the East.
These works are supplied with capacious steam
boilers for heating and drying purposes and
producing the requisite steam for driving a ten
horse power engine. Working up the surface
of the cloth with pumice stone for coloring,
which two years ago was performed by hand
labor in many Eastern factories, is effected here
by an ingenious and simple machine.

Booth & Co.

Have lately erected a new crane for hoisting
purposes in their foundry. The design is sim-
ple and substantial, and is a serviceable piece of
work. They consider the present wet season
the slackest time in the year, but notwithstanding,
the outstanding contracts warrant a busy
time for some months to come, and they are
looking forward to a brisk spring trade. Some
heavy mining orders are at the present time in
contemplation.

The Pacific Iron Works

Are enlarging the capacity of their foundry
and raising the roof. They have also erected a
new crane, doubtless convinced of the superior
convenience of the one now in use at Booth
& Co's. This crane is now in position and the
cupolas are set up. The Superintendent is also
improving upon the arrangement of their
yard scales, which have required extensive re-
pairs of late. A very good system is being em-
ployed here in connection with making the nu-
merous plans and designs for the work.

Those youths who show most desire to im-
prove during their apprenticeship are taken
into the office and put at drawing. The Super-
intendent tells us by far the greater portion of
their work is done this way by the boys, one of

whom recently took the first prize at the Me-
chanics' Institute for mechanical drawing.

One of the neatest and best arranged of our

Smaller Machine Shops

And engineering establishments is that carried
on by Mr. Deacon, formerly in partnership
with Mr. Bulger, the present engineer in chief
at the new Mint; the latter having sold out his
share in this business on obtaining his present
position to the proprietor under whose super-
intendence these works are doing a brisk busi-
ness. The premises are not over crowded, a
rare case among similar shops at this present
day. The tools are well arranged and there is
excellent light. We noticed a substantial pair
of marine engines, of the smaller class, in pro-
cess of construction here. One striking feature
consists in casting the engine frame, cylinder,
steam chest, cross head guides and slide,
pistons and bed plate in one solid casting,
producing a very efficient body for the working
parts of the engine, and being somewhat of an
unusual method. We are able to state upon
special examination that this form of combined
casting presents no very great difficulty in pre-
paring the parts by hand and machinery, for
their exact and finished proportions, such as
boring the cylinder, planing valve seats, slide
bars and the general fittings.

A New Street Pavement.

The question of street pavements seems to be
the puzzle of the day. It is an admitted fact
that after many years of trial of cobble, wood
McAdam, granite blocks, etc., we have not yet
found a material which gives anything like sat-
isfaction to property owners. Each in turn has
been discarded, and each has again been re-
sorted to as a desperate make shift to bridge
over the present until something can be found
which shall more fully meet the necessities
of the case. Just now stone blocks appear to be
in the ascendant; but no man of experience,
in such matters, who has observed the manner
in which they are being put down in this city,
can have any confidence that they will result in
any very material advantage over the ordinary
cobble stones on streets, subjected to heavy
traffic.

Many of our citizens have taken quite a lively
interest in what is known as the "Van Camp"
patent for street paving, samples of which were
on exhibition at the late Industrial Fair in this
city, and, more lately, at No. 607, Mont-
gomery street. This is an asphaltum pavement,
composed of asphaltum and finely crushed
rock, put together with just the quantity of
spishlum which is needed to form with the
rock a firm hard cement.

This material differs in several important par-
ticulars from the so-called asphaltum employed
for making sidewalks in this city. The latter
is composed largely of coal tar, barrels of which
are poured into the tank and mixed with a small
quantity of asphaltum and small, smooth
stones, forming a compound but slightly adhe-
sive, and readily softening under the rays of a
warm sun. The "Van Camp" pavement contains
no coal tar whatever, asphaltum alone being
mixed with finely crushed rock, whose rough,
angular faces greatly contribute to the firmness
and durability of the material. The rock and
asphaltum are brought together while both are
in a heated condition so that a minimum quan-
tity of the former suffices to effect the neces-
sary cohesion.

It is well known that coal tar and its mix-
tures, when it becomes hardened, will break up
and fall to powder under the action of wheels
and hoofs, and pass away before the wind,
while asphaltum, under like conditions, owing
to its bituminous character, resists friction and
wear. The "Van Camp" asphaltum pavement
is not made in blocks but is laid down in a solid
mass five inches thick from curb to curb, form-
ing a highly resistable but slightly flexible and
continuous covering to the entire street. It is
perfectly water tight, neither contracting nor
expanding under changes of temperature, and
of course, not liable to local depressions and a
gradual breaking up, as is the case with blocks
and cobbles. It is also perfectly free from all
odor and hence especially desirable in a sani-
tary view. It is as noiseless as wood, slightly
elastic, never becomes slippery and subjects
wagon tires and horse shoes to the minimum
amount of wear.

In proof of its durability we are informed
that it has been in constant use upon one of
the principal streets in Chicago over five years,
during which time it has manifested no signs
of wear or depreciation. We are also ascer-
tained that one of the chief engineers of that city has
reported upon it in the following language: "It
has not had one cent expended upon it for repairs
since laid; shows no perceptible wear, and bids
fair to run for twenty years without repair." The
same pavement has also been laid on two
squares in Louisville, Ky., where it is giving
equally good satisfaction, and stands the sum-
mer heat in that climate without any deteriora-
tion, although it is in a locality where heavy
six-mule teams are daily passing over it. Of
course parties interested can readily verify the
correctness of the statements if they desire to
do so.

We understand that negotiations have been
completed to give this pavement a fair trial in
this city, and works have been erected near the
foot of Fourth street for manufacturing it on a
large scale. To all appearances it is all that is
claimed for it, and we are pleased to see an in-
clination manifested to give it a fair trial. We
are certainly in great need of a better pavement
than we now possess, and should be rejoiced to
see this prove the very thing that is needed.

Mechanical Schools.

Mr. A. S. Hallidie, President of the Mechan-
ics' Institute, of this city, left for the East and
Europe on Wednesday morning last. On
Tuesday evening the Board of Trustees met,
when Mr. Hallidie presented his resignation
and retired from the committee room. The
following resolutions were then read and
adopted:

WHEREAS, The President of this Board is about to
visit the Eastern States and Europe, in the interests of
the Mechanical School endowed by James Lick, and the
Chamber of Industry, endowed by Horace Hawes, and
with a view to further the interests of the next Indus-
trial Exhibition, as well as for the purpose of prop-
erly securing and forwarding the Patent Reports presented
to this Institute by the Government of Great Britain,
through his efforts to this Society, and he has verily
requested this Board to accept his resignation or grant
him leave of absence; it is hereby

Resolved, That leave of absence be granted A. S. Hal-
lidie, the President of the Mechanics' Institute, until
the first Monday in June, next ensuing; and that a copy
of this resolution be transmitted to him, signed by the
Vice-President and Secretary, under the seal of the So-
ciety,

The resignation of Mr. Hallidie was laid on
the table.

The following resolutions were then unani-
mously adopted by the Board of Managers of
the Tenth Industrial Exhibition:

Resolved, That President A. S. Hallidie is hereby ap-
pointed Special Commissioner to call upon manufac-
turers and others in the Eastern States and elsewhere,
with a view of furthering the interests of the Tenth
Industrial Exhibition, to be held under the auspices of
the Mechanics' Institute, in August, 1875.

Resolved, That the above resolution be properly en-
gaged and signed by the Vice-President and Secretary
of the Board of Managers.

Resolved, That necessary leave of absence be granted
Mr. A. S. Hallidie by this Board, for the purpose above
mentioned; and that the Board of Trustees of the Me-
chanics' Institute be requested to extend to him such
leave of absence as may be consistent with his duties as
President of the Mechanics' Institute, and the best in-
terests thereof.

After the adjournment of the Boards the
members and invited guests retired to Corin-
thian Hall, where a fine collation had been pre-
pared. Mr. Hallidie was presented with a fine
gold watch manufactured by the Cornell Watch
Company, of this city, and a general good time
was indulged in.

In conversation with Mr. Hallidie a few days
since, on the subject of his trip, he stated that
his principal object was to make arrangements
for forwarding the set of patent office reports
presented to the Institute by the Government of
Great Britain, and to examine the workings of
mechanical and industrial schools in the
East and Europe.

There are in all 3,500 volumes of these
British patent reports, of which 2,800 volumes
are imperial quarto and the balance folio. It
will take about 600 running feet of shelving to
accommodate the set. The books will be bound
in the best style, according to the require-
ments of the gift. The cost of binding will be
about \$5,000, and the books will probably be
here by the time the next Industrial Exhibi-
tion is opened.

Mr. Hallidie will also visit the leading indus-
trial schools, and with a purpose of examining
the methods by which they are carried on. Mr.
Hallidie is one of the trustees of the Lick fund
for a mechanical school, and also a trustee of
the Chamber of Industry, endowed by Horace
Hawes for a similar purpose. Several gentle-
men in this city, who are anxious that our
youth should have the advantages of an indus-
trial training, have guaranteed a fund of \$15,-
000 a year to assist in carrying out any
practical plan which may be devised; and if neces-
sary will contribute liberally towards erecting
suitable buildings for the furtherance of this
object. The Lick fund amounts to \$300,000.
The Horace Hawes endowment is not in money,
but consists of his 50-acre lot, on Mission
street, near Ninth. It will be seen from this
that there are three distinct plans for estab-
lishing a mechanical school here, exclusive
of the University of California. The only ques-
tion now is the practicability of the scheme and
the plan upon which it must be accomplished.

There are many conflicting views upon this
subject, which we are not now prepared to dis-
cuss. It is difficult to get at the exact results
accomplished by similar institutions elsewhere,
and even what information there is seems to be
conflicting. Mr. Hallidie will, during his trip,
examine into the management of the mechan-
ical schools established at Worcester, in the
East, and at Glasgow and Manchester in Great
Britain, and at Paris. It is intended to see
how such schools may be adapted to the re-
quirements of this community. The effort is
to be made to consolidate the three funds
spoken of above, so as to have only one estab-
lishment, endowed with an amount of money
to make the institution effective and practical,
instead of having three separate schools. Mr.
Hallidie states that he anticipates no trouble in
raising an amount of money sufficient to erect
the necessary buildings without touching the
principal of Mr. Lick's gift. If this is done we
ought to be able to boast of a mechanical school
which will compare favorably with those of
older cities than San Francisco.

The Trustees of these funds are desirous of
obtaining all the information possible on the
subject of labor schools, and cordially invite
those who have any practical ideas on the sub-
ject to bring their view forward for considera-
tion. If any of our readers have any plan to
propose, or experience to communicate, we will
gladly give space to their communications.
This is a subject in which all parents are inter-
ested, and should be freely discussed before any
decisive steps be taken, so that no hastily ar-
ranged plan will be adopted.

Economic Botany.

Fourth Lecture Delivered before the University of Cali-
fornia College of Agriculture on Thursday January 21,
by Prof. C. E. BESSEY, M. S., of the Iowa College
of Agriculture, Ames, Iowa.

[Reported exp. resply for the Press.]

Ths Lilies, Etc.

I call your attention, this afternoon, to sev-
eral families lying between grasses and the
conifers; that is, the lecturers to-day may be
considered as the economic botany of the re-
mainder of the endogens.

Liliaceae, the lily family, is of moderate size,
about 1,300 species. Taking the common lily
as a type, if you will group around it the
members of the order, you will have a pretty
good idea of it. Taking the lilies as a whole
(and I apply the term now to all the members
of the order), they are quite variable in their
habits, from the diminutive hyacinth to the
gigantic dragon trees. They are very widely
distributed through the temperate zones. Cer-
tain regions seem to have particular plants
which give a character to the flora represented
there. In Europe, the order is mostly repre-
sented by *Allium* and *Ornithogalum*; in North
America and Japan, by the lilies; in Mexico, by
the yuccas; in Africa, by aloes and dragon
trees, and in Australia by grass gum trees.

They are of considerable economic import-
ance, both for food and for other uses. They
furnish many medicines, most of which are
irritant, drastic and purgative, while some
furnish poisons. In most natural groups of
plants, we find some principle running through-
out all the members of the group. This may
be irritant, as in the present instance; or aro-
matic, as in the laurels; or it may be pungent,
as in the mustards. To this property, which
makes plants irritant, aromatic, pungent, etc.,
we apply the term "principle," and understand
by it that such property prevails to a greater or
less extent throughout the group. We say
then, of the order under consideration (the
lilies), that its principle is an irritant. Among
the

Food Plants,

May be mentioned the onion, *Allium cepa*, which
comes from Mediterranean basin, especially
from Egypt. It has been in cultivation for
thousands of years, probably as long as man
has lived upon the earth. Besides the onion;
the leek, garlic, hives and two or three others
may be mentioned. These are grown largely
in Europe, and are much used, especially
by the people of southern Europe. People
from the Mediterranean basin seem to make
use of the onion, rather than the people north
of that. Asparagus is a native of the shores of
southern England. As we have it here, it has a
resemblance of its old habit, growing best
where there is salt in the ground, or where salt
is applied to it. It has been grown for about
two thousand years, yet in all that time it has
shown a wonderful tenacity to its original form.
If you take up the collections of asparagus vari-
eties, you will find very little difference between
them after three or four years of poor culture.
It is one of the most remarkable examples we
have of an unmodifiable species. Within the
last eight or ten years, a few varieties have
been formed, but they very soon run back to
the original form if neglected, showing that no
true varieties have been formed.

Several of the medicines are worthy of note.
The most important are the following: White
hellebore, *Veratrum album*, which is native in
the central parts of Europe; now cultivated
throughout the continent, but most abundantly
in the Alpine regions. It has been used con-
siderably in medicine, but is less so now than
formerly; and I may say right here that for
a majority of the so-called medicinal plants the
same remark can be made, that is, that they
were formerly more used than at present, indi-
cating that we are growing

Wiser, if not Hsallhier.

Squills; the product of *Scilla maritima* is also
a native of the coast of the Mediterranean; its
bulbous roots are gathered and broken up and
in this form known as squills; which is used
somewhat at the present time as a powerful,
irritant medicine. One species of *Scilla*, found
east of the Sierra, produces a valuable food for
Indians. Here we have a good illustration
again of the fact that, occasionally, closely
allied species differ very greatly as to their
uses; the one species, in this instance, furnish-
ing irritant medicine, while the other furnishes
nutritious food. Solomon's seal, *Polygonatum
multiflorum*, is a perennial growing in England.
It is used somewhat in ordinary medical prac-
tice, and is said to be in great repute for re-
moving discolorations of the face, produced by
blows. Aloes, derived from a plant in Asia-
and a few others—are used somewhat.

The order is of most importance, however
on account of its ornamental species, which are
many, and in some cases possess exceeding
beauty and fragrance. First on the list are the
tulips; *Tulipa Gesneriana*, named after an old
German botanist, Gesner, who discovered it in
southwestern Asia and brought it into cultiva-
tion. It was introduced in 1559; so, as you see

upwards of 300 years have elapsed since its introduction. The wild plants are yellow, but in cultivation they have taken on all sorts of colors. Now and then we have a reversion to the original form. If you take up our best tulips you will find sometimes a specimen which has reverted exactly to the old form which it had three hundred years ago. As an interesting illustration of the whims of trade, the tulip mania in Holland in the last century may be mentioned as one of the most peculiar. The people became greatly excited over tulip bulbs. At that time a mania seemed to seize upon them and business was materially affected by it. The principal dealings in stock were in the stock of the tulip bulbs. They had issued scrip which represented the stock of these bulbs, and this scrip representing bulbs, was bought and sold with all the eagerness of modern stock dealers. Consolidated Virginia stock at its highest fell far below the almost

Fabulous Quotations

Of tulip stock. Single bulbs, in some cases, represented from two to three thousand dollars. Possibly there may have been a craze on bulbs when the quotations ran so high. Holland is now, as you well know, the great tulip region, and from that country we still obtain our best bulbs and probably the great interest in tulips, during this mania contributed not a little to the high development which they have attained in that country.

The lilies proper embrace many species; all belonging to the genus *Lilium*. The more important are the whitelily, *L. candidum*, from Persia; and the orange lily, *L. bulbiferum*, from Europe; the martagon lily, *L. martagon*, from Europe; the red lily, from Palestine; the tiger lily from China; the Japan lily, from Japan; and most magnificent of all, the golden lily, *L. auratum*, from Japan. This last one, produced within the last few years, a great furor in the East when first introduced. Enormous prices were paid for the bulbs, of course nothing like the prices paid for the tulips in the tulip mania just spoken of, but as much as \$50 were paid in some cases. The tuberose, *Polianthes tuberosus*, is one of the greatest favorite and deservedly so, is supposed to have been first found in tropical America and is much esteemed on account of its delightful odor. The hyacinth, *Hyacinthus orientalis*, was found first growing in Syria. It was originally a blue flower but it is now of all colors. It is very largely grown in Holland and from that country we obtain our best bulbs. The red hot poker plant, a native of the Cape of Good Hope, introduced about 200 years ago, is, as I see, quite a favorite with the people of California. Nearly every garden has its plants of this species. Its winter blooming qualities render it a very desirable plant for growing.

The dragon tree, a native of the west coast of Africa, is now cultivated extensively throughout all of the warmer parts of the globe. In its native country it is very large, growing 60 to 100 feet in height, and very thick in diameter. Here it grows as a small-sized tree, having a thick stem, with a bunch of grass-green leaves at the top. Many may be seen in the city of San Francisco and also in the streets of Oakland. The largest one on record grew upon the island of Teneriffe. It was 16 feet in diameter and was supposed at the time of its overthrow, in 1867, to be

The Oldest Tree on the Earth.

Its age, as estimated by careful observers, was placed at from five to six thousand years.

Among other ornamental plants may be mentioned the crown imperial, with its circle of golden, bell-like flowers; the *agapanthus*, with its wands of pale blue flowers, which have earned for it the popular name of love flower; the sharp needled yuccas, of Mexico; the grass gum trees of Australia; the strange, leafless, thorny butcher's broom, (*Ruscus*) of Europe, and the delicate climber, the smilax of our windows. All these must be passed by, however, with a hundred others found in our grounds and conservatories. A volume might be devoted to them and still their uses and beauties would not all be described: much less then can I hope to do them justice in a part of a short lecture. The words of one who loved the flowers of Syria come now to our minds with fuller force, "Consider the lilies of the field."

The Pine-Apple Family.

This constitutes the order *Bromeliaceae*, which is confined to tropical America. It contains about two hundred species.

One of the plants is the long moss which grows very largely on the trees in the southern portion of the Eastern United States, and which is used for stuffing cushions, mattresses, and for other purposes.

The pine-apple, *Bromelia ananas*, is a native of Brazil, introduced nearly three hundred years ago into general culture. It is a spreading plant with more or less lily-like leaves; that the leaves rise from a center near the ground and spread out. From the center starts up a woody stem. These flowers usually prove abortive. The cluster changes to a form very much like that of the pine cone. Examining one carefully, you will find the remains of the old flower which have consolidated considerably with another. They seem to take very kindly to cure under glass.

Whether they are grown out of doors here I do not know. They are grown under glass as north as Chicago very extensively.

The Banana

Belongs to a closely allied family. This family is very small one, containing only thirty species, all natives of the tropics. In growing, they have the appearance of palms. View a

banana grove at a little distance and it will remind you very much of the palms. The leaves are long and spreading, and grow upon an elongated, strong stem. In fact, they may be considered as the plants uniting the lilies with the proper palms. The banana itself is called *Musa sapientum*. There is some confusion still amongst botanists as to whether plantains differ from the banana or not. They seem to be about the same as far as the specimens are concerned. Botanists have not really been able to distinguish between them. It is more than likely that they are but varieties of the same species. The difficulty arises from the fact that the plantains

one or two feet. These great, board-like leaves, are taken and used as coverings for their houses. So that, although a very little family, it is for certain regions a very important one.

The Orchids.

See Fig. 2. This family is an important one, embracing three thousand species at least. In all probability there are more in it, but these are not all known as yet. They are of various habits, of wide distribution in moist regions. All the orchids, you will recollect, as being lovers of moist localities. In the north, they are found growing in bogs and wet places. As



Fig. 2. An Orchid (*Lelia*).—From a Specimen in Dr. Gray's Conservatory.

and bananae were cultivated for ages before botanists found them; and it is now impossible to say whether they were originally distinct or not. This is continually coming up before us in all cases of plants long under cultivation. The fruits are borne on a central spike, which grows from an enormous bud.

The flowers are about an inch and a half

you go south; you will find them in the moist forests, on the trees, as epiphytes. They are of very little economic value.

The Vanilla.

Vanilla planifolia is of vine-like habits, and is a native of the West Indies and of Central America. It grows inconspicuous flowers, which produce the long pod from which we get the extract we call vanilla. This product, vanilla, when pure, is said to be the most costly vegetable product we have. It sells at enormous prices. It is very frequently adulterated, as is commonly the case with high-priced products. The chemists, too, have been able to imitate vanilla so closely that their article is frequently used as a substitute for the genuine. When first carried from Central America to India, to be there grown, it was found that while it grew well and produced flowers, it would not produce fruit. This was, for many years, a puzzling thing to the growers; but after a while it was discovered that in Central America the flowers were fertilized through the agency of a certain insect, and that in carrying the vanilla plant to India, this insect had not been taken along with it. When, however, the insect was taken to India, the vanilla there grown became fertile and produced fruit. The history of this plant may teach us, that what now seems to many merely a curious investigation—I refer to the relation existing between insects and plants—may turn out to be of great practical importance. Aside from the vanilla, orchids are chiefly interesting as ornamental plants and as botanical curiosities.

The Palm Family,

For the inhabitants of certain portions of the torrid zone, is just as important to them as the grasses are to the inhabitants of the temperate regions. Now, we here get certain ideas of the relations existing between man and the vegetable kingdom. There are a thousand species, some of which rise to a very great height, and their usual habit you are very well acquainted with. They grow with a tall, cylindrical stem, with a great tuft of leaves at the top. In their growth, many of the palms remain stemless for a long time. They first grow a great tuft of leaves for a great many years from an underground stem. This tuft grows larger and larger, and a great, stout stem, when it is large enough, shoots up. They seem to have a beautiful and almost divine loftiness. After they have gone up a certain height, they appear to have fulfilled their mission, and die.

The double coconut (see Fig. 3), found in the islands of the Indian ocean, grows to be about a hundred feet high, with a stem from one and a half to two feet in diameter. It bears nuts in great abundance, usually from eight to nine or ten in a bunch, in this way: each nut will weigh from thirty to forty pounds, so that there is a bunch weighing from three to four hundred pounds. A very remarkable thing is that they are

Ten Years in Their Ripening.

It seems strange here where we are accustomed to see fruits ripen in one year, or less, to think of a fruit requiring ten long years for its ripening process. The natives use coconuts in various ways, utilizing the stems, trunks and leaves of the trees, as well as the



Fig. 3. The Cocoa-Nut Palm.

long. The bud goes on growing constantly, and the fruits begin forming below, so you may have a bud at the top, and fruit growing at the bottom.

This banana is one of the most productive of all plants. The statement of the books is that where thirty-three pounds of wheat can be grown, upon that area

4,400 Pounds

Of bananas could be grown. You know from your own experience that bananas are very nourishing. They will go, perhaps, fifteen or twenty times as far as the wheat grown from the same area. In countries where they are grown readily, the inhabitants subsist almost entirely upon them.

Not only do they obtain food from them, but they make use of these enormous leaves, ten or fifteen feet in length, and having a breadth of

nuts. The nuts themselves, by the time they ripen are entirely insidible. The coconut proper is a native of tropical Africa, India, Malay and all the tropical islands of the Indian and Pacific oceans. It is generally cultivated in all the islands of the tropical regions. The trees are from fifty to one hundred and fifty feet high. It produces fruit in bunches of from ten to twenty each. The tree furnishes almost everything the inhabitants need. They have not very many wants. From it they get food, domestic utensils, materials for building, wine and sugar. From its principal fiber they manufacture ropes, matting, brushes and brooms. The stem yields very valuable lumber. So it will be seen, the tree is of very great importance to the people.

The sago palm, *Sagrus laevis*, is found in Siam and the Indian archipelago, and grows from thirty to fifty feet high and six to twelve inches in diameter. The tree is cut and the trunk is split, the pith is then taken out, thrown into water, and upon beating it a starchy matter falls to the bottom; this is the sago known in commerce, and is used very largely as an article of food. A student says: "Then they have to kill the tree to get this." Professor: "Yes. They have to cut it down and of course, it results in the destruction of the tree."

Rattan, *Calamus rotang*, and other allied species, natives of India and the Malay islands, produce the rattan, so largely used in the manufacture of chairs and other furniture. These are slender-stemmed palms, often growing to a length of from 150 to 200 feet, and climbing by their leaves—which have retrorse prickles upon them—over high trees and rocks.

There are a great many other palms which we have not time to notice. We must pass by with but a mention, the date palm of the deserts of Africa and Western Asia; the wax palm, of South America, from whose wax, holy candles are made to be used in the cathedrals of New Granada; the ivory palm, of tropical America, whose nuts become as hard as ivory, for which they are largely substituted; the climbing palms, of New Granada, whose long, tough stems are there twisted into cables and used in making suspension bridges; the cabbage palm, of the West Indies, whose young unexpanded leaves furnish a succulent food not very unlike the cabbage; the betel palm, of Cochinchina, which produces the far-famed betel-nut, so largely used by the inhabitants of the Indian ocean, in the way that more civilized people use tobacco; and the various palms which produce "toddy," which may be considered to be the whisky of the palm countries. You see then that this family of the palms, while not strictly of so great interest to us, is a most important one for the inhabitants of the warmer regions of the globe.

NEW MAP OF THE COMSTOCK.—J. B. Treadwell, U. S. Deputy Mineral Land Surveyor, has just issued a new map of the Comstock lode. It represents a number more locations than maps previously issued of the Comstock and is of convenient size. It is drawn on a scale of 1,000 feet to the inch and is 30 by 36 in size, mounted on rollers. It gives a longitudinal section of the lode with shafts, representation of ore bodies, etc. The shafts are all carried down to the depth at which they were when the map was issued—about the first of this month. The map was compiled by Mr. Treadwell, from patents, plats in the Land Office; drawings at the mines, and surveys by himself. Many of the locations which are not incorporated are shown on the map. The size of the map is much more convenient for office use than those published drawn on a larger scale, and it is published at the low price of \$6.

THE Consolidated Virginia mine is yielding 400 tons of ore per day. The ore breasts throughout the entire mine never were looking and yielding better than at present. The Gold Hill News says that the mine is simply looking magnificent at all points, all the prospecting drifts and winzes being in the richest character of ore. The mills are all running on ore from the mine, and are kept working to their fullest capacity. The yield for the past month was \$1,001,500, and notwithstanding the present will be a short month, it is confidently expected that the yield will be increased to between \$1,200,000 and \$1,400,000.

PAINFUL ACCIDENT.—James Hill, Esq., U. S. Boiler Inspector, was thrown from his buggy one day last week, and fractured his right leg between his ankle and his knee. This will probably prevent his attending to the duties of his office for a month or more, during which time C. C. Bemis and Captain Waterman will attend to all matters requiring the attention of the Boiler Inspector.

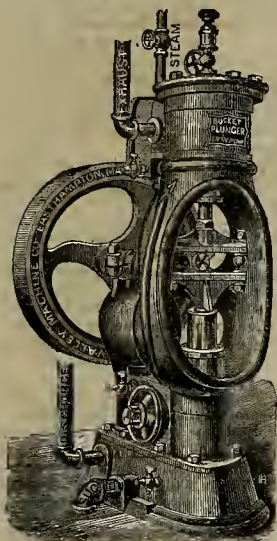
At the Poorman mine, in Idaho, the Burleigh drill are doing very well. The drills and compressors have been at work there about three months. By hand labor the progress in this shaft was twenty inches per day. With a Burleigh drill they now make six feet. The cost of making six feet is just the price of a quarter of a cord of wood above the cost of sinking twenty inches.

At the New Almaden quicksilver mine, San Jose, with the Burleigh drill, 177 feet of tunnel, 8x8 in size, was made in January, against 33 feet made by hand labor the previous month, cutting a tunnel but $4\frac{1}{2}$ x 6 feet in size.

The numerous mines in the vicinity of Ogden are being developed with much vigor, and are said to be looking finely.

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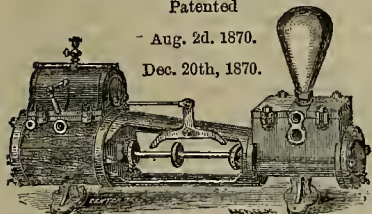


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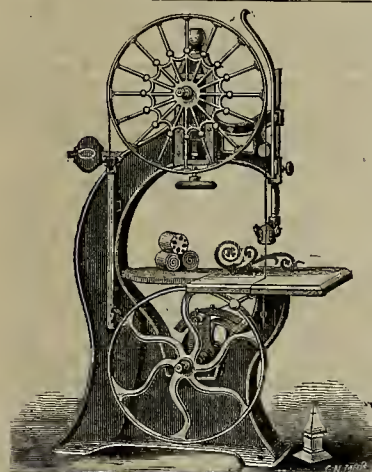
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There is but this one machine that has ever had these improvements employed. It is an old machine, formerly built for another device, and is unfavorably constructed for Ball's improvements; yet this first temporary experimental machine has filled a scow of eighty-five cubic yards in sixteen minutes in unfavorable digging. For durability, digging hard material and fast work, it has a reputation (supported by leading engineers) as having no equal.

Testimonials and references will be given on application to the inventor, who is the sole owner of patents (excepting having made an assignment of the one machine now belonging to the Central Pacific Railroad Company) Having resolved not to sell any rights unless upon a basis of actual work performed by a machine built by myself for the purpose of fairly establishing the worth of the invention, I therefore offer to sell machines or rights on the following plan, which is warranting the capacity of the machine by actual work:

I will enter into an agreement with any responsible party to build and sell a machine, scows and tender, all complete, and right of all my improvements in dredging machines throughout the Pacific Coast for \$20,000, warranting the machine to dredge six cubic yards per minute (to fill a scow at that rate). \$20,000 will but little more than pay the cost of building the machine, scows, etc., all complete; therefore I am proposing to ask nothing for my patents unless my machine dredges more than six cubic yards per minute. But it shall be further agreed that in case (at a fair trial to be made within a stated time) the machine shall fill a scow at the rate of more than six cubic yards per minute, then \$10,000 shall be added to the price above stated for each and every such additional cubic yard thus dredged per minute, and for additional fractions of a cubic yard thus dredged in the same ratio the \$10,000 is to be added to said price above stated.

I will sell any other Territorial or State rights (either United States or Foreign) upon the same plan and at a lower price proportionately than the rights for the Pacific Coast.

I will sell a single machine with scows and all complete, and right to use the same in a limited territory, for \$20,000 on the same plan as above stated, but will add only \$2,000 to each additional yard over the six cubic yards per minute. Each machine is not to employ more than two 10x20 inch engines.

Payments to be made in U. S. gold coin on delivery of machine, as may be indicated by agreement.

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Kipp's Upright Engine

Has decided merit. Its Beauty, Compactness, Strength, Durability, ECONOMY IN FUEL, Ease in Handling, and Small Space required attract the Buyer, and the Price readily concludes the Sale.

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Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grains Grammes, will be sent free upon application.

7v25-1f

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Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pan being filled, the motion of the muller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

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Ores worked by any process.
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Plans furnished for the most suitable process for working Ores.
Special attention paid to the Mining and Metallurgy of Quicksilver.

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On all kinds of Ores, and particular attention

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6v28-3m

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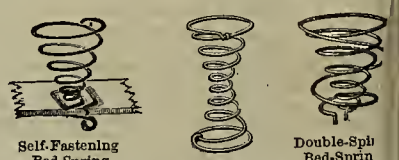
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The Concentration of Ores a Specialty. Agent for the Humboldt Company, Manufacturers of Mining and Concentrating Machinery.

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I am prepared to take contracts on Tunnels and the Sinking of Shafts.



We manufacture all sizes of BED and FURNITURE SPRINGS, from No. 7 to the smallest Pillow Spring, also, the Double Spiral Spring, which is the most durable Bed Spring in use. It is adapted to upholstered skeleton beds. We have the sole right in this State make the celebrated Overmann Self-Fastening Spring. Any man can make his own spring bed. They are particularly adapted to Farmers' Miners' use. Send for Circulars and Price List

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High and Low Pressure Boilers of all Descriptions.

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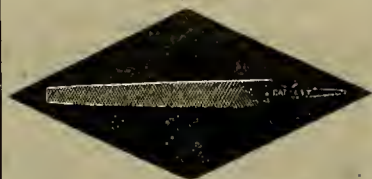
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Every Variety of Shafting,

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Of every description and size

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. box 2032, San Francisco, Cal., will receive prompt attention.

The highest price paid for Scrap Iron.

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Are prepared to make SHEET IRON AND ASPHALTUM PIPE, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

Standard sizes of railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

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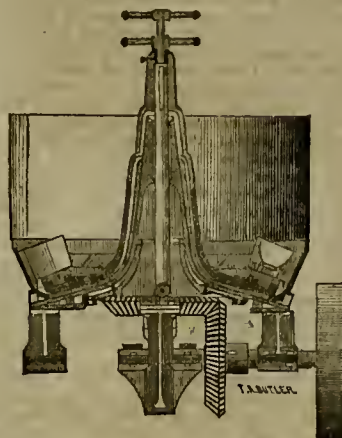
MACHINIST,

and Maker of Models for Inventors. All kinds of Dies Stamps and Punches made. Also, all kinds of Small Gears Cut.

Repairing done on very Reasonable Terms and in the best manner. No. 32 Fremont street, S. F. 19v23-3m

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IRON CASTINGS of all descriptions at short notice. Sole manufacturers of the Hepburn Roller Pan and Callahan Grate Bars, suitable for Burning Screenings.

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ALL kinds of Brass, Composition Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Boilers and Gaskets of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. H. WARD. V. KINGWELL.

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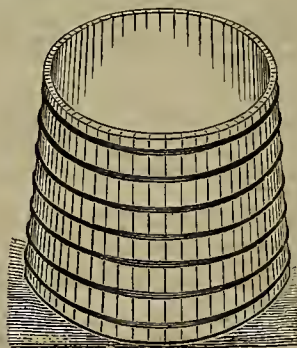
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Manufacturer of Flour and Saw Mills, Stationary and Portable Steam Engines, Pumps, etc. Boilers built and repaired, and all kinds of Iron and Brass Castings furnished at short notice.



WATER TANKS of any capacity, made entirely by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Cost less than elsewhere.

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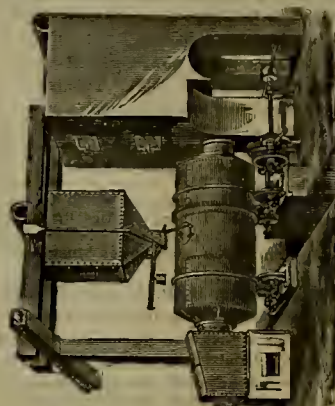
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Have always on hand a large Stock of

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TEATS' PATENT FURNACE.

TEATS' PATENT FURNACE

For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces, controls them with ease; adding heat or air; stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, heating the water for amalgamation and the boilers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kilm," for drying ores direct from the mine or breaking, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874. For particulars address

D. B. MILLER & CO.,

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STEEL SHOES AND DIES

FOR QUARTZ MILLS,

Made by our improved process. After many years of patient research and experiment we have succeeded in producing

STEEL SHOES AND DIES for QUARTZ MILLS, which are unequalled for

Strength, Durability, and Economy

Die. Shoe.

Will wear three times longer than any iron Shoes

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Of Quartz Mills, Pans, Separators, Concentrators, Jigs, Hydraulic Rock Breakers, Furnaces, Engines, Boilers and Shafting, and general Mining Machinery in all its details and furnishers of Mining Supplies. All orders promptly filled.

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88 Liberty street, N. Y. Examination solicited. 9v28-1y

EAGLE IMPROVED CHLORINIZING AND DESULPHURIZING FURNACE.

(Patented July, 1873.)



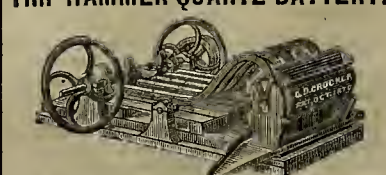
The Cheapest and Most effective Furnace now in use. Parties desirous of building above furnace, or for any information on same, address,

I. T. MILLIKEN,

No. 302 Montgomery st., room No. 14, S. F.

CROCKER'S PATENT

TRIP HAMMER QUARTZ BATTERY.



This machine, complete, weighs 1,500 lbs. Has an iron frame, five-steel arms with clamps working 17 lbs. each, which strike 2,000 blows per minute, in a mortar provided with screens on both sides, and crushes FINE 800 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$500.

G. D. CROCKER,

17v26-4f 315 California street, San Francisco,

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s MINING AND SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

CUTTING ATTACHMENT FOR SEWING MACHINES. M. A. Graham, San Francisco. This is an attachment for sewing machines which consists of a shear cutter so arranged as to be operated by the movement of the needle arm. An adjustable guide is fitted to regulate the width of the material to be cut. This device is extremely useful for cutting the trimming which is used in narrow strips in large quantities for ladies' dresses and it can be made with great rapidity by simply running the machine at a considerable speed.

COAL OIL STOVE. B. R. Sweetland, Sacramento, California. This invention relates to improvements in that class of coal oil stoves in which a water chamber is introduced between the oil reservoir and the point of combustion for the double purpose of keeping the oil tube cool and applying elements of combustion to the flame. The improvement consists in a peculiar arrangement of the water chamber, by which a more extended water surface is presented for vaporization, and at the same time the difficulty is avoided which has heretofore been encountered by the enlargement of the toothed wheels which raise and lower the oil wicks with the water wicks. It also consists in combining with the external water surface a heat radiator which will concentrate the heat upon the water and increase the evaporation.

FASTENING SEAMS IN OVERALLS. Chaug Quon Wo, San Francisco. This improvement in overalls consists in forming a gusset or triangular lap upon the piece of goods which comes opposite the corner of the pocket or other termination of a seam, and then sewing the lap or gusset down across the seam. The small lap which is shaped when cutting the material, is lapped over the corner of the pocket or seam and sewed down firmly all round so that it will form a gusset for strengthening the corner of the pockets and prevent them from ripping or being torn by any ordinary strain that may come upon them. The small lap spoken of is formed in the proper place when cutting the cloth for the pants so that it forms a permanent part of one of the pieces of the pants and is, therefore much stronger and more durable than if it was a separate piece sewed over the seam. This is the first United States patent, we believe, ever issued to a native of China.

CURING TOBACCO. Sebra R. Mathewson, Gilroy, Cal. This inventor provides an improved apparatus for hanging and handling tobacco in the leaf and stalk, in order to dry and cure it. The improvement consists in constructing a series of chains or ropes, which are formed into connected hangers and suspended upon a pulley, which moves upon an overhead rail, so that by moving the pulley along the rail the entire hangings with their loads can be shifted easily from place to place without handling the leaves.

ELASTIC DEMIJOHN. Carlton Newman, San Francisco, Cal. This is an invention which we described in detail on the 19th of September last, but the patent was only issued in January. It consists in surrounding the bottles with an elastic jacket, and weaving the rattan around the covering, thus doubly protecting the bottle. This patent demijohn is having a large run and meeting with ready sale. They will probably entirely supersede those of the old style. Mr. Newman has ten men constantly at work on these demijohns at the San Francisco glass works, where they are made exclusively. This is another use to which that abundant material, tule grass, is put, as Mr. Newman uses this as a covering for the bottles, on account of its superior elasticity and its cheapness.

DITCHING AND EMBANKING MACHINE. Wm. B. Hyde, Oakland, Cal. This invention relates to an improved machine for excavating shallow ditches, of greater width than the width of a single mould board, and at the same time conveying the excavated earth to the outside of the ditch, so as to form an embankment either upon one or both sides of the ditch. The invention consists in arranging two or more plows diagonally to the line of travel, so that each plow will cut its furrow in the manner of a gang plow; but instead of simply turning the furrow over, each plow is provided with a wing or side scraper, which forces the earth out of the excavation and deposits it upon the brink of the ditch, where it is left to form an embankment.

In Gold Mountain district, Esmeralda county, Nevada, the difficulty of obtaining water enough for milling purposes has retarded the growth of the camp. The Borax Miner states now, however, that Mr. John Roth, has recently been running a tunnel about 300 feet in Gold mountain for water, and has made a much greater success than was anticipated, having obtained a running stream of about one inch, and thinks that by cutting fourteen or fifteen feet further through a clay wall a much larger stream will be obtained. It is probable now that a mill will be put up.

The mines around Salt Lake have swallowed up \$3,000,000 belonging to St. Louis capitalists.

General News Items.

COLD WEATHER AT THE EAST.—Last week seems to have been the cold spell of the season in the East. The cold culminated on Saturday, closing up the rivers on both sides of New York city. Large numbers of fishing vessels were ice-bound in Cape Cod bay, unable to go either in or out. The entire bay was frozen over, an occurrence never known before. A cold wave passed over Maine, New Hampshire and Vermont, on Friday night, which sent the thermometer down to 26 and 32 degrees below zero. In Chicago, the thermometer on Saturday was six degrees below zero at noon. The high wind of Thursday drifted the snow badly and caused a great deal of delay on all railroad lines. Trains on seven different roads were either unable to get in or delayed several hours. Reports from all points state that great inconvenience is experienced on account of the freezing of water-courses and scarcity of water for stock.

THE BEECHER TRIAL is still dragging its slow and disgusting length along, and all excepting a knot of the friends of the chief actors are growing tired of the repetition of the great scandal. From present appearances it is thought by some that the trial will last a month longer. Probably no trial has occurred in the last century in any part of the world which has caused so much sensation, or which presented so many plausible sides—all contrary. The parties most interested seem to be really the ones most at ease. An exchange says: Mr. Tilton laughs at the jokes, eats like a wood sawyer, takes his ride and his glass of sherry, and prepares his case every night with the coolness of a night editor getting up the day's news. Mr. Moulton takes the witness box, laughs and argues at recess, foils counsel, and is a sort of Don Cesar de Bazan in general. Mr. Beecher has a little levee every day, and sits in Court with all his family, as at a pantomime.

A FEARFUL TALE.—A mother and her eight children were burned in their house, near Montreal, Canada, a few days since. The fire caught in the lower part of the house. The father, in trying to put it out, was cut off from his family, and barely escaped with his life. The mother seized two of her children in her arms, thinking to save them and go back for the others. She might indeed have escaped with them, but the cries for help of the little ones left so overcame her, that she preferred to go back and die with all her children than to escape with a part, and she did go.

SARGENT'S LAND BILL.—The Commissioner of the General Land Office writes to the Chairman of the Senate Public Lands Committee that he thinks it expedient to pass Sargent's bill, providing that all even numbered sections, which were included within the railroad limits and afterward restored to the public domain, shall be opened to homestead and pre-emption entry the same as odd numbered sections, at \$1.25 per acre. The Committee still have the matter under consideration.

POSTAL CHANGE FOR CALIFORNIA.—Offices established at Whitesill, Mendocino county, James M. Smith, Postmaster. At Spanish Dry Diggins, El Dorado county, Wm. B. Davis, Postmaster. Office discontinued—Waterloo, San Joaquin county. Postmasters appointed—Harvey Hayne, at Stoney Point, Sonoma county.

MR. BEECHER AND THE N. Y. "LEDGER."—The announcement is made that Mr. Beecher writes no more for the New York Ledger. Whether it is Mr. Beecher or Mr. Bonner who has felt compelled to make this innovation will probably remain forever one of those problems against which the public mind rasps itself in vain.

APPROPRIATIONS FOR CALIFORNIA RIVERS.—Clayton has secured an appropriation from the Committee on Commerce of \$15,000 for the improvement of the Sacramento river. And Page hopes to secure \$10,000 for the San Joaquin river.

POMEROY, THE BOY MURDERER, TO BE SENTENCED TO DEATH.—The Supreme Court in the case of Jessie H. Pomeroy, the boy murderer, overruled the exceptions and ordered judgment on the verdict. He will therefore be sentenced to death.

THE LICK SALE.—The balance of the Lick estate will be sold at auction, at Platt's Hill, on Thursday, April 6th. The property offered includes valuable lots in this city and San Jose.

Or the forty-two millions of passengers carried over the railroads in Massachusetts last year only a single one was killed, and but seven were injured.

SETTLED.—The Santa Barbara wharf trouble, has been settled. The wharf has been repaired and steamers land as usual.

THE COMMITTEE ON APPROPRIATIONS inserted in the Indian bill \$30,000 to pay land settlers in Round Valley Reservation.

THE ANTI-CHINESE NATURALIZATION BILL has passed both houses of Congress and will become a law.

HEREDITARY CONSUMPTION BARREN.—Because there is an inherited tendency to consumption it does not follow that the heir to this sad legacy must die of the disease. The early symptoms of danger are marked—a cough being the first and most prominent. Meet this first indication of peril with *Hale's Honey of Marshmallows and Tar*, and in three days it will have vanished, and with it all cause of apprehension. No matter how delicate the lungs may be, or how strong the predisposition to consumption, a speedy cure is absolutely certain.

Pike's Tooth-Ache Drops—Cure in one minute.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., Feb. 16, 1875.

FOR WEEK ENDING FEB. 2, 1875.*

SHOE AND GAITER.—George Bryant, S. F., Cal. **SLATE WASHER.**—Levi L. Lyman and Edward A. Boell, S. F., Cal.

SOFA BEDSTEAD.—John K. Underhill, Stanislaus Co., Cal.

SEWING MACHINE FOR SEWING BAGS, ETC.—Howard P. Garland and Andrew J. Gove, S. F., Cal.

CHAIN PROPELLER.—DeWitt C. Johnson, Redding, Cal.

APPARATUS FOR GENERATING GAS.—John H. Rawlings & Lambert Irelan, Watsonville, Cal. **COMBINED FLUTING AND SAIL IRON.**—Charles R. Rand, S. F., Cal.

EASTENING FOR METINO RAILS OF SASHES.—Chester J. Snow, S. F., Cal.

ROCK-DRILLING MACHINE.—George Atkinson, S. F., Cal.

GRAIN SEPARATOR.—Thomas J. Hubbell, Yountville, Cal.

WATER METER.—Nathaniel W. Knowlton, Nevada City, Cal.

JOINT FOR SHEET METAL PIPES.—Jos. Moore, S. F., Cal.

TRADE MARKS.

FOR TEA.—Robert Cunningham, S. F., Cal.

FOR TEAS.—Williams, Blanchard & Co., S. F., Cal.

FOR TEAS.—Williams, Blanchard & Co., S. F., Cal.

FOR CIGARS AND TOBACCO.—The Consolidated Tobacco Co., Gilroy, Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible.

METALS.

WEDNESDAY M., Feb. 17, 1875.

American Pig Iron, 30 ton	46 00	46 00
Swedish Pig Iron, 30 ton	46 00	46 00
White Pig, 30 ton	46 00	46 00
Oregon Pig, 30 ton	46 00	46 00
Refined Bar, bad assortment, 30 lb.	34 00	34 00
Refined Bar, good assortment, 30 lb.	34 00	34 00
Boiler, No. 1 to 4	5 00	5 00
Plate, No. 5 to 8	5 00	5 00
Sheet, No. 10 to 13	5 00	5 00
Sheet, No. 14 to 17	5 00	5 00
Sheet, No. 18 to 21	5 00	5 00
Sheet, No. 22 to 25	5 00	5 00
Horse Shoes, per keg	7 50	8 00
Nail Rod	10 00	10 00
Cast Iron	10 00	10 00
Roller Iron	6 00	6 00
Other Irons for Blacksmiths, Miners, etc.	4 00	4 00

COPPER	31 00	32 00
Copper Pipe	45 00	45 00
O. N. Pipe	60 00	60 00
Sheeting, 30 lb.	24 00	24 00
Sheeting, Yellow	24 00	24 00
Sheeting, Old Yellow	24 00	12 00
Composition Nails	24 00	24 00
Composition Bolts	24 00	24 00

Plates, Charcoal, 10 lb box	13 00	15 00
Plates, 10 Charcoal	13 00	15 00
Roofing Plates	12 50	15 00
Roofing Plates	12 50	15 00
Steel, English Cast, 30 lb	20 00	20 00
Anderson & Woods' American Cast	16 00	16 00
Drill	13 00	16 00
Flat Bar	13 00	16 00
Plow Steel	9 00	10 00
Zinc	11 00	11 00
Zinc Sheet	11 00	11 00
Sheet	4 25	4 25
QUICKSILVER per lb	1 37 1/2	1 40

LEATHER.

WEDNESDAY M., Feb. 17, 1875.

City Tanned Leather, 30 lb	22 00	22 00
Santa Cruz Leather, 30 lb	22 00	22 00
Country Leather, 30 lb	22 00	22 00
Stockton Leather, 30 lb	22 00	22 00
Jeodot, 30 lb	22 00	22 00
Jeodot, 11 to 13 Kil, per doz	63 00	72 00
Jeodot, 14 to 15 Kil, per doz	63 00	72 00
Jeodot, second choice, 11 to 15 Kil, per doz	57 00	74 00
Cornelian, 12 to 15 Kil, per doz	57 00	74 00
Cornelian Females, 12 to 15 Kil, per doz	57 00	74 00
Cornelian Females, 14 to 15 Kil, per doz	57 00	74 00
Simon Ulmo Females, 12 to 15 Kil, per doz	60 00	63 00
Simon Ulmo Females, 14 to 15 Kil, per doz	60 00	63 00
Simon Ulmo Females, 15 to 17 Kil, per doz	61 00	63 00
Simon, 15 Kil, per doz	61 00	63 00
Simon, 20 Kil, per doz	65 00	67 00
Simon, 24 Kil, per doz	65 00	67 00
Robert, 7 and 8 Kil, per doz	55 00	60 00
French Kips, 30 lb	1 00	1 15
California Kip, 30 lb	40 00	40 00
French Sheep, per color, 30 lb	8 00	10 00
Eastern Calf for Books, 30 lb	1 00	1 25
Sheep Roams for Topping, all colors, per doz	9 00	13 00
California Rueset Sheep Linings	5 50	10 00
Best Jeodot Calf Boot Legs, per pair	5 00	5 25
Good French Calf Boot Legs, per pair	4 00	4 75
French Calf Boot Legs, per pair	4 00	4 75
Harness Leather, 30 lb	37 00	37 00
Fair Bridle Leather, 30 lb	48 00	72 00
Skirting Leather, 30 lb	33 00	37 00
Jeodot, 30 lb	72 00	74 00
Rub Leather, 30 lb	30 00	50 00
Wax Side Leather, 30 lb	17 00	17 00
Western Wax Leather	17 00	17 00

To Patent Attorneys, Contractors and Inventors.

WASHINGTON, D. C. January 1st, 1875.

I have carefully prepared a complete digest of U. S. patented Paving and Roofing Compositions, up to January 1st, 1875, in which is given the name of patentee, number and date of patent, ingredients, and, (when given in the specification) the proportions of ingredients. Also, all of English Patented Paving Compositions up to January 1st, 1874, amounting in all to over six hundred patents, a complete state of the art to date. It is my intention to publish this work at an early day in book form, and should you wish to subscribe should address

L. W. SINSABAUGH, Assistant Examiner, Room 21, Patent Office, Washington, D. C.

A. ROMAN & CO.,

Booksellers, Stationers, Importers, Blank Book Manufacturers, and Wholesale Dealers in everything required by the Trade and School Departments, attention to their stock of Standard and Miscellaneous Books, which, for completeness and variety, cannot be excelled.

JUVENILE BOOKS of every description. **SCHOOL BOOKS**—Latest and most approved. **SCHOOL FURNITURE**—Elegant, durable and cheap. **STATIONARY**—Foreign and domestic. **BLANK BOOKS** in stock and made to order. **LETTER, NOTE, AND INITIAL PAPERS** in every variety.

Latest Publications received as soon as they appear. Book Buyers and Libraries supplied on liberal terms. Eastern Publishers' catalogues forwarded post-paid, on charge, upon application. Special care will be taken in filling Wholesale Retail orders by mail and express, with promptness and at the lowest cash rates. A choice assortment of the latest styles of Fine Stationery constantly on hand in both departments—retail and wholesale.

A. ROMAN & CO.,

11 Montgomery Street, Lick House Block

San Francisco, Cal.

Averill Chemical Paint.

MANUFACTURED BY THE

Cal. Chemical Paint Co.

PURE WHITE, AND ANY SHADE OR COLOR.

This Paint is prepared in liquid form, READY FOR APPLICATION—requiring no thinner or dryer, and not spoil by standing any length of time. It is Cheaper, more durable, more Elastic, and produces a more Beautiful Finish than the best of other Paints.

It will not Fade, Chalk, Crack, or Peel off, and last twice as long as any other Paint. In ordering White, state whether for Outside or inside use, as we manufacture an Inside White (oil Flat or Gloss) for inside use, which will not turn low, and produces a finish equal to the finest Oil Gloss.

Put up in 1/2, 1, 2 and 5 gallon packages, and Barrels. Sold by the Gallon. For further information send for Sample Card. Price List, or apply to the manufactory and office,

Cor. 4th and Townsend streets, S. F. TYLER BEACH, M. C. JEWELL, President, Secretary.

379-cow-bp-ly

Ayer's Cherry Pectoral,

For Diseases of the Throat and Lungs, such as Coughs, Colds, Whooping Cough, Bronchitis, Asthma and Consumption.

The few compositions which have won the confidence of mankind and come household words among not only one, many nations, must have extraordinary virtues. I have no one ever secured wide a reputation, or maintained it so long, as AYER'S CHERRY PECTORAL. It has been known to the public about forty years, by a continued series of marvellous cures, that have won for it a confidence in its merits, never equalled by any other medicine. It makes the most effectual cures of Coughs, Colds, and Consumption, that can be made by medical skill. Indeed, the CHERRY PECTORAL has really robbed these dangerous diseases of their terrors, to a great extent, and given a feeling of immunity from their fatal effects, that well founded, if the remedy be taken in season. Every family should have it in their closets, for the remedy a prompt relief of its members. Sickened, suffering, even life is saved by this timely protection. The patient should not neglect it, and the wise will not. It is by you for the protection it affords by its timely in sudden attacks.

PREPARED BY DR. J. C. AYER & CO., Lowell, Mass. PRACTICAL AND ANALYTICAL CHEMISTS.

Sold by all Druggists and dealers in Medicine.

CRANE & BRIGHAM, Wholesale Agents

729-ly SAN FRANCISCO, CAL.

Quartz Mill for Sale

At Mineral Hill, Elko County, Nevada, four miles from Mineral Hill Station, on the Palisades and Eureka Railroad, and 35 miles from the Central Pacific Railroad.

The Mineral Hill Silver Mines Company (Limited) offer for sale their new 20-stamp mill (dry crushing) built by H. J. Booth & Co. of San Francisco.

The mill is complete in every respect, with engine, Haller's Stetefeldt Furnace and all modern appliances and is as good as new, having only run two months upon ore.

The whole is offered very cheap for cash. For further information apply to

H. H. OAKES, Superintendent.

Mineral Hill, Nevada.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical House, Menagerie, Real Ponds and Skating Rink.

THE AMERICAN TURBINE Water Wheel.

Power Pledged Equal to any Over-shot Wheel Ever Built.

Recently improved and submitted to thorough scientific tests by James Emerson, showing the following effect of the power of the water utilized, being THE HIGHEST RESULTS EVER KNOWN.

Percentage of part gate, 1/2 50.08; 3/4 69.64; 5/8 78.73; 1/2 82.90. Percentage of whole gate, 83.14.

Mr. Emerson says: "These are the best average results ever given by any Turbine Wheel experience."

Amplified descriptive catalogues, or any other information desired, furnished on application to TREADWELL & CO., SAN FRANCISCO, CAL. Sole Agents for the Pacific States and Territories. 18729-cow-1f

PATENT ELASTIC PEN-HOLDER.

This Holder is furnished with a pair of elastic rubber cushions, which render a steel pen as flexible as the time goose quill pen.

It provides an easy hold, that does not cramp or tire the fingers.

It protects the fingers and desk from ink stains.

The fingers acquire a delicate touch that enables a person to obtain a beautiful hand-writing.

The elasticity of the pen can be adjusted to suit any hand, by simply sliding the pen up or down.

Sent by mail, on receipt of Seventy-Five Cents.

JOHN S. ORNDORFF, Money Order Clerk, Virginia, Nev.

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DIVIDEND NOTICE.

Bank of the Western Savings and Trust Co., San Francisco, Jan. 4th, 1875. Depositors' Dividend.—The Directors of this Corporation have this day declared the semi-annual dividend, at the rate of eight (8) per cent. per annum on Term Deposits and eight (8) per cent. on Ordinary Deposits, payable on and after January 10th, 1875, at the office of the Bank northeast corner of Post and Kearny streets.

F. CLAY, Vice-President and Cashier.
H. J. BOOTH, President. 3-19-1m

DIVIDEND NOTICE.

Savings and Loan Society, 619 Clay Street. The Board of Directors have declared a dividend for the six months ending December 31, 1874, of Nine per cent. per annum on all deposits free of Federal tax, and payable on and after January 15, 1875. By order CYRUS W. CARMANY, Cashier.

DIVIDEND NOTICE.

Masonic Savings and Loan Bank, No. 6 Post street, Masonic Temple, San Francisco. At a meeting of the Board of Directors of this Bank, held January 18th, 1875, a dividend was declared at the rate of nine and one-half (9 1/2) per cent. per annum on Term Deposits, and seven and one-half (7 1/2) per cent. per annum on Ordinary Deposits, for the semi-annual term ending January 21st, 1875, payable on and after January 28th, 1875, free of all taxes. H. T. GRAVES, Secretary.

DIVIDEND NOTICE.

The Farmers' and Mechanics' Bank of SAVINGS have declared a Dividend for the half year ending December 31, 1874, at the rate of ten per cent. per annum on term, eight per cent. per annum on class ordinary, and six per cent. per annum on class two ordinary deposits, payable on and after January 15th, 1875. By order G. M. CONDER, Cashier. 3-19-1m-bp

The Pacific Mutual Life Insurance Company of California.

No. 41 Second street, - - - Sacramento

ACCUMULATED FUND, NEARLY

\$1,250,000.00.

\$100,000 Approved Securities, deposited with the California State Department as security for Policy holders everywhere.

LELAND STANFORD, President.
J. H. CARROLL, Vice-President.
JOS. CRACKBORN, Secretary.

All Policies issued by this Company, and the proceeds thereof, are exempt from execution by the laws of California. THE ONLY STATE IN THE UNION that provides for this exemption. Policies issued by this Company are non-forfeitable, and all profits are divided among the insured. Policies may be made payable in Gold or Currency, as the applicant may elect, to pay his premium.

Executive Committee:
LELAND STANFORD, J. H. CARROLL,
ROBT. HAMILTON, SAMUEL LAVENSON,
JAS. CAROLAN.

SCHREIBER & HOWELL,
11-29-cow-bp-3m General Agents, Sacramento.

Anglo-Californian Bank.

LIMITED.
Successors to J. Seligman & Co.
London Office.....No. 3 Angel Court
San Francisco Office.....No. 412 California street.

Authorized Capital Stock, \$6,000,000,
Subscribed, \$3,000,000. Paid in, \$1,500,000.
Remainder subject to call.

DIRECTORS IN LONDON—Hon. Hugh McCulloch, Renard D. Sassoon, William F. Scholfield, Isaac Seligman, Julius Sington.

MANAGERS:
F. F. LOW and IGNATZ STEINHART,
SAN FRANCISCO.

The Bank is now prepared to open accounts, receive deposits, make collections, buy and sell Exchange, and issue Letters of Credit available throughout the world, and to loan money on proper securities. 2-27-cowbp

The Merchants' Exchange Bank

OF SAN FRANCISCO.
Capital, One Million Dollars.

O. W. KELLOGG, President.
H. F. HASTINGS, Manager.
R. N. VAN BRUNT, Cashier.

BANKING HOUSE,
No. 423 California street, San Francisco.

KOUNTZE BROTHERS, BANKERS,

12 WALL STREET, NEW YORK,
Allow interest at the rate of Four per cent. upon daily balances of Gold and Currency.
Receive consignments of Gold, Silver and Lead Bullion, and make Cash advances thereon.
Invite Correspondence from Bankers, Mining Companies, Merchants and Smelting Works.

French Savings and Loan Society,
411 Bush street, above Kearny..... SAN FRANCISCO

G. MAHE, Director. 4-27-1f

Mining and Other Companies.

Calaveras Hydraulic Mining Company—

Location of principal place of business, San Francisco, California. Location of works, Central Hill, Calaveras County, California.
Notice.—There are delinquent upon the following described stock, on account of assessment, (No. 2,) levied on the 7th day of December, 1874, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
W H Knight, trustee.....	9	1875	\$37.75
W H Knight, trustee.....	01	1875	93.75
O H Stover.....	15	500	25.00
O H Stover.....	10	500	25.00
O H Stover.....	14	500	25.00
O H Stover.....	17	375	18.75
G H Stover.....	8	750	37.50

And in accordance with law, and an order of the Board of Directors made on the 7th day of December, 1874, so many shares of each parcel of stock as may be necessary will be sold at public auction at the office of the Company, 321 Battery street, San Francisco Cal., on Monday, the twenty-fifth day of January, 1875, at 12 o'clock, m., to pay delinquent assessment, together with costs of advertising and expenses of sale.

Office, 321 Battery street, San Francisco, California, (office of U. S. Internal Revenue Collector.)

POSTPONEMENT.—By order of the Board of Directors of the Calaveras Hydraulic Mining Company, the above advertised sale is postponed to Tuesday, February 23rd, 1875, at 12 o'clock, m., and will take place at the office of the Secretary, No. 321 Battery street, 130-3t By order, ABRAHAM SHEAR, Secretary.

California Beet Sugar Company.—Loca-

tion of principal place of business, San Francisco, California. Location of works, Sonoma, Santa Cruz County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of January, 1875, an assessment of Five dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, 314 California street, San Francisco, Cal. Any stock upon which this assessment shall remain unpaid on the 1st day of March, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on the 24th day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

LOUIS FRANCHONI, Secretary.
Office, No. 314 California street, San Francisco, Cal.

California Consolidated Mill and Mining

Company—Location of principal place of business, San Francisco, Cal.
Notice.—There are delinquent upon the following described stock, on account of assessment levied on the fourteenth day of January, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Benjamin, A. F.....	71	25	\$25.00
Benjamin, A. F.....	72	75	75.00
Bryant, A. J.....	7	100	100.00
Lunt, O. A.....	10	100	100.00
Taylor, J. W.....	74	5	5.00
Torrey, E. N.....	8	100	100.00
Torrey, E. N.....	11	100	100.00
Torrey, E. N.....	12	100	100.00
Torrey, E. N.....	13	100	100.00
Torrey, E. N.....	15	100	100.00
Torrey, E. N.....	16	100	100.00
Torrey, E. N.....	17	100	100.00
Torrey, E. N.....	19	100	100.00
Torrey, E. N.....	20	100	100.00
Torrey, E. N.....	21	50	50.00
Torrey, E. N.....	22	50	50.00
Torrey, E. N.....	23	50	50.00
Torrey, E. N.....	24	50	50.00
Torrey, E. N.....	25	50	50.00
Torrey, E. N.....	26	50	50.00
Torrey, E. N.....	27	50	50.00
Torrey, E. N.....	28	50	50.00
Torrey, E. N.....	29	100	100.00
Torrey, E. N.....	30	100	100.00
Torrey, E. N.....	31	100	100.00
Torrey, E. N.....	32	100	100.00
Torrey, E. N.....	33	334	334.00
Torrey, E. N.....	39	100	100.00
Torrey, E. N.....	40	100	100.00
Torrey, E. N.....	41	50	50.00
Torrey, E. N.....	42	50	50.00
Torrey, E. N.....	43	50	50.00
Torrey, W. L.....	40	100	100.00
Townsend, M. D.....	6	100	100.00

And in accordance with law, and an order of the Board of Directors, made on the 14th day of January, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the Company, room 16, 408 California street, San Francisco, Cal., on the 5th day of March, 1875, at the hour of 12 o'clock, m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary.

Office, room 16, 408 California street, San Francisco, California.

Confidence Mining Company—Location

of principal place of business, San Francisco, California. Location of works, Tuolumne County, State of California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the sixteenth day of January, 1875, an assessment of thirty (30) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, 210 Battery street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of March, 1875, will be delinquent, and unless payment is made before, will be sold on Wednesday, the seventeenth day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

W. S. ANDERSON, Secretary.

Office, 210 Battery street, San Francisco, Cal.

Electric Mining Company—Principal

place of business, San Francisco, State of California. Location of works, Lincoln Mining District, Butte County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 16th day of February, 1875, an assessment of five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold and silver coin, to the Secretary, at the office of the Company, in San Francisco.

Any stock upon which this assessment shall remain unpaid on the 24th day of March, 1875, will be delinquent, and unless payment is made before, will be sold on Monday, the 12th day of April, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

T. B. WINGARD, Secretary.

Office—Room 13, No. 318 California street, San Francisco

Geneva Consolidated Silver Mining Com-

pany. Principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, Nevada.
Notice is hereby given that at a meeting of the Board of Directors, held on the 24 day of January, 1875, an assess-

ment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, Room 14, 302 Montgomery street, San Francisco.
Any stock upon which this assessment shall remain unpaid on the 8th day of February, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday the first day of March, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 14, No. 302 Montgomery street, S. F.

POSTPONEMENT.—The time when the above assessment will become delinquent is postponed to the eighth (8th) day of March, and the sale of stock for delinquency is postponed to Wednesday, the thirty-first (31st) day of March, 1875, at the same hour and place above mentioned. By order of the Directors.
T. T. MILLIKEN, Secretary.
San Francisco, Feb. 2, 1875.



PARKE & LACY,

SOLE AGENTS FOR THE

Burleigh Rock Drill Company.

—MANUFACTURERS OF—

PNEUMATIC DRILLING MACHINES,
AIR COMPRESSORS AND OTHER MACHINERY.

Also, Farmers' Dynamic Electric Machine and
Hill's Exploders for Blasting, Putnam Ma-
chines Company's Tools, Wright's Steam
Pumps and Haskin's Enginss.

Address

PARKE & LACY,

21728-3m-hd

310 California St., S. F.

FIREMANS' FUND INSURANCE COMPANY OF CALIFORNIA.

Assets:

REAL ESTATE (unencumbered) S. W. cor. Sansome and California streets.....	\$165,000 00
LOANS ON BOND AND MORTGAGE, first liens.....	120,872 00
INTEREST due thereon.....	701 42
do due and accrued on stocks.....	640 00
UNITED STATES REGISTERED BONDS, par value, \$138,600; market value.....	148,195 00
SAN FRANCISCO CITY AND COUNTY do.....	18,000 00
CALIFORNIA STATE BONDS.....	1,000 00
SOUTH CAROLINA STATE BONDS.....	2,600 00
STOCKS, BANK OF CALIFORNIA, 200 shares.....	26,800 00
do FIRST NATIONAL GOLD BANK, 100 shares.....	11,750 00
BILLS RECEIVABLE, secured by collaterals, market value \$88,600—loaned.....	60,000 00
CASH in Company's Principal Office.....	5,892 86
do deposited in Bank of California.....	7,674 82
do do do do Sather & Co.....	9,286 01
do do do do Laidlaw & Co., New York.....	2,843 10
do do do do Union National Bank, Chicago.....	6,210 06
PREMIUMS in due course of collection.....	23,431 42
NET BALANCES in hands of Managers, Eastern and Western Departments, and in due course of transmission.....	26,749 00
BILLS RECEIVABLE, not matured, taken for Marine and Inland Risks.....	22,239 76
TAXES AND STREET ASSESSMENTS advanced on Real Estate, secured by terms of original Mortgages.....	3,073 19
RENTS due and accrued.....	250 00
OFFICE FURNITURE.....	5,661 12
Gross Assets.....	\$667,469 93

Liabilities:

LOSSES due and unpaid—none.....	
do reported and in process of adjustment.....	\$31,870 61
do resisted.....	33,996 86
MARINE BILLS payable.....	1,784 00
PERSONAL ACCOUNTS.....	2,169 36
Total.....	\$37,940 21

Net Assets, December 31, 1874.....\$629,529 72

COMPARATIVE.

NET ASSETS, December 31, 1873.....	\$658,418 60
NET ASSETS, December 31, 1874.....	629,529 72
Gain.....	\$71,111 22

D. J. STAPLES, President.
ALPHEUS BULL, Vice-President.

GEO. D. DORNIN, Secretary.
WM. J. DUTTON, Assistant Secretary

VERY IMPORTANT

TO MINERS AND MILL MEN.

Silver-Plated Copper Amalgamating Plates for Saving Gold,

Of all Sizes and in any Quantity, Furnished to Order.

FULL INSTRUCTIONS SENT FOR OPERATING THESE PLATES.

Over fifty prominent Mills and Mines have already been furnished with these plates. Particular attention given to plating goods for Builders, Plumbers, etc. Hotel and Restaurant work replated.

SAN FRANCISCO GOLD AND SILVER PLATING WORKS,

653 and 655 Mission Street, SAN FRANCISCO

E. G. DENNITON, Proprietor.

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WANTED—By a graduate of the Massachusetts Institute of Technology, who has had practical experience, the situation of Chemist or Assayer, or a position as Assistant in a Mine or Smelting Works. References given if required. Address, C. B. STAFFORD, Toledo, Ohio.

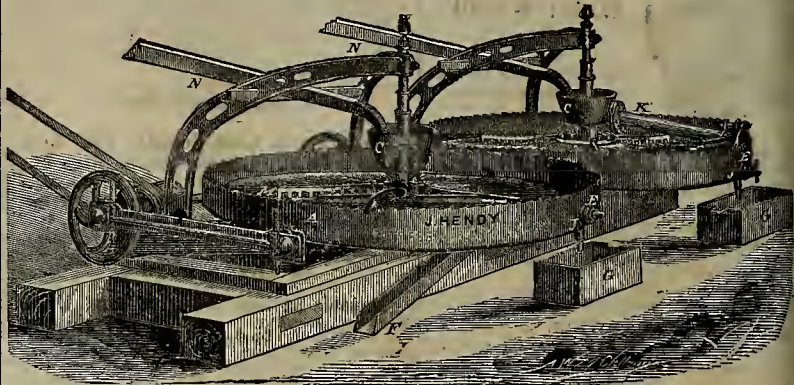
Brittan, Holbrook & Co., Importers of
Stoves and Metals, Tinware Goods, Tools and Machines;
111 and 113 California St., 17 and 19 Davis St., San Francisco, and 178 J St., Sacramento.
mr.-ly

PURCHASERS please say advertised in Scientific Press

OVER \$3,500 PER MONTH SAVED

BY THE USE OF

Hendy's Improved Amalgamator and Concentrator



Can be seen at the Manufactory, No. 32 Fremont Street, San Francisco.

SAN FRANCISCO, April 27, 1874.
JOSHUA HENDY, Esq.—Dear Sir:—As a practical miner and millman, I take pleasure in recommending the use of your Concentrators in all mills where gold or silver ores are reduced. No mills should be without them, for the following reasons:

1st. They are good sizers (no perfect concentration in pulverized ores can be effected without first sizing).
2d. The best Concentrator I have ever known—(the concentrated stuff only containing 6 per cent. of sand).
3d. They are good amalgamators, light (feather) particles of amalgam and particles of coated gold by attrition are brightened, and from their specific gravity and the action of the pan, fall to the bottom and adhere.
4th. They require but little power and attention to run them, and with ordinary care will last for years.
I have been familiar with the workings of your Concentrators for four years past; have run them myself in the North Star Mine, Grass Valley; am familiar with their practical workings on the Empires Mine, Grass Valley; St. Patrick, Placer Co.; St. Lawrence, El Dorado Co.; Oaks and Reese, Mariposa Co., and most cheerfully give you this testimonial. For further information you are at liberty to refer to,

Yours respectfully,

JAS. H. CROSSMAN, M. E.

409 California street, or Cosmopolitan Hotel.

SAN FRANCISCO, February 10, 1874.

OFFICE SUPERINTENDENT OF KEYSTONE CON. M. Co., AMADOR, AMADOR COUNTY.

MR. J. HENDY—Dear Sir:—In answer to your inquiries as to your Concentrators furnished our company last July, I would say that I am more than pleased with them; and the saving to the company has been over \$3,500 per month more than with the blankets and boulders formerly in use.
O. C. HEWITT, Supt.

OFFICE SUMNER MINE, KERNVILLE, April 27, 1874.

J. HENDY, Esq.—Dear Sir: Having four of your Concentrators in use at our Mills for four or five months, which for saving Amalgam and for concentrating Sulphurates, are a success, beyond a doubt, I feel it a duty due you and those interested in Quartz Mills, to recommend them.

As further evidences of their worth, I now order TWELVE more of your Machines for our new Mill, now in course of erection.

E. R. BURKE, Superintendent.

For description send for Circular.

JOSHUA HENDY, San Francisco.

Office and Works, 32 Fremont street.

9v28-1m-1f

DUNHAM, CARRIGAN & CO.,

SUCCESSORS TO

CONROY, O'CONNOR & CO.,

IMPORTERS OF

HARDWARE, IRON, STEEL

AND OTHER METALS,

107, 109 and 111 FRONT STREET,

108, 110 and 112 PINE STREET,

SAN FRANCISCO, CAL.

2v30-6m-cow

AMMONIA!

For Washing and Cleaning Purposes.

For Sale by all Grocers.

This article is universally used in Europe, and, recently introduced for general family use in San Francisco and neighborhood, is already in great demand. It is now the intention of the manufacturers to introduce it all over the Pacific Coast, at prices which will bring it within the reach of every household.
It is unequalled for cleansing Woolen Fabrics, Outlets, Carpets or Crockery; for Scrubbing Floors, Washing Paint, Removing Grease Spots, Shampooing or Bathing. It renders water soft, and imparts a delightful sense of coolness after washing.

DIRECTIONS.—For Laundry, use two to four table-spoonfuls to a wash tub of water. For bathing, use one table-spoonful in the bath tub. For removing grease spots, apply with a brush, undiluted, and wash with water afterwards. For stimulating the growth of plants, use a few drops in every pint of water used in watering.

PRICE.—Per Pint Bottle, 25 cents; per quart Quart Bottle, 40 cents; per Half Gallon, 75 cents.
Also, SULPHATE OF AMMONIA for chemical purposes, fertilizing, and the preparation of artificial manures. AMMONIACAL PREPARATION, for the prevention and removal of boiler scale. CRUDE AMMONIA, for general manufacturing, and PURE LIQUOR and AQUA AMMONIA for chemical and pharmaceutical purposes.

Manufactured by the
SAN FRANCISCO GAS-LIGHT CO.
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Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND-POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 315 California street, Rooms 16 and 17.

24v26-4f

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MANUFACTURERS OF

Hydraulic Pipe,

AND

ARTESIAN WELL PIPE.

Having the Latest Improved Machinery, we can make it an object to

Mining & Water Companies

OR

WATER WORKS,

To Contract with us for

SHEET-IRON PIPE.

All Sizes Made and all Work Guaranteed.

130 Beale Street,

SAN FRANCISCO.

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special lengths and sizes. Constantly on hand a large stock of Manila Rope, all sizes; Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

TUBBS & CO.

de20 611 and 613 Front street, San Francisco.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

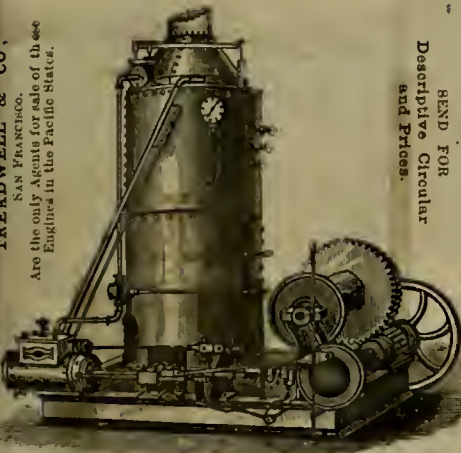
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J. HENDY, No. 32 Fremont Street.

IMPROVED HOISTING ENGINES.

HOISTING ENGINES.

TREADWELL & CO.
SAN FRANCISCO.
Are the only Agents for sale of these
Engines in the Pacific States.



Descriptive Circular
SEND FOR

COOK, RYMES & CO.'S Celebrated Hoisting Engines have been too long in use on the Pacific Coast to require any special recommendation from us. We refer with confidence to any one of the hundreds now in use. We simply state that they still sustain their old reputation, the manufacturers not having followed the now too common practice of reducing the quality of material and workmanship for the sake of competing with cheaper engines. For details of sizes send for price list. We desire to call particular attention to our new

MINING HOISTING ENGINES.

(Manufactured by the same parties.)

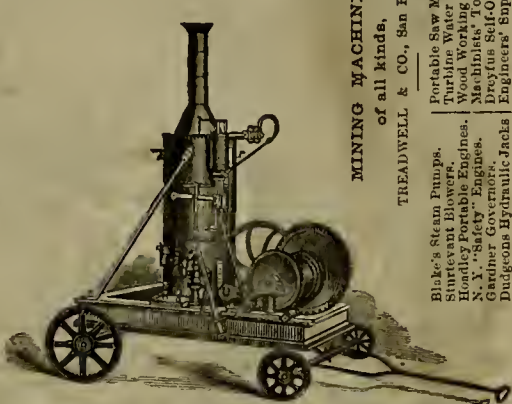
Which have just been introduced on this Coast. The plans and specifications are the combined efforts of OUR MOST SUCCESSFUL MINING ENGINEERS, and the result is the most complete

DOUBLE-DRUM HOISTING ENGINE

Ever built. Their advantages will be seen at a glance by any one familiar with the necessities of a mine. One of these engines may be seen at work in the Reicher mine, and one in the Ophir, on the Comstock lode, to both of which we refer. We have all sizes of these engines constantly on hand. For sale only at

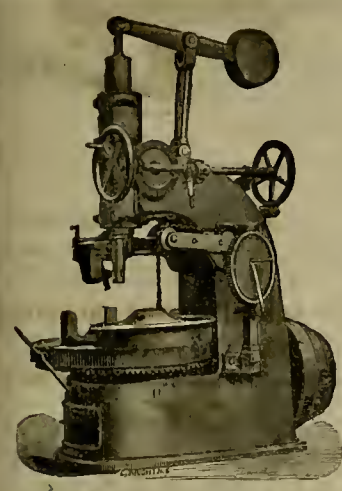
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TREADWELL & CO.'S,
San Francisco, Cal.



MINING MACHINERY
of all kinds,
TREADWELL & CO., San Francisco.

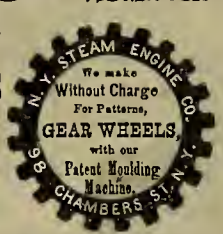
Black's Steam Pumps.
Blair's Water Mills.
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No. 4 Car Wheel Borer.



We have the best and most complete assortment of
Machinists' Tools
In the Country,
Comprising all those used in
MACHINE, LOCOMOTIVE,
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R. R. REPAIR SHOPS.



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NEW YORK STEAM ENGINE CO.,
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THIRTY DIFFERENT STYLES.

Smooth, Jack, Fore, Jointer, Block and Circular Planes.

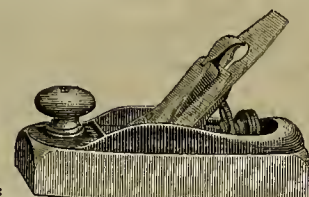
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IRON AND WOOD.

OVER

80,000

Already Sold.



MANUFACTURERS:

STANLEY RULE AND LEVEL COMPANY.

Factories: New Britain, Conn. Warerooms: 35 Chambers Street, New York.

FOR SALE BY ALL HARDWARE DEALERS.

Send for descriptive Circulars, embracing a full assortment of Improved Tools.

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THE BIRMINGHAM SHOVEL.

These Shovels have No Rivets nor Straps.

The blade is made of one piece of BEST SOLID CAST STEEL, the blade and shank being one piece.

THEY WILL WEAR TWICE AS LONG

As the ordinary shove They are the STRONGEST, BEST and CHEAPEST SHOVEL EVER MADE. Examine the engravings carefully and you can see how they are made.

THEY NEED ONLY TO BE TRIED

To prove their value. Prices same as ordinary shovels. Ask for the BIRMINGHAM SHOVEL. Take no other.

TREADWELL & CO., Sole Agents for Pacific States,
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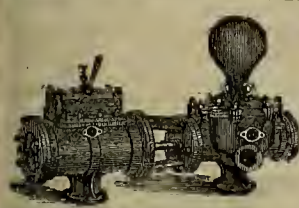
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STEAM PUMPS, INDEPENDENT BOILER FEED PUMPS, AND COMBINED COLD AND HOT WATER ENGINE PUMPS.

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CENTENNIAL PACKING.

SELF-LUBRICATING.

FOR

Locomotive

Marine and

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ENGINES.

FOR

Steam Pumps

AND

Hot or Cold

Water Pumps

OF ALL KINDS.



The CENTENNIAL is composed of the finest Hemp, made in strands or sections, of different sizes, each being saturated in a composition of pure German Black Lead and Tallow and covered with a braiding of the best Italian Hemp to be found in the market. It is manufactured in a shape the most convenient to use and handle, and gives from 50 to 100 per cent. more length compared with an equal weight of other makes. It runs with less friction on the rod than any other Packing made, from the fact of its being so perfectly soft and pliable, and so well lubricated so to require a minimum pressure on the rod. It cuts off smooth and makes perfect joints, is easily adjusted to any size rod, and only requires occasionally a new ring to keep the stuffing box full. ENGINEERS, TRY IT. For sale in any quantity by **TREADWELL & CO., San Francisco.**



IMPORTANT TO LUMBERMEN.

\$100.00 IN GOLD.

And FIRST PRIZE SILVER MEDAL were awarded to us for the best

SAWS

In the great National contest held at Cincinnati, September, 1874, and lasting over six days. Our celebrated DAMASCOUS TEMPERED SAWS were declared the victors.

We have made special shipping arrangements for very low freights and quick dispatch of our saws for the Pacific Coast. ONLY SEVEN DAYS BY MAIL FROM SAN FRANCISCO. Send your address for a full report of the great National Sawing Contest, and the class of saws that you use, with the thickness, size and kind that you use, and specify such as you will require within the next 60 days. We will guarantee to furnish you with saws that have no equal in quality, and at prices that will be entirely satisfactory. Address

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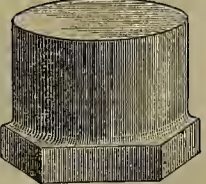
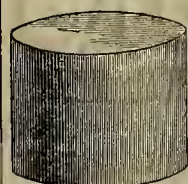
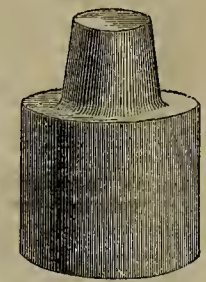
Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

[PATENTED MAY 26TH, 1874.]
Price Reduced to 16 Cents Per Pound.

SAN FRANCISCO, November 10th, 1874.

To Supts. of Quartz Mills and Mining Men generally.

We take pleasure in stating that owing to the rapid increase in our orders, our Pittsburg Manufacturers have been compelled to add largely to their works—a new gas furnace and heavier trip hammer—and are thus enabled to reduce the cost of steel and at the same time produce SHOES AND DIES superior to any yet manufactured. We have consequently reduced the price to 16 cents per pound and solicit a trial order, guaranteeing that you will find them at least 10 per cent. cheaper than the best iron. There are no STEEL SHOES AND DIES made excepting under our patent and sold at this office, or by our authorized agents, though certain Eastern manufacturers advertise STEEL SHOES AND DIES which are only cast iron hardened by the addition of a composition. They will not out-wear two sets of common iron, though called steel. They are very brittle and are not capable of being tempered, flying from under the hammer like cast iron. Our STEEL SHOES AND DIES are in use in many of the largest mills on the Pacific Coast, and all who have tried them pronounce them cheaper and far superior to iron in every respect, even at the old price of 20 cents per pound. Their advantages over iron are cheapness on first cost, increased crushing capacity, time saved in changing and in setting tappets, increased value of amalgam by absence of iron dust and chippings, and a saving of 75 per cent. in freight. It takes 60 days to fill orders from the manufactory East. Price 16 cents per pound shipped at San Francisco. Terms liberal.

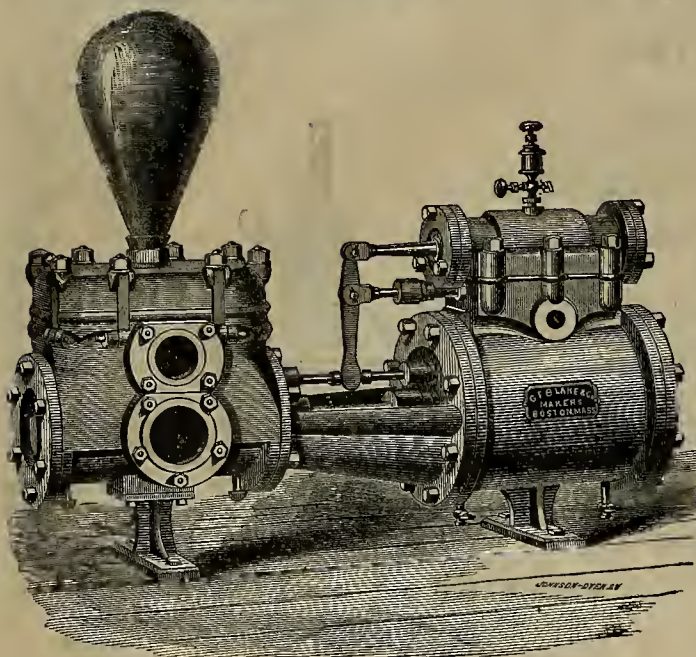


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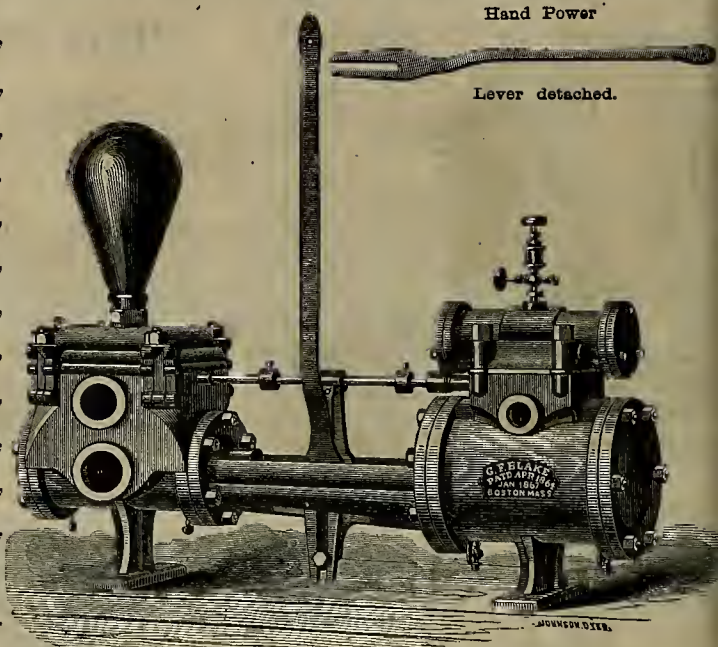
CAST STEEL SHOE & DIE CO., Room 11, Academy Building, S. F.

1v23-3m

BLAKE'S PATENT STEAM PUMP—MORE THAN 7000 IN USE.



MINING PUMPS,
TANK PUMPS,
MARINE PUMPS,
FIRE PUMPS,
Plunger PUMPS,
SUGAR PUMPS,
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The BLAKE PUMP may be seen in many of the principal mines of California and Nevada. More than 7,000 have been sold, and we refer to any one found in use. Send for our large and handsomely illustrated Catalogue giving prices and details of over 100 different sizes. A large stock of all sizes on hand at the Machinery Depot of

TREADWELL & CO., San Francisco.

1874. A GRAND SILVER MEDAL. 1874



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310 California Street,
SAN FRANCISCO.

The highest and only prize of its class given to any Vertical Engine was awarded to the
HASKINS ENGINES AND BOILERS,
BY THE
MASS. CHARITABLE MECHANICS' ASSOCIATION,
at their Fair in Boston, in competition with the
Baxter, New York Safety Steam Power
and the Sharpley Engines.

W. T. GARRATT.

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Brass and Bell Founder,

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MANUFACTURERS OF

Brass, Zinc and Anti-Friction or Babbett Metal
CASTINGS.

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FIRE ENGINES, FORCE AND LIFT PUMPS.

Steam, Liquor, Soda, Oil, Water and Plunge Cocks,
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Hose and all other Joints, Spelter, Solder and Cop-
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Particular attention paid to Distillery Work. Manu-
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Highest Market Price paid for OLD BELLS, COP-
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Cazin's Combination Ore-Sizer and Con-
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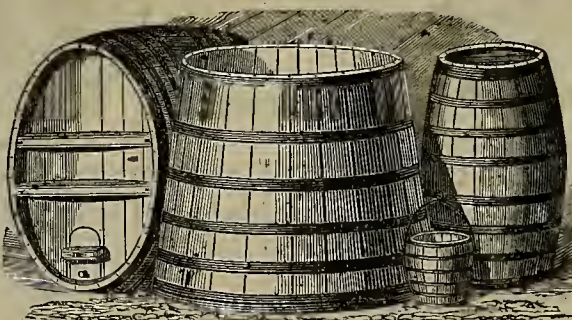
(Covered by Letters Patent of July 2d, 1872, and recent
applications.)

Containing a sizing apparatus, (revolving screws) de-
livering two or four sizes of ore to two or four rows of
sieves, each row independent of the other, and each
having 5 sieves, each row concentrating according to
specific gravity the special size automatically fed into
it, resulting in the simultaneous continual delivery of
separated materials, working 2d and 3d-class ores into
1st-class ores of perfect cleanliness. It thoroughly sepa-
rates native gold or copper from quartz or any other
lode matter—galena and silver sulphurets from
pyrites, barytes and quartz; and pyrites from quartz.

Added to a battery of stamps these machines consti-
tute a full system of ore concentration, sufficient in
most cases for the requirements of western mines, with
a capacity of 16 or 20 tons per 24 hours.

For particulars apply to,
F. CAZIN, M. & C. E.
Supt. Denver Concentration and Smelting Co.
At Denver, Colorado, Lock-Box 2225, or corner of
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CALIFORNIA WINE COOPERAGE AND MILL CO'



M. FULDA & SONS
Proprietors,
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Manufacturers of
WATER TANKS, MIN-
ING WORK OF
ALL KINDS.
WINE, BEER AND LIQUOR
CASES, TANKS, ETC.

GIANT POWDER.

Patented May 26, 1868.

THE ONLY SAFE BLASTING POWDER IN USE.

GIANT POWDER, NO. 1,

For hard and wet Rock, Iron, Copper, etc., and Submarine Blasting.

GIANT POWDER, NO. 2,

For medium and seamy Rock, Lime, Marble, Sulphur, Coal, Pipe Clay and Gravel Bank Blasting, Wood, etc.
Its EXCLUSIVE use saves from 30 to 60 per cent. in expenses, besides doing the work in half the time
required for black powder.

The only Blasting Powder used in Europe and the Eastern States.

BANDMANN, NIELSEN & CO.,

General Agents, No. 210 Front Street.

v22-3m16p

QUICKSILVER.

Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

PATENTED NOVEMBER 25th, 1873.

RANDOL AND FIEDLER'S QUICKSILVER CONDENSERS,
MADE OF WOOD AND GLASS.

Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

FIEDLER'S QUICKSILVER CONDENSERS,

MADE OF IRON.

Patented February 24th, 1874. See MINING AND SCIENTIFIC PRESS, November 15th, 1873.

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21v29-16p-3m

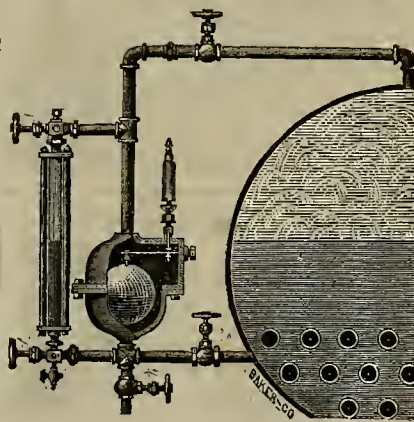
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My new revised and enlarged Catalogue of PRACTI-
CAL AND SCIENTIFIC BOOKS, 96 pages, 8vo., will be
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A New Fruit Dryer.

The business of fruit drying in this State has, within the past few years, grown to large proportions, and bids fair to be even larger. We now raise much more fruit than home consumption demands, and the consequence of this is that in order to insure the sale of crops the farmers and fruit raisers must dry or otherwise preserve the surplus production. Since it was first demonstrated in California that fruit can be dried with profit a number of fruit dryers have been introduced in the market and several different machines are now in use. We have described all the processes in use here in this paper and now illustrate and describe a new aspirant for public favor.

The dryer illustrated by the accompanying engraving was invented by William S. Plummer, of this city, and has been tested practically for over three months, principally on pumpkins. The process is continuous the fruit being placed on racks which are made to revolve and carry the fruit around a horizontal course through heated chambers and back to the place of starting.

By referring to the cut the general plan of the dryer can be seen. B represents a circular drying chamber in which the racks, A, for holding the fruit are carried. This chamber is enclosed by a stationary circular wall which is provided with a door, to get at the racks, as shown. A steam coil passes all around the interior of the drying chamber on the floor. The heated air from the furnace passes into an air chamber about the foot in height and comes through the perforated floor so that the hot air comes up through the steam coils and is distributed throughout the fruit drying chamber. A steam coil attached to the sliding door, C, is used for giving a greater degree of heat to the fruit as it is first put in.

It will be seen that there are several rows of pipes in this movable coil so arranged that a row of steam pipes passes between each two racks of fruit. A small movable partition is inserted between the row of racks, A, which is to be taken out, and the racks holding the green fruit on the left. By this means when the racks holding the green fruit are put in their place, the chamber is revolved sufficiently to place that section in the position where the sliding coil can be run in between the racks; at the same time the door can be opened and the fruit which has been dried can be removed. The movable coil, C, is so subject the green fruit for short time to a greater heat than can be maintained in the drying chamber, for "bursting the air cells." The slide on which this coil is placed, is to draw the coil and the partition back, momentarily to allow the racks to be run as often as each set is filled with green fruit.

A boiler in another part of the building furnishes steam for the steam coil and for the engine for driving the air pump. An air heater is placed in the furnace under the boiler so that the same fire furnishes both steam and hot air to the fruit dryer. Both boiler and air heating apparatus are placed in a room under the dryer. The fan drives the hot air through the drying chamber and through the escape pipe, D. The revolving chamber in which the fruit is dried, is suspended on a frame by means of an axle, so that it may revolve around the central support, E. The steam coils are laid on the floor and the hot air enters through the stationary side of the chamber at a point behind the movable coil, C. The hot air thus comes completely around the chamber before it escapes at D. By this means both hot air and steam are used in drying the fruit and as one batch of fruit is dried and removed another batch is put in the chamber. The machine which we examined at Spaulding & Bros., 31 Beale street, is 24 feet in diameter and has room for 140 trays. The trays have a superficial area of about one square foot. Six trays are put in about every twelve minutes. Mr. Plummer states that he easily dries 500 trays in a day, for as fast as one batch is finished another is put in. The capacity of

the machine is only limited by the size of the chamber. The same fire heats the air and furnishes the steam for steam coils and engine. This dryer can be attached to any steam engine and boiler now in use at a saving of from \$500 to \$1,000 on the first cost.

The arrangement of this dryer is quite simple, and it seems to be effective. While we were examining the machine one day this week they were drying pumpkins, and those removed from the machine were immediately ground to a fine powder. The amount of pumpkin dust in the room showed plainly that the pumpkins had been thoroughly dried. This finely powdered pumpkin is put up in small packages and sold.

These fruit dryers are sold at a comparatively low price. No. 1, which is 22 feet in diameter,

The City of Peking.

That noble specimen of naval architecture, the "City of Peking," sailed from this city on Saturday last. Invitations were issued by the agent of the P. M. S. S. Co. in this city to a number of persons, to take a short excursion around the bay in the "Peking" before her departure. The guests were transferred to the steamer "Arizona" when near Hunter's Point, and both vessels sailed in company as far as Fort Point, where farewells were exchanged, and the "City of Peking" passed on through the Golden Gate on her voyage to China. A number of small steamers and tug-boats accompanied the large steamer to the Gate, and then whistles and bells, with the band, and the boom-

ship ten or twelve knots an hour. There was no jurr or trembling whatever caused by the propeller. The vessel was stopped and started several times and it was impossible to tell by any jarring whether the propeller was revolving or not. The quietness with which the machinery worked was marvelous. It went like clockwork, and with not much more noise. After getting aboard the "Arizona" and steaming alongside the "City of Peking" one could realize better the proportion of the latter. She cut the water smoothly and took the water for about 30 or 40 feet without a ripple. At a point that distance from the entrance a slight curly wave rolled over, but from the aft there was not a ripple. She was drawing 24 feet of water, and her wake was as clean and smooth as that of a captain's gig, no foam or signs of agitation in the water being perceptible. After leaving Alcatraz they "opened her out" and she showed a clean pair of heels to the "Arizona," the "Antelope," the "General McPherson," and the new tug "Reeue," which steamers were escorting her out. As a specimen of naval architecture and ingenious mechanism the "City of Peking" and her engines are a credit to America.

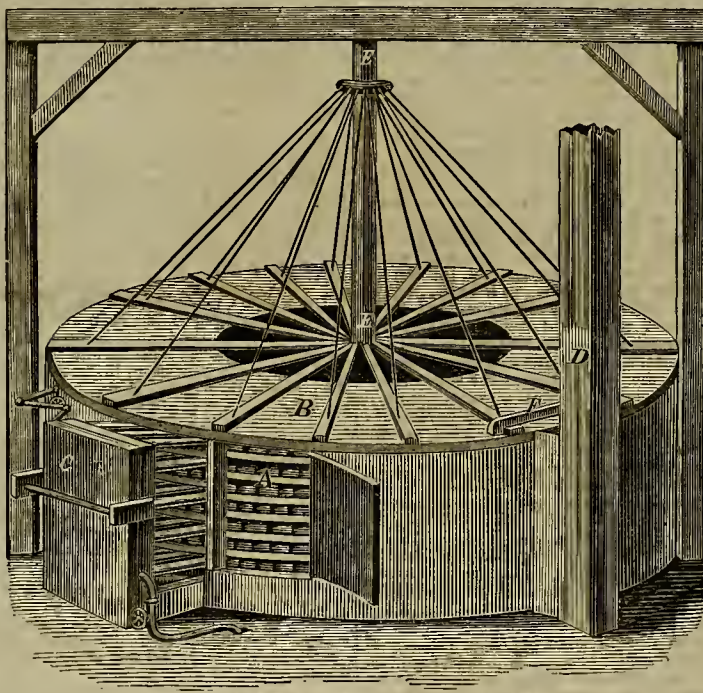
Reworking Old Ground.

The effect of the United States law requiring expenditure on mining claims annually has caused the relocation of many old, abandoned claims throughout the country. From all parts of this and neighboring States we hear of old claims being reworked, and many of them with good results. The abandonment of a mining claim does not always indicate worthlessness by any means, for in many cases it is caused by want of capital or a desire to seek new fields. Moreover, the causes which made many miners abandon their claims in some localities have been removed. New mills have been built in districts where formerly there were none; railroads have brought other mining camps into notice; new methods of working refractory ores have been devised, and capital has come to the assistance of labor.

We hear of new mines coming to the front every day, many of them in old districts, and the prospector has work before him for many a year to come. Still, there are numbers of mines which were originally located years ago, which from adverse circumstances were not worked, but which are as good now as some of the new mines. In some of the old districts "revivals" have taken place, and work recommenced with vigor. As an instance of this we can mention the celebrated Meadow Lake district, several developments in which, the Truckee Republican says, give promise of a revival of the abandoned city, more than thirty claims having been relocated. It is also reported that persons in the lower part of the county contemplate running a stage line from Cisco to Meadow Lake. This place has been considered quite a romantic spot on account of its being utterly deserted, and several pretty little stories have been written about it. Now, however, it seems that the spirit of progress has reached it again, and the grass-grown streets will once more know the foot of man.

Another instance which can be mentioned is Forbestown, formerly a famous mining town, which the Oroville Mercury says has all at once taken a new lease of life and is going ahead at a rapid rate. New buildings are going up, and new faces are to be seen every day on the street, seeking their homes. The work carried on by the mill company is giving employment to many, and the prospect is good that as soon as the new company get in running order there will be employment for a great many new hands, especially quartz miners. The placer mines are by no means exhausted yet, and many find employment in them.

It is not, however, in totally abandoned camps that the work of relocation is most marked, but in camps where great rushes have been made for fortunes, and where they were not made in a day they were left for other places. Miners recognize now, more forcibly than ever, that they, like most other men, must be content with modest profits, although, at the same time, they stand a chance of something handsome. We are glad to note the fact that so many old claims have been taken up again and worked, knowing that it augurs renewed prosperity in mining matters.



PLUMMER'S PATENT FRUIT DRYER.

is sold for \$2,500; No. 2, which is 24 feet in diameter is \$3,000, and No. 4 is sold for \$4,000 and is 28 feet in diameter. No. 3 has 24 sections and holds 168 trays. There are seven trays to each section in all the different sizes. These prices include the whole machine, engine, boiler, pump, steam coils, patent right and all; parties buying only furnishing their own building. The engine furnished is five horse power, and may be used for other purposes, such as pumping, etc. Mr. Plummer is confident that he can introduce his dryer all over the State, as its construction is so simple that he can sell it cheap. As will be seen from what we have said its capacity is great, and the operation of drying is continuous. As fast as one tray is put in another is removed, by simply turning the revolving chamber one section, the catch E, regulating it so that the trays always come exactly in front of the doors. The machine is easily revolved by a light crank, the position of which is close behind the escape pipe, D. The arrangement of the movable coils, C, is particularly ingenious, as considerable heat is concentrated exactly where it is wanted, and at the time it is wanted, namely, when the fruit is first put in the dryer. The machine does not take up much room and may be erected in a shed. The walls of the revolving chamber are lined with felt to prevent the escape of heat. The hot air is compelled to pass through all the fruit in the dryer before it can escape, and the steam coils extend around the whole machine. It will be observed that this fruit dryer differs from others now in use in several particulars, and it is the only one in which a horizontal revolving motion is accomplished. Those desiring further information concerning it can send for circulars to Spaulding Bros, 31 Beale street, in this city.

ing of the big guns from Alcatraz, as a salute was fired, altogether made an exciting scene.

No repairs were necessary to the machinery of the "Peking" after her voyage. When in the dry dock her propeller was repaired and a number of defective rivets were replaced with good ones. Quite a number had to be removed, but this is what happens to nearly every iron ship after her first voyage. The engines and machinery of the "Peking" attracted a great deal of attention from our engineers. There is no reason why engines of like character could not be made here if occasion requires it. We gave a detailed description of the steamer when she was launched, and as so much has been said of her that we do not care to repeat it. The engines of course are very large. Each consists of two pairs of compound engines. The stroke is 54 inches. There are two low-pressure cylinders of 88 inches each, and two high pressure of 51 inches each. Either engine may be detached from the other, and in case of breakage of one of them at sea, the sound one may be worked while the other is in process of repair, and will propel the vessel at two-thirds of its regular speed. This colossal machinery is furnished with steam from ten cylindrical boilers, 13 feet in diameter by 10 feet 6 inches long, the shell of each boiler being 13-16 of an inch thick and double-riveted. Each boiler has three cylindrical furnaces, with 204 tubes 3 3/4 inches outside diameter by 7 feet 6 inches long.

On the excursion trip last Saturday, we examined with great interest the machinery at work. Standing over the cylinders there was not the least perceptible noise, and everything worked as smoothly as possible. In the engine room one could hardly conceive that the almost noiseless machinery was driving the enormous

CORRESPONDENCE.

Mexican Mines—San Dimas.

ENTRORS PRESS:—It has been some time since I have had the opportunity to post you on this and neighboring districts. The principal companies here are the Lsveaga's, the Durango mining company of New York, the house of J. Kelly & Co., of Msztlsn, and any amount of "buscones" (chlorides). The first own the San Luis mine, the Tapias, the Soledad and Arana mines. Fred. Sundell is their engineer. He put a two-mule whim into San Luis mine for them, which has done so much to remove their prejudice towards machinery, that they sent him to San Francisco to buy "Msquins" for the rest of their mines. They own the Hacienda of "Bsnarte," and they are the big guns of this region, holding the powers that be where the hair is short. In the meantime they are working only one quality at a time, until Sundell returns. They still adhere to the Mexican style of working ores, although Capt. Dahlgren's mill (rented to Storch & Co.) gives them ocular proof of the rapid dispatch and close working of ores, whether rebellious or not.

We now come to the second mentioned company, Durango mining company of New York. This company own the Bolanos, Candelaria and Cinco Senores mines, and the Hacienda of Huamuhil. This company bought these mines in 1864. Mr. Jos. G. Rice (now dead) was the first Superintendent. He started two tunnels, one for Candelaria and one for Cinco Senores. He worked the Bolanos mine and started the mill building of a 10-stamp mill at said Hacienda de Huamuhil.

M. Ralph Martin, of New York, was the second Superintendent. He advanced the two tunnels. In 1870, Capt. Dahlgren, of Nevada, succeeded him. He finished the mill and advanced the tunnels, starting a new one for Bolanos. Not being supported by his company, as promised, he got into debt and had to rent his mill for three years to get out, as also the Bolanos mine to Henry Janin and Thomas Bell, of San Francisco. Some troubles arose and things are mixed, although it is very evident that Dahlgren did not allow Janin to get ahead of him. There are all the elements of a fine lawsuit, etc. The mill was rented to Dr. J. B. Storch, of Austin and Eureka, and partners (Kelly & Co.). It has a dryer, crusher, self-feeder (Tulloch's), five stamps at present running; furnace of Dr. S. own idea, wooden pans, etc. The wheel is 50 feet diameter (overshot) and can drive twenty stamps if required. The Dr. has in 1½ years run worked up to 87½ per cent., and he gets more out by concentrating on "planillas," proving himself a first-class mill man, the only one in this part of Mexico. His loss is 20 oz. per ton of \$140 ore cost \$35 per ton, and they have shipped over \$100,000 (mostly bought ores).

The Candelaria is preparing to start up, as arrangements have been made for capital to push things to an early completion.

The Cinco Senores is in lawsuit with some jumpers, and Capt. Dahlgren is putting pumps into the Bolanos to drain it.

So just at present San Dimas is dull, but all indications are towards a speedy resumption of work and lively times.

The weather is cold for here, being 45° at 5 A. M., and as high as 80° mid day, dropping to 60° at 7 P. M. In San Vicente a Mr. Carson is pegging away at his mine with indifferent success. "On dit," that he has struck it lately—rich, very rich. The other district are holding the even tenor of their way.

"Tax."

Candelaria mine, San Dimas, Durango, Mex.

Utah Mines.

EDITORS PRESS:—Mining and smelting in Utah is this winter more lively than it has been any previous winter. In the Cottonwood, the Flagstaff is hoisting 60 tons per day of good ore. The Highland Chief, Wellington, Antelope and Prince of Wales are working and shipping quite lively.

In American Park, the Miller mine is working with 20 men and is taking out some good ore. In Tintio, the Eureka is working with 40 men who take out plenty of horn silver. The men receive a share of the ore instead of pay, which shows their good faith in the mine.

In Parley's Park, the Ontario is working under the able management of G. Hearsh as superintendent, with 25 men, taking out no ore but developing the mine continually. On the dump there have 1,000 tons of ore.

In West Mountain district, which is the most lively mining camp at present in Utah, the Neptune and Kempton mines working with 60 men, taking out from 30 to 40 tons per day. The Jordan and Galena are working with 60 men, shipping 50 tons of ore per day. This mine belongs to Carson & Bnzo.

The Utah concentrating works are not working at present on account of the difficulty of getting coal. The mine works with 10 men taking out 12 tons per day. The Rawling works with 15 men, taking out 15 tons of ore per day. The

Spanish Hill works with 30 men, taking out 40 tons per day. The Nez Perces Chief is working with 15 men taking out 20 tons of ore per day. They will soon be taking from 40 to 50 tons of ore per day. The Lsht Chance have run their tunnel 720 feet in and will soon strike the vein. The Ashland mine, owned by G. Hearst, works with 24 men and ships 20 tons per day. The Esst Last Chance, owned by Carson & Bnzo, is in 650 feet. All the other mines are working with energy, and some of them, as the Saratoga, Revere, Osceola, Lucky Boy, Washington and Royal have lately made rich strikes. The ore is most all carbonate, from 20 to 30 ounces in silver and 50 to 60 per cent. lead. From the other districts I cannot give you special information, as I have not visited them lately.

Climatic Changes in California.

At a recent meeting of the Californian Academy of Sciences, Dr. Henry Gibbons, Sr., read the following paper on climatic changes in this State:

An opinion prevails that the climate of California has changed since the American occupation, and that further settlement and cultivation will produce further changes. It may be well to inquire whether this be probable or, indeed, possible. The peculiar features of the climate of a country depend on two classes of causes, the one fixed and the other capable of change. The fixed causes are mountains and plains and permanent bodies of water. The changeable causes, such as man can modify or remove, are forests or the absence of forests, cultivation of the surface and drainage. The climate of California depends mainly on fixed causes. We have on the east the Sierra Nevada mountains, presenting to the winds an almost impassable barrier. Hence, east winds are almost unknown and will over continue so. On the west we have the ocean, with a constant current from the north, bathing the coast with water of the temperature of 52 degrees at San Francisco. Winter and summer this is the same. At high tide the thermometer plunged into the bay at Meigs' wharf shows this temperature in July as in January. Resting upon the ocean is, therefore, a body of air always cold. It follows that at all seasons, and under all circumstances, the sea breeze will have nearly the same temperature when it strikes the land. It is the great equalizer of temperature on the line of the coast, and wherever it can penetrate. Where the coast is skirted with mountains the ocean wind is walled out, just as the east wind is walled out by the Sierra.

Between the Coast mountains and the Sierra are other ranges running northward and southward, which also modify the direction of the atmospheric currents. The southerly storm winds of winter pour through the intervening valleys like water running in troughs, and, of course, take the direction of the valleys.

Our climate is modified also, to some extent, by the great deserts in the southern part of the State, and beyond. Those deserts become heated in the winter season, the superincumbent heated air rises, and its place is supplied from the colder regions of the northward. "Northerners" are thus produced. They are frequent in the southern counties, where they are called "sand storms" occasionally they sweep the whole State from its northern limit.

In the summer, when the valleys and plains throughout the State become heated, the air rises in like manner, causing the cool air of the coast to pour in at every possible break or depression in the mountain barrier, and to distribute itself through the interior following the lines of the valleys. Now, all these causes and conditions are permanent, and no amount of population or cultivation can change them. If man could level the Sierra, we might have east winds and a different climate, if he could remove the coast mountains, the sea breeze would sweep the State in its length and breadth. If he could, on the other hand, hold up the depression of the latter, and close the Golden Gate, we should have the climate of Arizona everywhere. If he could convert the Mohave desert into a garden, or wall it out by a mountain range, we might possibly get rid of our unwelcome northerners.

So much for the permanent causes of our peculiar climate. Now let us look for a moment at those causes which man can control or modify:

First. The removal of forests. This diminishes the rain fall, and renders the climate dryer and warmer, but there are no forests in California except among the mountains; and there a new growth of trees would spring up before the process of destruction would begin to tell on the climate.

Second. The drainage of marshes and lakes would have the same effect. But this is not likely to be done to an extent sufficient to produce tangible results, even if those results were desirable.

Third. The cultivation of the soil, by which a surface comparatively barren may be covered with verdure, would tend to render the air more cool and moist. But the difference would, in all probability be so slight as to exhibit no marked change of climate.

Fourth. The planting of forests, or patches and lines of trees, will have an effect similar to ordinary culture, and will also present a decided impediment to the surface winds. Most persons have noticed the increased force with which the wind blows over a raised causeway, or even over a wide and level plain. Many opportunities have been afforded in this State to witness the effect of an orchard in warding off

the sea breeze for some distance to the leeward. This process, it is true, would not produce any change in the general climate, but it might be employed in proper localities to serve the interests and comforts of the inhabitants, and to protect them in a measure both from the rigor of the ocean wind and from the drying and blighting influences of the northerly gales.

In contemplating this subject I can discern no other influences by which our climate can be changed than those above enumerated. It is evident that no radical change can be induced by those agencies; but it may be alleged a spontaneous change is going on irrespective of local conditions and causes. We have no warrant for this supposition in the history of older countries. It is more than probable that a gradual change is going forward in the climate of the whole earth, but so slowly that centuries of carefully made and renewed observations, will be required for its demonstration. Any change which takes place within a period of fifty years at any point should be regarded as a temporary oscillation, or a portion of a circular revolution.

My conclusion, therefore is that the climate of California and the adjacent territory is undergoing no permanent change; that no such change is possible; that the winter season will continue to give its rains in uncertain quantities; that the dry season will continue to be dry; that summer and winter, seed time and harvest will continue to succeed each other with no essential deviation from the general type as observed since the American occupation.

A rich vein of cinnsbar has been discovered by S. W. Payne, on Point Reyes, Marin county. Quicksilver has been found by retorting the soft clay of an ochrous color, which lies between the rock. The vein runs north by west to southeast, and has been traced about eight miles. There seems to be several minerals in the ledge. W. O. L. Crandall found two small buttons of silver by the rude process of roasting the rock.

THE Calaveras Chronicle says the running of a tunnel through the ridge that separates Cook & Co' hydraulic claim on Sport hill, from the ditch is completed and being used for conducting water to the mine. The tunnel drove for the reception of the sluices is also finished and the flume laid. The claim is now in prime order for working to advantage, and operations are being pressed with vigor.

WITHERILL, of Benton, Inyo county, has made a sale of his mill and mining property to a San Francisco stock company, receiving therefor \$65,000. Last summer, in a five months' run, the selling party realized \$55,000 from the same mine; but he sells it with the avowed intention of finding something near by equally as good.

THE hoisting machinery of the Black Diamond coal company's new shaft at Nortonville, which has been thoroughly refitted since the disastrous fire, some four months since, was tried with steam last week, in preparation for the business of hoisting the coal from all the workings through the new shaft.

BETWEEN Coso and Little Lake are several famous springs or mud volcanoes. These have been located by A. B. Elder and others, principally on account of the vast deposit of brimstone, of which it is said no less than 10,000 tons, almost pure, can be collected there.

THE suit of Creed Haymond against the Spring Valley canal and mining company, for the sum of \$9,700 was settled at Oroville last Wednesday by arbitration. The matter was referred to Judge Sexton, Judge I. S. Belcher and P. O. Hundley, and the sum allowed was \$3,500.

A NEW and rich quicksilver mine has recently been discovered on Mr. Brannan's land, two and a half miles west of the Calistoga railroad depot, and not a little excitement has been created thereby.

THE work of running the 1,000-foot level in the Gwin mine is progressing finely. Indications are good that the level is approaching the pay chute. In the meantime good ore is being mined in the 900-foot level, upon which the batteries are kept busily employed.

THE mining excitement in Potter valley is running high. They have found gold, silver and quicksilver. It is said there is not a foot of the hills surrounding the valley, north, east, west, or south but what has been staked off for a mining claim.

JOS. GINACOA, Superintendent of the Humboldt mill and mining company's works at Winnemucca, Nev., has leased the Tullula mine in Dup Glen for eighteen months. He intends to commence operations on the mine about the first of March.

A RICH strike is reported in the Hussey mine at Cornucopia. The mine referred to is the first location north of the famous Leopard mine, and work, which has been suspended for some time past, had only been resumed some three or four days before the strike was made.

A SAN Fernando correspondent writes to the Call confirming the reports of rich cinnsbar discoveries in that vicinity, and states that all that is now needed is capital with which to develop the mines.

MINERS near Quincy are making good wages.

Nickel Mine in Napa County.

We have lately referred to new discoveries of copper and chrome iron in our neighborhood and have endeavored to show up the many advantages to our citizens to be derived from the working of these newly found deposits, and the sure influx of a large immigration to our county as a necessary sequence to the developing and working of our mines, of whatever kind they may be. The latest new discovery is that of nickel. Mr. Finley, who has been prospecting for the last few years, while in the neighborhood of Pine Flat a few days since, discovered an immense ledge of this metal, which may be added to the many mineral productions of our section of country. The value and usefulness of this metal cannot be overestimated. Its uses are various, principal among which is the manufacture of our new American cent coin, of which twelve parts in one hundred are nickel and eighty parts copper. Aside from this newly found ledge in our neighborhood, we believe there are but two other mines in the United States where it can be obtained; one is in the State of Connecticut and the other at Lancaster, Pennsylvania; the latter being the mine which supplies the nickel for our new one-cent coin. It is also used for making needles for the compass, having the advantage over iron, inasmuch as it does not rust. This metal would be more generally used in the various arts, judging from its adaptability for many purposes, if it were more generally known, and if larger quantities of it could be procured. Other metals, such as iron, lead, cobalt, copper, together with sulphur, are usually found in small quantities where this metal is procured. Ores of a similar character have also been discovered in North Carolina, but as yet no great development of the ledges have been made. Missouri also claims to have some discoveries of this ore, but the proof of its existence is yet wanting. We have most unbounded faith in the recent discovery of nickel in our vicinity, and, like our copper and chrome iron mines, it only needs a little capital in conjunction with labor to unearth and bring to light another source of great wealth to our State. This discovery is situated about two miles from Pine Flat, and near the Occident, Brother Jonathan and Woodpecker quicksilver claims. The assay of the latter shows the presence of copper, and as this is usually found in conjunction with nickel, and as all three of these claims are in close proximity to the recent discovery, we see no reason why we should not infer that the region in which these claims are situated should not contain nickel in large quantities. Nothing is now wanting but capital to develop.—*Calistoga Press*, Feb. 13.

PEAVINE.—The most encouraging reports are coming in from the Peavine mines. The Consolidated Peo are crushing ahead without interruption, both as to the mill and McGlew furnace. They both work to a schism. Their average roasting of ore daily is only five tons, owing to the bad quality of wood that is being used; otherwise the yield of bullion would be larger. The last thirty-six hours retorted bullion to the amount of sixty pounds, showing a fineness of 980, and a yield of over \$60 per ton of ore. In a very short time this company will be clear of all liabilities, and run the mine and mill without assessments. The daily yield of ore from the mine is over thirty tons of good pay ore. The Golden Fleeca mine is producing a very high grade of pay ore out of the incline, which is down to 70 feet, from the 156-foot level. The bottom of this incline contains the whole width of this fine grade of ore—over three feet. The average assay of this ore is over \$300 per ton. They have contracted with the Auburn mill company to crush a few tons by Stetefeldt process, during the coming week. There is prospecting going on on all claims which can be worked under cover much more activity of working the several claims would prevail if the heavy snow was not a barrier to the sinking of open shafts. Already every preparation has been made to start up in full earnest the moment the state of the weather will permit.—*Nevada State*.

SHEWD miners and traders are already making active preparations for another assault upon the treasure vaults of Cassiar, although there seems every reason to apprehend that King Frost will keep them back later than usual. Upward of 2,000 went there last year, and probably more than double the number will go this year. We do not think, however, that many from California will go there, as the reports of the country last year with regard to climate and possibilities of work, were sufficient to warn people in this State to stay at home.

THE RAILROAD car shop of Sacramento, is running all its machinery, and there are good prospects for plenty of work. They are busy in the paint shop also with a full gang, an altogether, the indications are that the company will have a large force employed this season.

A CAT fell down the shaft of the Minnesot mine at Fairview, Idaho, a few days ago, a distance of 800 feet, and on being sent to the surface, sprang out of the bucket, apparently uninjured.

A LARGE number of new mining enterprises have been inaugurated in the vicinity of Silver City.

GLOWING reports are received from the silver copper and iron mines in Soledad canyon, Los Angeles county.

SCIENTIFIC PROGRESS.

A Layer of Hydrogen Above Our Atmosphere.

In a paper read before the Manchester Literary and Philosophical Society, Henry H. Howorth observes: "It is clear that if under certain conditions hydrogen be an exception to the general law of the diffusion of gases, and follow rather the more general law of gravitation, it will exist in a stratum above the atmosphere and beyond the reach of direct observation. In his experiment upon the occlusion of gases, Mr. Graham examined several aerolites and found that under the air pump, they parted with a very large quantity of occluded hydrogen. If, as is probable, the gas was occluded by the aerolites when at a red heat, and this red heat was coincident with their passage through the layer of the upper atmosphere in which the phenomena of the shooting stars and of the aurora occurs, it seems more than probable that this stratum is a layer of hydrogen. This is confirmed by what we know of the spectrum of certain auroras, which resembles those of the zodiacal light and the solar corona. The spectrum of the corona has been the most attentively studied, and Janssen, perhaps the greatest authority on it, speaks most confidently about its distinguishing feature being the hydrogen lines, while a special line which characterizes both its spectrum and that of aurora, and which is different to that of any terrestrial substance, is considered by Father Secchi to be an abnormal hydrogen line. Dr. Dalton long ago argued, as Mr. Baxendell has reminded Mr. Howorth, that the peculiar features of the aurora could best be explained by the hypothecon of a stratum of some peculiar gas above the atmosphere. A gas of a 'feruginous nature' is the expression of Dr. Dalton. Now, hydrogen, in the higher chemistry, is not only closed among the metals, but Faraday and others have shown that in its relation to magnetism it is nearly allied to iron. So that a stratum of hydrogen above the air would seem to exactly answer Dr. Dalton's postulate. If it should exist the earth would resemble the sun in one remarkable feature; for we now know that the sun is girded with an immense layer of hydrogen. Lastly, he would add that the heterogeneous texture of the great nebula in Orion seems to argue that the law of the equal diffusion of gases does not prevail here.

Gases Evolved from Molten Iron.

The author considers that gases evolved from molten iron come from three sources. 1. They were dissolved by the iron while melting in the furnace. 2. They were dissolved by contact of the molten iron with the air. 3. They were dissolved by contact of the molten metal with the mould.

1. The evolution of gas from gray iron is small; the gas consists chiefly of hydrocarbons or carbon iron oxide. From white iron more gas is evolved, together with little particles of iron, which are oxidized in the air. Spiegel-eisen evolves a peculiar white fuming gas, which contains silica, and is probably silicon fluoride.

The author thinks that the poorer an iron is in combined carbon, the more readily does it absorb gases containing carbon, while the richer it is in carbon the more readily does it dissolve gases containing hydrogen. The primary cause of the evolution of those gases which have been dissolved in the furnace he traces to the diminished pressure under which the iron exists, as compared with the pressure in the furnace.

2. By the action of the air, the surface of the molten iron becomes oxidized. In iron containing much carbon, the oxygen is transferred from the air by means of the metallic surface to the carbon, which it oxidizes to carbon monoxide, which again bubbles up through the molten mass; hence it is in such irons that we find the greatest amount of blisters on the surface after cooling. White irons show fewer of these, and spiegel-eisen solidifies with a smooth surface.

3. As the mould into which the molten iron is run always contains water, this water is vaporized by contact with the liquid iron, the steam thus generated is partly given off as gas, and partly decomposed, hydrogen being evolved and iron oxide being formed. Again, if the iron contains sulphur, this, by reacting on the steam, will form sulphuretted hydrogen, which is often formed in the cooled iron.—*A. Ledebur, Chem. Center, 1873, 810.*

FLUIDS IN CRYSTALS.—Dr. Carmichael, in a paper on the "Growth of Crystallization in Treps and Slegs," stated that in 1820 Worcester found in diamonds and chrysoberyls a fluid, and in some cases two fluids, having an expansive capacity thirty-two times that of water. Examined microscopically these liquids were found to exist in the minute cavities of various rocks. Dr. Carmichael stated that he himself had made many examinations of slags from the Hartz mountains. These crystals were no doubt formed with great rapidity, and this fact in part accounted for the finding of aqueous solutions in the center or cavities of crystals. In the genuine trap rock liquid (carbonic acid) inclosures are found, sometimes with minute traces of watery vapor. Gas cavities have broad margins, the vaporous cavities thin margins.

Science Among the Ancients.

One of the most important discoveries ever unearthed is probably the library of Assurbanipal, who reigned over the kingdom of Assyria about 1,000 years before the Christian era.

This discovery furnishes the most undoubted proof that science had made considerable progress, even at that early day—nearly 3,000 years ago. This curious library consists of flat, square tablets of baked clay, having on each side a page of closely written cuneiform letters which had been impressed on the clay while it was yet moist. The great majority of these tablets are now in the British Museum, and have been found to contain the remains of an immense grammatical encyclopedia. There are fragments of many mathematical and astronomical treatises, with catalogues of observations, tables, calculations of eclipses of the moon, and observations of solar eclipses, the earliest of which occurred nearly a thousand years before the beginning of the Christian era. There are also fragments of law books and legal records, books of chronology, manuals of history, accounts of Assyrian and other divinities, collections of hymns in the style of the Psalms of David, a geographical encyclopedia, works on natural history containing lists of plants and animals, of timber trees employed in building and furnishing, of stones fit for architecture and sculpture, etc. Perhaps the most interesting of all these lists is a classified catalogue of every species of animals known to the Assyrians, showing a scientific nomenclature similar in principle to that of Linnaeus. Opposite the common name of each animal is placed a scientific and ideographic name, composed of two parts, a family name and a characteristic epithet denoting the species.

A still more remarkable indication of the scientific advancement of the ancient Assyrians appears in their system of weights and measures, in which, as in the French system, all the units of surface, capacity, and weight were derived from one typical linear unit. The basis of the system was the cubit (equal to 20.67 inches). This was divided into sixty parts, corresponding with the minutes of the degree. The cubit, multiplied by 360, the number of degrees in the circle, produced the stade, the unit for large distances. The fundamental unit for areas was the square foot, the square of measure bearing to the cubit the relation of 3 to 5, or 12.4 inches of our measure. The cube of the foot was the metreta, the standard of all measures of capacity; and the weight of a cubit foot of water gave the talent; the fundamental unit of weight; the sexagesimal division of the talent gave, first the mina (=510.83 grains), and second, the drachma, (=8.51 grains).

The sexagesimal system was employed throughout their mathematics, the unit being invariably multiplied or divided by sixty, the result again by sixty, and so on to infinity. "This, it is very evident," observes Lenormant, "was the result of a wise combination of a very practical character, intended to combine the advantages of the two systems of dividing unity that have been in dispute at all times and among all nations—the decimal and the duodecimal." We still follow this Chaldeo-Assyrian system in the divisions of the circle and in our divisions of time.

ALUMINIUM FOR ENGINEERING INSTRUMENTS.—Mr. S. B. Clevenger recommends the use of aluminium for engineers' instruments, its great recommendation being that an equal bulk weighs but one-fifth as much as brass, an ordinary transit weighing 11 pounds in brass, weighing but 3 pounds in aluminium, and within the limits of practicable weight such instruments could be made very much larger and more accurate than in any other metal. Aluminium costs about half as much per pound as silver, and does not rust or tarnish so easily as brass. It combines the ductility and malleability of copper with vastly more than the strength of steel (it is placed by some as thirteen times stronger), and the lightness of chalk.

IMPROVED CHROMO LITHOGRAPHIC PROCESS.—Messrs. Johnson, of Hatton Garden, London, have invented a new and economical process for producing chromo-lithographs. In place of using a special stone for each color, necessitating so many separate impressions as there are colors, the entire subject is drawn upon a single stone and a proof is taken on a thin sheet of copper. This sheet is then cut out carefully according to the desired contour of the colors, and upon each of the portions is fixed a solid block of color previously prepared. The whole is combined into one form, and is printed on an ordinary press—all the colors at once.

EVAPORATION OF WATER FROM PLANTS.—So great is the evaporation of water from plants that it was found by Mr. Lawes that a plant of barley of one hundred and seventy-two days' growth, in which it had acquired four hundred and nineteen grains of dry organic matter, had converted into vapor not less than seventeen pounds of water.

OPTICAL PROPERTY OF CRYSTALS OF SULPHATE OF COPPER.—If we receive the solar light reflected by a large crystal of sulphate of copper upon a sheet of platinum or tin plate, placed at a small distance from the crystal, the sheet assumes the color of metallic copper upon the part which receives the reflected light.

MECHANICAL PROGRESS.

Sand and its Effects in Mortar.

We extract the following from a report made by some eminent French engineers, who made a series of scientific and practical examinations of sand, and the effects of different qualities of the same on various kinds of mortars:

The primordial element of sand is quartz. Rocks composed of felspar and mica cemented together by natural affinity, produce many varieties; some are derived from gneiss, protogine, or talcose granite, sienites, etc., or are entirely calcareous; lastly, others are mixed with volcanic sand, but these do not possess any of the qualities of puzzolana.

Sand is designated as coarse, middling, fine, and very fine.

It is considered coarse when the grains have a diameter of 1-12th to 1-18th of an inch; and it is called fine when the grains do not exceed 1-25th of an inch. That which exceeds the former diameter is called gravel.

Besides river and sea-sand, we have those which are found away from water sources, known as fossil sands, of the plain, or quarry sand; but these must be distinguished from the true fossil sands, which are called *arenas* in France.

Fossil sand (that found in hill deposits) is far more irregular in the grain than either river or sea sand; it is far more gritty when the grains are strongly compressed between the fingers; quartz and granite dominate in their composition.

In the composition of mortar, sand forms the inert matter; it exercises no chemical action on the lime, the puzzolanic constituents, and the mortars with which it is mixed; its action is purely mechanical, and consists in the aggregation of the grains by the aid of the lime and cements, which perform the part of mordants, or active agents of cohesion; it follows that the sand of which the grains are angular and the angles the sharpest, are preferable to those with rounded grains, or of which the asperities are less numerous.

The various kinds of sands should be hard to touch, gritty to the fingers, exempt from earthy matter, which causes disaggregation of the mortar by humidity; and for the same reason, though to a less degree, marly or clayey sand should be rejected.

In the case of sea sand, the first thing to be done, is to get rid of the salt. The presence of salt, however, may be very useful in certain cases.

It is of great importance to take careful note of the various results obtained by the use of different kinds of sand found where works are being carried on; some kinds contribute powerfully to the cohesion of mortars, in combination with certain kinds of lime, while others are the cause of disintegration. Experiments of this kind cannot be too numerous or too carefully conducted.

M. Vicat instituted a series of experiments in order to determine the effect of the coarseness or fineness of eminently silicious sands, or the resistance of mortars, and arrived at the conclusion that for use with eminently hydraulic lime, sand ranks as follows: 1, fine grain, 2, sand with mixed grain and sharp angles; 3, coarse sand; while in the case of moderately hydraulic lime, the order is reversed, the coarse standing first, the mixed second, and the fine grain last.

Results since obtained with other kinds of sand, have fully borne out M. Vicat's conclusions.

The mixture of lime and sand is the more complete, and the aggregation the more intimate, in proportion to the roughness of the grains; river sand, which has been extracted and left on the banks for many months, and having its surface corroded by natural agents, are beyond all question the best; but those of the quarries, which are best when their composition is very silicious, offer much the same advantage in practice.

Mortar made from quick-lime and coarse sand is the most durable; fine sand acts best with hydraulic limes. In the case of hydraulic mortars, the definite setting with middling-sized sand being fixed at 100, the proportion will descend as low as fifty with gravel, and even lower when it is very coarse.

Quartzose and silicious sands are insensible to the most powerful compression. This quality has caused them to be sought for paving-work; and they are preferred before all others for foundations, and in all cases where great pressure has to be considered.—*Manufacturer and Builder.*

MECHANICAL PUDDLING IN ENGLAND.—There seems to be considerable dissatisfaction in the north of England (Cleveland) iron district, with regard to the working of the Dank's furnace, and the iron workers are just now in the throes of the Crampton furnace; and it is being employed to improve upon the Casson-Dormoy furnace. Nothing definite, however, has as yet been accomplished, though it is said some experiments which Mr. Crampton has made with Cleveland pig iron encourages them to anticipate that the change from the Dank's to the Crampton will prove a wise one. This opinion should doubtless be received with much doubt, as coming from those to whom the wish is father to the thought.

Paint for Iron Surfaces.

A writer in the *Painter's Magazine* says that the best linseed oil, with all its advantages, is but poorly adapted to long service as a protection to iron surfaces exposed to extreme variations of temperature and to all kinds of weather; but that in selecting a paint for such purpose, mechanical adhesion is a consideration of the first importance. In this respect, paints differ widely, but it must be remembered that, mechanical adhesion is all we have to depend upon. With absorbent surfaces it is different. Professor Williams gives it as his opinion, based on observation and experiment, that pitchy or bituminous films are especially effective as regards their adhesion to iron; for example, solutions of asphalt or pitch in petroleum or turpentine. These are also very effective as regards continuity, owing to the fact that, in drying, they form plastic films, which yield to the expansion and contraction of the iron, and manifest no tendency to crack. If the surface is rusty, they penetrate the oxide scale and envelop the particles very effectually, making them a portion of the paint. The solubility of such a film in water may be counteracted by mixing it with linseed oil. The experiment may easily be tried by mixing about two parts of Brunswick black with one of white, red, or colored paint, the body of which is composed of red or white lead or litharge. Red lead is the best for many reasons, if finely ground and thoroughly mixed with linseed oil. Any of several kinds of bitumen may be used, either natural mineral asphalt, pine pitch, or artificial asphalt, such as gas tar or the residuum of petroleum distillation in cases where the crude oil has been distilled before being treated with acid. This gives a very hard, bright pitch, which is soluble in "one run" paraffine spirit, and which makes the base of an excellent, cheap, and durable paint for iron work in exposed positions.

During the past few years, the writer has heard many accounts of the preservative influence of paraffine when applied to iron surfaces, and can recommend it for all classes of iron work which can be treated hot. The most effective method of applying it is to heat the iron in vacuo, in order to expand it and open its pores, when paraffine, raised to the proper temperature, is run upon it. By this means the iron is penetrated to a sufficient depth to afford a very effectual protection against oxidation, especially when a suitable paint is subsequently applied. Any non-oxidizable substance would probably answer; but paraffine is as cheap as any and quite as good if not better. Brushed upon the outside merely, it is doubtful if paraffine would have much effect in preserving iron, while it would certainly lead to lessen, if not destroy, the mechanical adhesion of a surface paint.

LOCK AND MORTISE BRICKS.—On the score of ingenuity, one of the most prominent features is the process by which the lock and mortised bricks are obtained at the Serr Terra Cotta works, near Waterbury, Salop, England. The machinery itself will be readily appreciated when the fact is borne in mind that the bricks, while producing workmanship infinitely superior to walls built with pressed bricks, being tongued, grooved and locked at intervals, and at each angle, are also stronger than common hand made brick, besides possessing the additional recommendation of effecting a saving of two-thirds in the material used. These lock and mortised bricks, it may be added, are capable of extensive and varied uses, and are invaluable where space and height, with solidity, are an object. Their importance is especially noticeable when required for the building of, or sustaining and retaining, embankments, sea and other walls, quays and river frontages, as also in the erection of shafts, the construction of brewers' vats, and, in a word, the formation of all works to which brick can by any possibility be applied. The company also produce Kongh's universal ventilators. The mechanism applied, is of a unique description; and it is necessarily exclusive.

MAONETTO IRON SANDS.—The vast deposits of magnetic iron sands in various parts of the world promise soon to become of great industrial value. These sands from New Zealand have long been worked to much advantage, being transported to England for treatment. The extensive deposits in Labrador are also beginning to excite much interest, and several companies are now engaged in collecting and shipping them to England. About 30 tons are collected daily at one single locality. The separation of this sand from other substances mixed mechanically with it is now greatly facilitated by the use of a new magnetic ore separator, which has also been used to advantage in other localities.

The sand thus separated are roasted and then converted into a magnetic oxide, from which the iron is easily extracted. It is well known that extensive deposits of magnetic iron sands are found on the sea beach for some distance to the south of Fort Point, along the western outskirts of this city. It is confidently believed by many that these sands may at some future time be profitably worked in this city.

RECIPE FOR A CEMENT FOR MENDING STEAM BOILERS.—Mix two parts of finely powdered litharge with one part of very fine sand, and one part of quicklime which has been allowed to sleep spontaneously by exposure to the air. This mixture may be kept for any length of time without injuring. In using it a portion is mixed into paste with linseed oil, or, still better, boiled linseed oil. In this state it must be quickly applied, as it soon becomes hard.

Mining Stocks.

We are still calid upon to wirts the same sentence concerning mining stocks, that we have for the past six wssks, viz. that the market continues dull. Transactions are limited, and nothing at all but Consolidated Virginia holds its own. Everything else is down and no buoyancy at all is manifest. Some little attention is being again turned to the Ely District stocks, but there is no excitement in them. All the Washoe line of mines continue very dull, and the brokers business must be poor just at present. Every now and then some stock will take a little spurt upwards for a few days, but no general advances has taken place for some time. All the operators seem to be lying on their oars, and waiting for something to turn up. The market will no doubt "wake up" again some time but whether within one month or three months no one can tell. At present, however, very little is being done.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, FEBRUARY 19.	THURSDAY, FEBRUARY 25.
MORNING SESSION.	MORNING SESSION.
250 Alpha.....156 1/2	95 Alpha.....156 1/2
950 Best & Belcher.....31 1/2	995 Best & Belcher.....31 1/2
250 Belcher.....36 1/2	1000 Belcher.....36 1/2
250 Baltimore.....36 1/2	1000 Baltimore.....36 1/2
240 Bullion.....24 1/2	170 Bullion.....24 1/2
350 Chollar.....35 1/2	350 Chollar.....35 1/2
585 Crown Point.....24 1/2	180 Crown Point.....24 1/2
210 Confidence.....15 1/2	240 Confidence.....15 1/2
100 Con Virginia.....10 1/2	100 Con Virginia.....10 1/2
210 California.....21 1/2	1555 California.....21 1/2
210 Caledonia.....21 1/2	230 Caledonia.....21 1/2
50 Challenge.....50 1/2	300 Dayton.....50 1/2
700 Dayton.....70 1/2	20 Dayton.....70 1/2
120 Empire.....12 1/2	20 Empire.....12 1/2
250 Gould & Curry.....19 1/2	535 Gould & Curry.....19 1/2
300 Globe.....30 1/2	300 Globe.....30 1/2
15 Hale & Norcross.....15 1/2	85 Hale & Norcross.....15 1/2
100 Imperial.....10 1/2	875 Imperial.....10 1/2
10 Justice.....10 1/2	25 Justice.....10 1/2
130 Julia.....13 1/2	420 Julia.....13 1/2
210 Kentuck.....21 1/2	210 Kentuck.....21 1/2
300 Knickerbocker.....30 1/2	100 Knickerbocker.....30 1/2
350 Lady Bryan.....35 1/2	3450 L. Bryan.....35 1/2
150 Mexican.....15 1/2	480 Mexican.....15 1/2
165 New York.....16 1/2	480 New York.....16 1/2
500 Mexico.....50 1/2	470 Ophir.....50 1/2
65 Occidental.....65 1/2	100 Picher.....65 1/2
200 Phil Sheridan.....20 1/2	160 Phil Sheridan.....20 1/2
250 Savage.....25 1/2	250 Silver.....25 1/2
340 Sierra Nevada.....34 1/2	695 U Consolidated.....34 1/2
240 Succor.....24 1/2	150 Utah.....24 1/2
255 Silver Hill.....25 1/2	100 Yellow Jacket.....25 1/2
100 Senator.....10 1/2	
755 Union Con.....75 1/2	
330 Utah.....33 1/2	
155 Woodville.....15 1/2	
30 Yellow Jacket.....30 1/2	
AFTERNOON SESSION.	AFTERNOON SESSION.
50 American Flag.....2 1/2	40 Andes.....2 1/2

A VERY useful arrangement has just been adopted at Brussels. Any traveler from Paris to that city may purchase a railway ticket which will include the hire of a good carriage to take him and his luggage from the Brussels station to his destination within that city. The advantage is that he is saved all trouble in looking for a cab, and all annoyance in squabbling with the cabman about his fare.

The North Bloomfield gravel mining company in Nevada county, has been at work for four years and has not yet fairly commenced washing. The total expenditures on the claim have been \$1,979,760. The tunnel, which is nearly 8,000 feet long, consumed \$498,000 of this amount, and \$1,081,000 has been spent for ditches, reservoir, water rights, etc.

Advices from Castle Dome, Arizona, say H. W. Keering has succeeded in making a fine run at the smelting works there, and has demonstrated beyond doubt the feasibility of reducing those refractory ores without shipment to San Francisco, as formerly.

The San Diego Union reports that all the mines in the Julian and Banner districts are looking well, and that the quantity and quality of the ore is steadily increasing. Work is going forward with greater activity than ever before.

The Quincy National says: "Many of our hydraulic miners depend almost entirely on the snow water, and unless the weather changes soon, and the stream hold out much longer in the spring than usual, the water season will be unusually short."

The inventor of the McGlew furnace must feel happy over the success of this invention in Peavine District, Nevada. Peavine ore has been difficult to work, but the McGlew furnace has demonstrated the fact that they can be worked with profit.

DURING the past year, 81,397 tons of coal were shipped from Nanaimo, 15,197 of which went from the Vancouver coal company's mine, and 30,200 tons from the Wellington mine.

ABOUT 75 miners for Sticken left Victoria by the "California" week before last for the mines.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Adams Hill Cons M Co	Eureka Nev	8	15 Feb 13	Mar 24	W W Taylor	408 California st
Alps S M Co	Ely District	8	15 Jan 10	Mar 22	D Squire	Cor California st
American Flat M Co	Washoe	5	20 Feb 8	Mar 15	A Sinker	331 Montgomery st
Bellevue M Co	Cal	11	50 Feb 17	Mar 23	D F Verdenal	409 California st
Bowery Cons M Co	Ely District	3	50 Dec 15	Jan 25	O E Elliott	419 California st
Caledonia S M Co	Washoe	10	300 Jan 8	Mar 5	R Wegener	419 California st
Chariot Mill & M Co	San Diego Cal	2	50 Feb 17	Mar 22	A F Swift	419 California st
Cherry Creek M & M Co	Nevada	2	35 Feb 17	Mar 22	D F Verdenal	409 California st
Confidence M Co	Cal	30	30 Jan 16	Feb 23	W S Anderson	210 Battery st
Cross Bay Oregon Coal Co	Oregon	1	100 Feb 5	Mar 10	T P Beach	424 Montgomery st
Daney M Co	Washoe	12	75 Jan 12	Feb 16	G R Spinnay	320 California st
Dardanelles M Co	Washoe	2	100 Feb 5	Mar 10	W S Duval	402 Montgomery st
Dayton G & S M Co	Washoe	2	100 Feb 16	Mar 23	W E Dean	419 California st
El Dorado South Cons M Co	Cal	5	75 Jan 15	Feb 19	W Willis	419 California st
El Dorado Water & D G M Co	Cal	9	100 Feb 16	Mar 19	H Elias	416 Montgomery st
Empire M Co	Idaho	9	100 Jan 30	Mar 5	W Willis	419 California st
Florida S M Co	Washoe	10	100 Jan 8	Feb 10	L Hermann	11 Pine st
Gold Run M Co	Idaho	12	100 Jan 4	Feb 8	K Kaplan	Merchants' Ex
Hale & Norcross S M Co	Cal	10	15 Feb 9	Mar 15	O O Palmer	41 Market st
Ida Elmore S M Co	Washoe	45	500 Jan 8	Feb 11	J F Lichtner	438 California st
Imperial S M Co	Idaho	16	100 Jan 1	Mar 8	D A Jennings	419 California st
Iowa M Co	Washoe	21	25 Jan 13	Feb 15	W Willis	419 California st
Julia G & S M Co	Washoe	21	25 Jan 13	Feb 15	A D Carpenter	605 Clay st
Justice M Co	Washoe	13	500 Jan 12	Feb 12	A Noel	419 California st
Labey Bryan M Co	Idaho	15	200 Jan 5	Feb 11	J S Kennedy	Merchants' Ex
Mahogany G & S M Co	Idaho	15	200 Jan 5	Feb 11	O B Higgins	402 Montgomery st
Meadow Valley M Co	Ely District	8	100 Feb 11	Mar 23	J W Colburn	419 California st
Mint G & S M Co	Washoe	9	200 Jan 19	Feb 24	D A Jennings	419 California st
North Bloomfield G M Co	Ely District	18	100 Feb 2	Mar 10	W Willis	419 California st
Polk Sheridan G M Co	Washoe	3	50 Feb 16	Mar 23	H C Kibbe	419 California st
Poorman G & S M Co	Cal	31	100 Feb 3	Mar 12	T Derby	320 California st
Raymond & Ely S M Co	Idaho	2	120 Dec 26	Feb 8	W F Townsend	419 California st
Red Jacket M Co	Idaho	6	50 Feb 1	Mar 9	W Willis	419 California st
Rock Island G & S M Co	Washoe	6	100 Jan 13	Feb 17	W Willis	419 California st
Savage M Co	Washoe	17	50 Feb 19	Mar 24	E B Holmes	419 California st
Silver Hill M Co	Washoe	5	200 Feb 10	Mar 19	W E Dean	419 California st
South Chariot M Co	Idaho	12	100 Jan 9	Feb 18	O H Bognart	402 Montgomery st
Starbuck G M Co	Cal	10	50 Feb 2	Mar 8	D F Verdenal	419 California st
Sutro M Co	Washoe	8	50 Feb 17	Mar 22	G W R King	434 California st
Utah S M Co	Washoe	8	200 Jan 23	Feb 24	W E Dean	419 California st
War Eagle M Co	Idaho	9	100 Jan 25	Mar 2	L Kaplan	Merchants' Ex
Washington & Oreole M Co	Robinson Dist	14	100 Feb 18	Mar 18	J M Huntington	419 California st
Washington & Oreole M Co	Ely District	14	100 Feb 18	Mar 23	F D Cleary	Merchants' Ex

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Alpine G M & M Co	Cal	8	125 Feb 11	Mar 23	J F Lichtner	438 California st
California and Arizona M Co	Arizona	1	100 Jan 8	Feb 22	T E Jewell	567 Montgomery st
Carrie Hale Hydraulic M & W Co	Cal	3	10 Jan 15	Feb 24	J W Phipp	419 California st
Combination G & S M Co	Panama	5	10 Dec 28	Feb 1	D Wilder	Merchants' Ex
Emma Hill Cons M Co	Utah	2	40 Jan 29	Mar 5	G J Cole	302 Montgomery st
Equitable Tunnel M Co	Utah	9	25 Jan 12	Feb 17	J J Hermann	419 California st
Gold Mountain G M Co	Bear valley Cal	4	100 Jan 25	Mar 6	C S Healy	Merchants' Ex
Hale & Norcross M Co	Mariposa Co Cal	3	125 Jan 13	Feb 16	J P Cavalier	513 California st
Hays G & S M Co	Robinson Dist	6	50 Jan 4	Feb 12	W A M Van Bokkelen	419 Cal st
Homes M Co	Nevada Co Cal	5	50 Feb 13	Mar 24	F J Hermann	419 California st
Imperial S M Co	Washoe	21	100 Feb 10	Mar 17	W E Dean	419 California st
Little Panache Quicksilver M Co	Cal	1	20 Feb 1	Mar 4	G R Spinnay	320 California st
Little Panache Quicksilver M Co	Cal	1	20 Feb 1	Mar 4	H C Kibbe	419 California st
Occidental M Co	Nev	30	50 Feb 2	Mar 9	A K Deubrow	Merchants' Ex
Ophir M Co	Bear valley Cal	1	10 Jan 23	Mar 2	J P Cavalier	513 California st
Ratten M Co	Washoe	7	25 Feb 15	Mar 23	L Hermann	380 Pine st
Phantom Tunnel & M Co	White Pine	10	10 Jan 9	Feb 15	H C Kibbe	419 California st
Prussian G & S M Co	Nye Co Nevada	3	100 Jan 12	Feb 18	R H Brown	402 Montgomery st
San Jose M Co	Egan Canon	6	25 Feb 8	Mar 15	A Carignan	109 Front st
Silver Cloud G & S M Co	Cal	5	100 Jan 13	Feb 16	W A East	71 Montezuma st
Silver West Cons M Co	Enreka Nev	3	10 Jan 13	Feb 20	F R Bunker	606 Montgomery st
Table Mt Alpha M Co	Washoe	6	100 Feb 5	Mar 15	T F Cronise	438 California st
Union Cons M Co	Washoe	7	10 Feb 23	Mar 10	J M Huntington	Merchants' Ex
Washoe Tunnel & H M Co	Cal	20	50 Feb 28	Mar 29	F H Rogers	419 California st
Wellfoot M Co	Elko Co Nev	1	25 Jan 23	Mar 3	D A Jennings	419 California st
Wyoming G M Co	Cal	5	50 Jan 13	Feb 27	J M Huntington	Merchants' Ex
Yamhorough S M Co	Kern Co Cal	6	30 Dec 23	Jan 30	E Barry	415 Montgomery st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
California Borax Co	Lake Co Cal	L Hermann	330 Pine st	Annual	Mar 10
Black Bear Quartz	Cal	J F Lichtner	418 California st	Annual	Mar 10
Golden Chariot M Co	Idaho	L Kaplan	Merchants' Ex	Annual	Mar 10
Hale & Norcross M Co	Washoe	J F Lichtner	438 California st	Annual	Mar 10
Ida Elmore M Co	Idaho	W Willis	419 California st	Annual	Mar 10
Independent & Omega M Co	Idaho	J M Huntington	419 California st	Annual	Mar 10
Indus M Co	Washoe	D Wilder	Merchants' Ex	Annual	Mar 10
Justice M Co	Washoe	Called by Trustees	Merchants' Ex	Special	Mar 18
Nahogany M Co	Idaho	O B Higgins	402 Montgomery st	Annual	Mar 3
Patten M Co	Washoe	L Hermann	330 Pine st	Annual	Mar 3
Santa Rosa M Co	Washoe	H C Kibbe	419 California st	Annual	Mar 4
Silver Cord M Co	Washoe	Frank Swift	419 California st	Annual	Mar 4
Silver Peak M Co	Washoe	G T Grimes	240 Montgomery st	Annual	Mar 4
Sutro Tunnel Co	Washoe	P W Ames	419 California st	Annual	Mar 4
Tintic M & M Co	Utah	H C Miller	411 California st	Annual	Mar 4
Vivian G & S M Co	Utah	H S Pritch	535 California st	Annual	Mar 4

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co.	Washoe.	H. C. Kibbe.	419 California st	3 00	Jan 11
Black Bear Quartz	Cal.	L. Oliver.	26	20	Jan 11
Chariot M & M Co.	Idaho.	Frank Swift.	419 California st	2 00	Nov 16
Consolidated Virginia M Co.	Washoe.	D T Bailey.	401 California st	2 00	Feb 11
Crown Point M Co.	Washoe.	O E Elliott.	414 California st	3 00	Jan 12
Dana M Co.	Washoe.	J. W. Ames.	29 Clay st	20	Jan 25
Eureka Consolidated M Co.	Nev.	W W Taylor.	419 California st	50	Feb 5
Rye Patch M Co.	Nevada.	D F Verdenal.	409 California st	50	Feb 5

THE LA GRANGE ditch and hydraulic mining company, says the Modesto Herald, located at Le Grange, Stanislaus county, has at last got to paying handsome dividends. This company was organized four years ago, and is composed of San Francisco capitalists. Its invested capital is \$600,000, and it disburse about \$9,000 per month in the way of expenses. It works a force of 90 men, and operates over an area of 500 acres. It owns the most extensive, expensive, and substantial ditch in the county, being 17 miles in length, and costing \$500 per rod.

COPPER.—We see by James Lewis & Son's monthly Liverpool report on ore and metals, that the copper market is very dull and inanimate. Quotations on the 1st inst. were; bars, £83 to £85 10s according to brand; ingots, £89; ore and regulus, 16s 3d to 16s 9d per unit. The Chili exports to January 17th, were 55,859 tons fine. Stocks of West Coast produce are estimated at 12,242 tons fine, against 11,765 tons on the 1st of January.

APPROPRIATIONS FOR CALIFORNIA.—The River and Harbor Bill, which has passed Congress, appropriates \$100,000 for the improvement of Oakland harbor; \$80,000 for Wilmington; and \$15,000 for removing snags from the Sacramento river. San Diego gets \$80,000 for turning San Diego river into Pelee Bay, instead of allowing it to deposit sand in the bay proper. This, however, is small consolation to San Diego after the Texas-Pacific defeat.

The Redington quicksilver mine shipped 141 flasks during January, a far smaller amount than usual, owing to the bad condition of the roads.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR COUNTY.

THE NEW QUICKSILVER SMELTING WORKS.—*Amador Dispatch*, Feb. 20: We are happy to be able to state that the new smelting works at the Amador quicksilver mine have been completed and were set into active operation last Monday. We hope to be able before many days, to give our readers a favorable report as to the richness of this mine, after being practically tested; and, judging from the various specimens of ore we have seen taken from this mine, we have no doubt as to the result.

SMELTING PROCESSING.—*Amador Ledger*, Feb. 20: The Cosmoss ditch, owned by Judge Purinton of Fiddletown, has been extended to the Gover mine, and to Quartz mountain, and will supply the Gover mill and the mills hereafter to be erected at Quartz mountain with water to propel the same. From these localities the ditch will be continued west to furnish water for other mills and mines. The extension of the ditch above named, will open up extensive gravel claims along the line of its extension, and will give a new impulse to mining in that part of the county.

NEW DISCOVERY.—In the tunnel now being driven by Messrs. Trueb & Billiard, in their claims, adjoining the Martell, a channel of very fine gravel has been recently struck, which promises very rich results. This channel is evidently a separate one from all others heretofore discovered in the ridges, and as far as proven, seems to be more extensive and richer in gold than those tapped by other tunnels driven into the same hill. The newly discovered channel seems will run through the claims of Trueb & Billiard, and the Martell claims, the latter owned and worked by the Amador canal and mining company. The discovery of the new channel will add greatly to the value of claims through which it may pass.

CALAVERAS COUNTY.

GRAVEL MINING.—*Calaveras Chronicle*, Feb. 20: All the hydraulics in this vicinity are in full blast. The ditch is taxed to its utmost capacity in conveying water enough for the various claims, making things lively in the mining line. Several new enterprises are about being undertaken, and everything be-appears unusual activity in gravel mining operations.

GOOD CLEAN UP.—A late clean-up at the Mullins' gravel claim, near Central Hill, yielded one hundred and sixty ounces of gold. The result of four weeks' work of four men.

WORK RESUMED.—Work has been resumed on the old Vance mine at Mosquito. The ledge was one of the earliest discovered in that district and has yielded a large amount of bullion. THE VALENTINE MINE.—We learn that the Valentine mine, in Mosquito district, has been re-located under the provisions of the Mining Act of 1872, and that work upon it is now going steadily forward. The Valentines is, we believe, the pioneer mine of this district.

THE LEWIS & FAIRCHILD MINE—GOOD YIELD.—Last week we briefly chronicled the recent discovery of a very promising quartz ledge, near Leavitt's ranch in the Mosquito district, by those well known miners and prospectors, Messrs. Lewis & Fairchild. Since then, thirty-odd tons of rock taken from the ledge have been crushed in Garland's mill at Mosquito. The ore yielded an aggregate of eighty-four ounces of gold—an average of nearly \$50 per ton. But little work, comparatively speaking, has yet been done upon the lead, but this prospect is altogether favorable for the development of a valuable mine. The ledge averages fully two feet in width, while the result of the crushing, stated above, establishes the character of the ore for richness.

CONTRA COSTA COUNTY.

QUICKSILVER NEAR CLAYTON.—*Antioch Ledger*, Feb. 20: While the adjoining counties across the bay have been making rich developments in silver, quicksilver and other precious metals, there has been some prospecting on Mt. Diablo and vicinity, and not without success. A few days since, a well defined lead of quicksilver was found on the ranch owned by Mrs. Hastings, widow of the late Liman Hastings. The location is within two miles of Clayton. C. P. Marsh, of Oakland, Harry Morse, Sheriff of Alameda county, Mr. Calderwood, his deputy and one Spaulding, have purchased the ranch of widow Hastings, rumor says, for five thousand dollars. The vein of quicksilver is said to be the best defined and richest of any yet discovered in the county.

EL DORADO COUNTY.

NEW MINES.—*Folsom Telegraph*, Feb. 20: In El Dorado county, near the line of the railroad about Sugar Loaf mountain,

Feb. 20: Richer and better and more of it, is the report this week from New York Hill. Mr. Meek, late cashier of the bank of A. Delano and one of the executors of the estate, showed us some of the finest specimens one day this week that it has ever been on lot to examine. One piece, estimated to weigh about two pounds if all quartz, actually weighs over four pounds, and therefore must contain something like \$425 in gold. This was from the lowest depth reached and a direct continuation downward of the rich bonanza struck some weeks since.

DARTMOUTH.—We visited this mine, just out at the north end of Church street, this week and found both mill and hoisting works at work. For several weeks past they have been taking out of the drifts a lot of waste stuff left there in previous workings, and as this was soft enough to wash out in ordinary sluices the mill has been idle for some time. This old waste gave a clean-up of \$1,140 from a two weeks' run, and on the return of Captain Miller, the Superintendent, from below, it was thought best to put what is now coming out through the mill, as much of it was cement. Capt. Miller is fast getting the Dartmouth in shape for a splendid run.

THE GOLD TRAP of Mr. Tuubridge, having proved itself capable of saving gold from the tailings of the Empire Mill—which saves \$60 a day by the use of Hendy's Concentrator above the "trap" but below the point at which many mills let all go to waste—is now stationed on the gravel alluvial below the Dartmouth works, out on Church street.

PLUMAS COUNTY.

STUCK IT.—Plumas *National*, Feb. 20: We learn from Deputy Sheriff Yeales that the American Company of Washington Hill, (Flagg, Durrell & Co.), recently struck gravel which prospects first-rate. They got one nugget which weighed half an ounce. This company have been running in bed-rock for the past two years, and deserve to have the best kind of pay. We hope the strike will prove rich and extensive.

SIERRA COUNTY.

PAYING.—Mountain *Messenger*, Feb. 20: The diggings on Badger Hill are paying very well just now, and the rich bank of ground recently discovered, promises to hold out for some time to come.

ORO.—It is now a dead certainty that work on the new Oro mill, just above town, will be commenced at an early day.

WATER.—Westall & Co., of Poverty Hill, have enough water to pipe about eight hours every other day, which is better than no water at all.

A new claim has been located near the Iowa claim in which pay gravel was recently struck.

SONOMA COUNTY.

RICH STRIKE.—Petaluma *Argus*, Feb. 19: We are informed that the Eastern Quicksilver mine, near Guerneville, has recently made a strike of some very rich cinnabar. The company has been running a tunnel parallel with the ledge for several months, and are now in over one hundred feet. The mine is supposed to be very rich, but the owners refuse to admit the public in the tunnel. The Western company are also taking out some very rich rock, and the people of Guerneville are happy.

ABE LINCOLN.—The Abe Lincoln silver mine, located a few miles northwest of Healdsburg, is creating quite an interest among our local mining sharps. The company have sunk a shaft on the mine some fifty feet deep, and drifted on the ledge forty-five feet in one direction, and fourteen in another. The ledge is well defined, and three and a half feet thick, standing at an angle of forty degrees. The rock taken from the ledge twelve feet down assays \$24 per ton, and specimens that have been picked run as high as \$80 to \$120 per ton.

Henry Miller has found a quartz ledge on his land near Guerneville, from the croppings of which an assay has been made, showing silver and gold in small quantities—enough to justify him in prospecting the vein.

The Ida Clayton mine, which is situated in Knight's Valley, is looking well. Its superintendent is Charles Ridgeby, an old Napaite. Fifty men are employed at the mine, and they are getting out some very good ore. In a seven days' run they got thirty fisses of quicksilver. The workmen have struck a body of black ore, which is one of the richest of cinnabar formations.

SISKIYOU.

TRAMWAY.—Yreka *Union*, Feb. 20: We understand that the Black Bear mining company talk of building a tramway for the purpose of carrying their rock from the mine to the mill. The distance which the rock has to be taken is about two miles. To perform the work several teams, with drivers, are required. The grade from the mine to the mill is so descending that loaded cars will run from the former to the latter without other force than that of gravity.

CINNABAR DISCOVERED.—From Richard Smith we learn that some rich cinnabar was discovered on the Klamath, near the mouth of Horse creek, last week. The discoverer was Eli Miller. It seems there is a peculiar formation, or ledge in which small veins of cinnabar alternate with the common rock. This formation is about one hundred feet in thickness, and was discovered first on the north side of the Klamath, in the point formed by the junction of Horse creek and the Klamath. It was afterward found on the south side of the river, maintaining about the same width and exhibiting the same appearance and characteristics. Smith said the veins of cinnabar through this formation were numerous but small. There

was no one there who had had experience in quicksilver mining, but with improvised retorts they were able to obtain an abundance of quicksilver. The discovery had caused quite an excitement, and several were prospecting in the hills in the vicinity.

TRINITY.

CINNABAR DISTRICT.—Trinity *Journal*, Feb. 20: B. C. Wattles came in this week from Cinnabar district, and reports further rich developments. As to the district at large, Wattles is of the opinion that it contains more wealth than all the remainder of the county. As far as ascertained the main lode of cinnabar is from one-half to one mile in width, and has been found at irregular intervals for a distance of three miles in length. Lytle & Hawket, with two men, are taking out ten tons of ore per day, which will work on an average of 25 per cent. Worland & Butler are working concentrated ore which gives 80 per cent. The Trinity quicksilver company are in a little over 200 feet in their prospecting tunnel, the last 120 feet of which shows mineral, being in low grade ore, but continually improving as the tunnel goes in. In fact, Wattles says every foot shows a decided improvement in the ore taken from this tunnel. H. C. Wilt has found a rich vein on his claim, and will commence taking out ore as soon as arrangements can be made for reducing it. On his own claim Wattles has a tunnel in 100 feet, and is well satisfied with his prospect. Every man in Cinnabar district is employed, and others who understand the work could find ready employment. There is no snow at the mines and no obstacle to travel in and out. Many new locations have been made, and some of the old claims on which no work has yet been done have been relocated. Lively times are expected in Cinnabar district next summer, as the rush of prospectors will commence as soon as danger from storms is past.

YOLO.

NEW DISCOVERIES.—Yolo *Democrat*, Feb. 14: It has long been known that the range of hills bounding the Sacramento valley on the west contain various kinds of minerals, but for some reason they have never been thoroughly and determinedly prospected in any locality. Coal, iron, tin, quicksilver, silver and gold are known to exist in this range. In one case we know of croppings from a ledge which were assayed and found to yield gold to the amount of \$30 per ton. The other day, however, a new mine was discovered a few miles above Dogtown, in Cache Creek canon, which promises good results. Samples of the ore are now in the assayer's hands in San Francisco, and the result is looked for with intense interest. Pure quicksilver was run out of the specimens obtained, and lead was also melted out with a blow-pipe.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—Gold Hill *News*, February 18: Daily yield, 460 tons of ore. The ore breasts on the 1,300, 1,400 and 1,500-ft. levels are all yielding splendidly and look more promising than ever. No new developments have been made during the past week, with the exception of the continuation of east cross-cut No. 2, on the 1,500-ft. level, the face of which is still in the richest possible character of ore. The mine is showing richer and better the more it is developed, and there is simply no estimating its immense wealth.

ORHR.—The ore stopes on the 1,366-ft. level are both looking and yielding well. The east and west ore stopes on the 1,465-ft. level are also yielding the usual amount of good ore. The east cross-cut on the 1,366-ft level on the California line, is passing through very favorable ground containing numerous stringers and streaks of fine ore. The east cross-cut on the California line, on the 1,465-ft level is also passing through a very changeable and favorable character of ground. The bottom of the north winze on the 1,465-ft level has encountered a new and heavy body of ore dipping strongly to the east, which seems to have turned the course of the stratum of ore passed through a few feet higher up, although the same character of ore still shows under the sills on the east side of the winze. A new station for the head of the main incline, 50 ft below the 1,465-ft level is being opened, the work on which is making good progress. A new station is being opened at the 1,600-ft level, from which point a drift is being run to connect with the new incline. This drift already shows some fine indications of ore.

CALIFORNIA.—The cross-cut near the center of the mine, on the 1,400-ft level is still continued to the eastward, the face in good ore. On the 1,500-ft level the face of both cross-cuts Nos. 1 and 2 are in the richest character of ore, while that of cross-cut No. 3 is in low grade ore, and is daily expected to reach the rich east ore body already developed in the drifts further south. The drift on the 1,550-ft level continues to the north and eastward, the face in the same rich character of ore heretofore described. This drift has now reached a point under cross-cut No. 2 on the 1,500-ft level. Another cross-cut, No. 4, has been started on the 1,500-ft level; also a drift north and east from the main north drift to again connect with the east cross-cut in the ore vein on the Ophir line, running parallel with the ore vein, and from which it will be much easier cross-cutting and prospecting the northern portion of the mine, besides greatly benefiting the air circulation. Sinking the C & C shaft is making excellent progress, the rock in the bottom blasting out finely.

GEORGIA.—The new three-compartment work-

ing shaft is being put down at an active rate. It is very eligibly located, south of the Rock Island shaft, and considerable farther east. They propose erecting hoisting works of the best and most effective character. The shaft will intersect the vein at a depth of about 1,600 ft, but at the depth of 500 ft they will drift to the vein in order to open and work it at that point.

BEACON.—Sinking the main incline is making steady progress. The main north drift on the 1,500-ft level is still driven vigorously ahead, without change of interest to report. The south, middle and north winzes from the 1,400-ft level are all making a fair rate of progress in sinking, the bottom of all still being in good ore. The new air shaft is progressing finely, and will now soon be completed.

GOULD & CURRY.—Enlarging the main shaft below the seventh station level, so as to give three compartments for hoisting, and one for pumping, is making good headway.

SIERRA NEVADA.—Sinking the new shaft is making good progress. The flow of water at the bottom of the shaft has been quite strong for several days past, but is again gradually decreasing. The old Apple shaft is cleaned out and the sinking has been resumed.

YELLOW JACKET.—A new station is being opened at a point in the main incline, 103 ft below the 1,740-ft level. The east cross-cut on the 1,740-ft level is in 315 ft.

SAVAGE.—The 2,200-ft station is about completed, and a drift started to the southward to connect with the north drift from the bottom of the south winze below the 2,000-ft level. Sinking the main incline is making steady progress. The foundation for the new incline machinery is nearly completed.

LADY BRYAN.—Cross-cut No. 3 from the south drift on the 80-ft level has penetrated a fine body of ore a distance of 25 ft. The ore gives an average assay value of about \$63 per ton, and is as yet of an unknown extent. The pump is being lowered to the 380-ft level, at which point a new drift will be started in a very few days to cut and prospect the ore vein.

BULLION.—As soon as a point 100 ft north of the Exchequer line is reached a cross-cut east will be started to determine the character of the ore vein. The prospects of an ore development in the south drift on the 800-ft level continues to improve almost daily.

ORIGINAL GOLD HILL.—Cross-cut No. 2, from the north drift, is completed, showing the ledge to be 60 ft wide, with considerable good ore in it.

MEXICAN.—A cross-cut east has been started from the main north drift on the 1465-ft. level, the face of which is in a very favorable formation for good ore developments, notwithstanding which it is expected that the drift will have a considerable distance yet to run to reach the rich ore body found on the east side of the drift further south.

LEO.—There has been a marked improvement in the character of the ledge material penetrated during the past few days. The ledge is about five feet in width, and carries some fine ore.

CALDONIA.—A new ore and waste chute is being put in at the 1000-ft. level, and a considerable amount of repairing is being done to a portion of the mill shaft.

ROCK ISLAND.—Sinking the shaft for the purpose of opening a new level, is making excellent progress.

CHOLLAR-POTOSI.—The old incline has been cleaned out to the bottom, all the timbers being perfectly sound and the shaft in excellent working condition. The prospects are much more favorable than heretofore for a consolidation of the ore vein on this level and the finding of a continuation of the rich ore body worked on the levels above.

HALE & NORCROSS.—Three drifts are being run at the 2100-ft. level—one north, one south and one west. All of the drifts are in vein matter, and none of them have yet developed any valuable ore bodies. Daily yield of ore from the old stopes above the seventh station level, 40 tons.

DAYTON.—The 400-ft. station has been reached, a station set, put in, and the shaft again continued downward.

WELLS FARGO.—New shaft 140 ft deep. It has passed through the hard country rock, and the bottom is in vein matter and quartz. Water does not trouble.

CROWN POINT.—Sinking the main incline is progressing finely. It is now down to the 1700-ft level. The main east drift on the 1600-ft level is still driven vigorously ahead without change of interest to report. The ore breasts on the 1400 foot level are yielding the usual amount of good ore. Daily yield 400 tons of ore.

WOODVILLE.—Sinking the new shaft is making steady progress. The recently discovered ore body in the north drift on the 300-foot level continues to improve as the development progresses. The width and extent of this ore body is as yet entirely unknown. The mill is kept steadily running on ore from the mine.

SILVER HILL.—The face of the main south drift on the third level is still in fine quartz, carrying some fair grade ore.

IMPERIAL-EMPIRE.—Sinking the main incline is making splendid progress considering the great depth reached. The main south drift, on the 2000-ft level, is still driven vigorously ahead.

JULIA.—The main south drift on the 1000-ft level is advancing steadily along the west wall of the ore vein in a more and more encouraging character of vein material.

BALTIMORE.—The erection of the new pumping machinery is making slow though steady progress.

Arizona.

MINING ITEMS.—Arizona *Citizen*, Feb. 13: L. W. Carr and John W. Hopkins have bought 750 feet in the Ostrich gold mine, and are determined to have a stamp mill on it soon, and are now examining some machinery for that purpose. The main shaft is now down over forty feet, and a ledge of paying quartz eight to ten feet is developed. Both walls of the vein are perfect, and every pound of the ore prospects well in free gold—much of it away up in the hundreds per ton.

Lee & Scott have just let a contract to sink the main shaft on their Negrilla mine fifty feet deeper, and it is now 120 feet deep. This is already demonstrated to be a very rich silver vein, and ore shipped to San Francisco was there worked at a profit to the shippers. The mine is only about twelve miles west of Tucson.

D. A. Bennett left early in the week for the Patagonia country, where himself and Mr. E. N. Fish are engaged in what promises to be very extensive mining operations. They are sinking and find the prospects better than expected. A shaft of 100 feet is down on the San Jose, and of 250 feet on the Santa Maria. They have about 25 men at work, and Mr. Padres employs 45 men in smelting ore obtained from the San Jose and Santa Maria. Mr. Bennett informed us that they expected to commence smelting inside of two months, but desired to make certain developments first, which they are doing vigorously.

Colorado.

CLEAR CREEK COUNTY.—Colorado *Miner*, Feb. 13: The Clark mining company's ground on the Terrible is yielding to the lessees who are working it ore that fully sustains the royal character of this great mine.

JOHN COLLOM writes to the *Miner* as follows: I am happy to inform the miners of Georgetown that the arrangements are now made for building the Colloim concentration works in Georgetown, and that we intend to commence the erection as soon as the cold weather is over. The capacity of the works will be one hundred tons a day, so that we shall be prepared to buy and concentrate all the low grade ores that the mines of Georgetown will produce.

DENVER SMELTING WORKS.—The Denver smelting works, at Swansea (Denver Junction), have been purchased by Mr. William Lawson, a gentleman of abundant means from England. He will immediately send to England for a gentleman to come here and take charge of the works. Possessing as he does plenty of capital necessary to carry them on, this purchase appears to be particularly opportune and gratifying.

Idaho.

BOISE COUNTY ITEMS.—Cor. Silver City *Avan-lanch* Feb. 15: Except prospecting in quartz, little is being done here at present.

Some of the boys have struck a rich streak in a ledge belonging to J. G. Hnghs & Co. A large portion of it pays \$3 to the psn, and the remainder is over an average milling ore in a 4-foot vein.

Nothing but prospecting is required to prove our range of mountains second to no other camp in the Territory. But situated as we are—nearly all of us poor—we cannot, without the aid of capital, open our mines successfully. Our ledges, barred as they are with gold, open out to the magic touch of golden keys.

It is reported that operations will be resumed the ensuing summer on the Mammoth ledge, at Summit Flat. In times past considerable money was taken from the mine and those interested retired with a "home stake." Being cautious men, they were afraid to invest what they had already made by putting it into the ground again, and so left it; now, however, they have either made some arrangement, or gave gained a little courage, and are about to have another slap at it, probably with the intention of selling. Mammoth ore never milled less than \$50 per ton, and is very hard.

The owners of the different mines are confident of being able to work out their own salvation, without the aid of outside resources, and some there are who would not sell under any consideration.

Oregon.

MINING ITEMS.—Oregon *Independent*, Feb. 17: The late pleasant weather has started prospecting in a way that will soon determine the actual worth of the late numerous discoveries reported by us, as well as extend the field already gone over. Earnest work is begun on nearly or quite all the ledges heretofore spoken of and prospecting is being done at this time in localities so remote that we are able to obtain only occasional reports.

The "Hodges" cinnabar lead. The last most extensive discovery of cinnabar was made public about a week ago. It was discovered near a place known as "The Meadows," on Evans creek, about 30 miles northeast of here, by a man named Daniel Hodges, who had been prospecting in that region for several weeks, living at times on bread and water; but so sanguine was he of success, notwithstanding the adverse counsel, and even ridicule of acquaintances, that he persevered against all obstacles until finally rewarded with the discovery of what promises to be the most valuable lead of that ore yet found. After locating what ground he desired he notified his friends, and soon parties from here were on their way to secure claims. Thus far ten claims of 1,500 feet each have been recorded.

Irrigating and Other Canals.

A State System of Canals for the Development of the "Field," the "Forest," and the "Mine,"—Its Immense Benefit to California—How the City and the State Would be Enriched.—By a Distinguished Engineer.

What the New York State Canals Have Cost.

The navigable canals constructed by New York State since 1817, aggregate a total length of 907 miles.

The cost of construction to 1874 is.....	\$64,710,832
The cost of maintenance, repairs and collection.....	24,377,108
Total cost of construction and maintenance, etc.....	\$89,087,940
Receipts from tolls were.....	97,525,056
The actual cost, including the interest thereon, is.....	\$64,710,832
Total interest on same.....	93,736,554
Total cost maintenance, repairs, and collection.....	24,377,108
Total interest on same.....	27,258,595

Total cost from commencement to completion.....	\$210,093,489
Aggregate receipts from tolls, with interest.....	202,619,510

Present cost to State of the entire canal system..... \$7,473,569

Number and Tonnage Capacity of the Boats.

There are 6,511 boats, having an aggregate of 971,395, the average tonnage of the boats being 160 tons. The age of the present boats is ten years, and the total number of navigable days in ten years is 2,268 days: (In California there would be 3,650 days.)

Cost of Transportation.

Cost of boats complete.....	\$ 5,000
Interest on same for ten years.....	3,500
Repairs, with interest on same.....	2,061
Expense of crew, \$185 per month.....	15,555
Expense of towing, 35 cts. per mile, 79,526 miles.....	30,334

Total for 2,268 days..... \$57,451

Total for one day..... \$25.33

Total per mile..... 72

Average burthen of boats, up and down tonnage..... 155

Actual cost, exclusive of tolls, per ton per mile..... 4.61 mile

The average current charges upon all classes of freight upon the canals, per ton per mile..... 5.55 "

Leaving a profit of..... 1.05 "

Average receipts from tolls..... 4.38 "

Total cost per ton per mile (5.55-4.38)..... 10.04 "

Results.

During the 10 years ending 1864, the New York State canals moved 8,175,803,065 tons, average receipts from which were 0.91 cents per ton per mile, as against 2,132,073,612 tons moved by the New York Central Railway, the average receipts of which were \$2.60 per ton per mile; and 2,587,274,914 tons moved by the Erie Railway, the receipts from which were \$2.22 per ton per mile. The average of both railways being 2½ times the cost upon the canals.

In 1867 the business of the canals was as much as the aggregate of the three years (1865-1867) of the New York Central Railway.

It is calculated that the revenues of the canal will, with the tolls at the present low rates, extinguish the debt yet to be redeemed in the cost of these works in less than fourteen years, and that a tax of seven and a half mills upon the dollar of assessed property would discharge it in a single year.

The State of New York has, since 1825, unaided, and without embarrassment, or an undue extension of its credit, and when its resources and wealth were undeveloped, expended these many millions in the construction, maintenance, and working of the canals. Notwithstanding that the canals are closed annually for about five months, by Jack Frost, they carried for the ten years previous to 1870, about 24 per cent. more freight than the New York Central and Erie railways together, which were working all the time. It would be impossible for the State to prosper without this system of canals, and the railways cannot supplant them and absorb all the internal carrying trade of the country. The "Field," the "Forest," and the "Mine" yield products which are bulky and of small value compared with their weights, and they do not require to be transported at 15 to 20 miles an hour. At a speed of 2½ to 3 miles an hour such goods can be carried on canals at such low rates that no railroad could compete with them.

Both are, however, necessary for the prosperity of the State, and both are of mutual advantage. The railroads are necessary for passengers and for perishable goods, for which the canals are not available. Notwithstanding the closure of the Erie Canal by frost for so many months, it has moved annually 6,000,000 of tons, which is more than the full work of six double-track first-class railways, and yet it is only 70 feet wide on the surface, and has a depth of seven feet of water. What would Chicago, Milwaukee, Cleveland, Rochester, Buffalo, Syracuse or Utica have done, or have been without the Erie Canal?

This canal transports, in eight months, twice the whole foreign tonnage of the port of New York. Governor Morris, the projector of the Erie Canal, in writing to Mr. Parish in England in January, 1801, showed his wonderful foresight. He says: "Shall I lead your astonishment up to the verge of incredulity? I will. Know you that one-tenth of the expense borne by Britain in the last campaign would enable ships to sail from London, through Hudson's river, into Lake Erie. As yet, my friend, we only crawl along the outer shell of our country.

The interior excels the part we inhabit in soil, in climate, in everything. The proudest empire in Europe is but a bubble compared to what America will be in the course of two centuries, perhaps in one."

This being the showing of the New York State canals, let us now see what the State of California might do in the same direction, combining irrigation with cheap transportation. We have the New York State canals as a precedent of financial success, notwithstanding the many mistakes made and the political influences which have increased the cost of the same.

System of Canals for the Plains of California.

The San Joaquin and Sacramento together form the great valley of California. This is the great backbone in the future prosperity of the State, and already the source of an immense business to the city of San Francisco. The geographical features of the San Joaquin valley, on the west side, must always prevent the rain fall from being sufficient to mature the grain crops, and to afford permanent pasturage. Irrigation is therefore an acknowledged necessity, and until the lands can be watered by artificial means, this vast area of rich and easily cultivated land must remain more or less unproductive and uncultivated. A main canal connecting Kern and Buena Vista lakes with Tulare lake, and Tulare lake with Suisun bay, will open out the entire western slope of the valley and bring San Francisco in direct communication with the extreme southern portion of the valley.

Again, a main canal from Suisun bay, along the western slope of the Sacramento valley to the junction of the Sacramento and Pit rivers, and the improvement of Pit river to its connection with Goose lake, and the connection of Goose lake with Klamath lake, and Klamath lake with the Columbia river along the Des Chutes valley for purposes of navigation and irrigation, is a project deserving the attention of the State and of action by the next Legislature.

Some Estimates.

The following table of the cost of transport per mile is deserving of careful consideration:

	Mile.
Ocean, long voyage, per ton per mile.....	1
Ocean, short voyage, per ton per mile.....	2 to 4
Lake, long voyage, per ton per mile.....	2
Lake, short voyage, per ton per mile.....	3 to 4
Rivers—Hudson, and of similar character.....	2.5
Rivers—St. Lawrence and Mississippi.....	3
Rivers—Tributaries of the Mississippi.....	5 to 10
Canals—Erie.....	4
Canals—Ordinary size.....	5
Canals—Ordinary size, great lockage.....	5 to 8
Railroads—Transporting coal.....	6 to 10
Railroads—Not for coal; favorable grades.....	12.5
Railroads—Not for coal; steep grades.....	15 to 15

The cost of movement on a canal depends upon the relative sectional areas of the boat and of the canal; upon the actual size of the two, and upon the elevation to be overcome. The increased cost of transportation on the New York canal, due to the suspension of navigation from frost, is an item that will not exist in the great valley of California system of canals. The actual cost (not charge) of transit by steam on the Forth and Clyde Canal, including everything (not tolls), is 1-20 cent. This canal is closed for some time by frost.

If the main canals cost \$15,000 per mile, and carried a million tons, the tolls would be 1-40 cent to cover 7 per cent. for interest; and taking the cost of transit at the same rate, the total cost would be 1-20 cent against 1 to 2 cents, the total cost by rail. But in the case of canals along the western slope of the San Joaquin and Sacramento valleys, irrigation would be combined with transportation, and the sales of water for irrigation and mill power (if the canals are owned by the State), would enable the tolls for transportation to be very low, and consequently the State of California could possess a system of canals that could be operated to far greater advantage in the interests of the public than the New York canals have been. If the country required speed, of course it could have it, by a greater expenditure on the protection of the canal-banks, and by an increase in the rate of tolls. The Hudson and the Clyde are worked at 15 to 18 miles an hour, and there is nothing to prevent a higher speed, except the expense of works of protection. But the question is, how can we carry a million or two tons a year on a certain line at 1.10 to 1.20 cent per ton per mile, and this can only be done by large navigable canals.

Advantages of Canals Over Railways.

Canals protect the country from drought, and railways do not.

Canals carry at rates which make even grain at one cent a pound remunerative, although grown 300 miles from tide-water; this railways cannot do. Canals increase the value of lands several hundred fold where the rain-fall is always deficient, and induce immigration and cultivation on such lands. Canals in such districts of deficient rain-fall, or where the rains occur during only a few months of the year, by encouraging cultivation and immigration, also develop the railway system, and make the same a necessity for the transit of passengers and of perishable goods.

Advantages to the State.

By the early completion of such large canals for the purposes of irrigation and navigation the State will increase the taxable property of the country, and so reduce the pressure on the present population. Merchants and farmers would not then be discouraged at the present low price of wheat, because if the State canals could convey at 0.5 cent per ton per mile, the

average cost of moving wheat a distance of 200 miles, would be one dollar a ton. The advantage in having such works carried out by the State consists, moreover, in the fact that the credit of the State enables it to obtain loans at a lower rate of interest than private companies can, and there is therefore, no necessity for burdening the country with taxes to pay for works of this character, which will much more than pay for themselves.

No sensible or well-read man can doubt the financial excess of well laid out and carefully-constructed canals for irrigation and transportation. The New York canals are a proof of the latter item, and the canals in Europe and India are overwhelming proofs of the former.

"Popular Errors."

Many persons argue that the time is not yet ripe for such a system of canals; that the country is too sparsely inhabited. Such persons forget the simplest principles of the traffic question, the first point of which is that communications make traffic. Afford the communication and population will flow in, and traffic must ensue. If the drought of 1864 and of 1871 was so terrible in these plains of California, what would not similar droughts be with the present population therein? If the farmers and cattle and sheep owners can be secured from their present misery and anxiety, whenever signs of similar drought are present, will it not tend to induce a better and more permanent settlement of these great interior plains? The loss of thousands of sheep and cattle from starvation is a direct loss to the entire community. A State charge of even five cents a head a year on all the cattle and sheep of these plains, for the purpose of developing a system of irrigation and cheap transportation, would be a boon to the stock men compared with the present risks they now run from periodical droughts.

What Irrigation Canals Would Do.

A general system of irrigation and canals for transportation by the State would do more than anything else to break up the present evils arising from large land-ownership.

It would make the lands too valuable to be held, as now, for stock-raising, and the consequent increased assessments from \$2 to even \$6 would force the large land-owners to divide the lands into small farms. At the same time there would be an immense increase in the number of sheep, cattle hogs and horses raised on the same land. Although the State's credit and sovereignty is necessary to raise the loans and to enforce the proper working of the canal system, yet in some way or other the private land-owners whose estates are improved should be made liable by law to pay for all that is done to improve the land. If the State were to make advances for works of permanent value to the reproductive powers of any section belonging to private parties, such advances should be repaid by installments from rents and sales of land at such rates as shall extinguish the debt in a reasonable number of years; and if the landlord should be unable to repay such advances, the State should have the power to foreclose its mortgage on the land.

Take the case of the west side of the San Joaquin valley, from Tulare lake to tide-water, at say Martinez. Here we have about 500,000 acres of land, well adapted, by the quality of the soil and the evenness of its surface, for irrigation. The irrigation of this large area is chiefly dependent upon the waters of King's river and Tulare lake. The settled portion, in farms of reasonable size, is in the lower part of the valley, and there are not much over 10,000 acres, out of the 500,000 acres, in the hands of small farmers. These unfortunate parties are therefore at the mercy of the large land-owners who own the lands between them and the necessary water-supply.

Now, if the State would amend the Constitution at the next general election, so as to enable it to undertake the canal work, these small farmers would in three years have a system of irrigation and a canal available for transportation. The large land-owners would also find it to their advantage to have the State system of irrigation laid out on one or two sections in width along the line of the main canal; and unless they were unusually short-sighted in regard to their own interests, they would readily support the Legislature in any such enterprise. These 500,000 acres could then, in the course of twenty years, be divided into a large number of farms, capable of supporting a population of 100,000 where now there is less than 5,000.

The New York State, in Article 7 of the Constitution, provided for the construction, maintenance, and regulation of the canal system; why cannot California do the same and combine irrigation with cheap transportation? The natural facilities are immense. Nature, in the provision of Tulare lake, the wonderful evenness of the country, the constant supply of water in the snows of the Sierra Nevada, and in the climate, has done nine-tenths of the work. The State alone can have the power to control the necessary system of irrigation and drainage, so necessary in connection therewith; and there are so many millions of acres in need of irrigation and reclamation, and which require to be dealt with on a complete system that it is impossible for private enterprise to work it out. Whether the people irrigate or not, they have the immense benefits of navigation, drainage, timber, cheap food and forage.

Benefit to Mines—Great Possibilities.

The mining districts will be likewise benefited in the increased cheapness of bacon,

beans, etc., which are now imported from the East.

No country in the world could furnish more pork and bacon, cheese, honey and flour, than the San Joaquin valley, if the advantages of irrigation were available. The portions of the State which are not dependent on irrigation need not hesitate to support the action of the State Legislature in the direction of canals, because they must be benefited indirectly if not directly. The lumber business of Mendocino, for instance, will be largely increased, in the supply of fencing and building lumber. The mining counties will obtain their bacon and beans, etc., at a very considerable reduction on present rates. San Francisco will be brought in direct water communication with this vast back country, and, therefore, cannot fail to reap largely from such facilities. The State could make contracts with private companies to construct the canals, and save in that way considerable outlay and trouble. But it should exercise a constant control over the distribution of the water and in the proper adjustment of the canals and system of ditches. The general question of irrigation by the State is one that well deserves the attention of every Californian.—*Bulletin.*

DUBIOUS BUT WORTH EXAMINATION.—SPONTANEOUS COMBUSTION.—Somebody has stated that when oxide of iron is placed in contact with timber, excluded from the atmosphere, and sided by a slight increased atmosphere, the oxide parts with its oxygen, and is converted into very fine divided particles of metallic iron, having such an affinity for oxygen that, when afterwards exposed to the action of the atmosphere from any cause, the gas is absorbed so rapidly that these particles become rapidly red hot, and if in sufficient quantity will produce a temperature far beyond the ignitable point of any timber. Whenever, therefore, iron pipes are employed for the circulation of hot water, air or steam, and when in close contact with timber are allowed to become rusty, it is only necessary to suppose that under these circumstances the finely divided particles of metallic iron becomes exposed to the action of the atmosphere, in order to account for many of the fires which take place at the commencement of the winter season.

In the California mine, the face of the east cross-cut, on the 1,400-ft. level, is in one of the richest possible character, proving beyond a doubt, the extension of the ore body, from the 1,500-ft. level up to and above the 1,400. This is a development of great importance, as it establishes the unbroken continuation of the great ore body from the 1,400-ft. level down to the 1,550-ft. level, where the quality of the ore is unsurpassed in richness, and its breadth and extent as yet literally unknown.

SOLD.—The Wetherell mine, situated in Hutch's canyon, in the White mountain range, in the extreme western portion of Esmeralda county, Nevada, has recently been sold to a San Francisco company. The exact amount paid for the property is not known, but it is said to be about \$65,000. The site includes the mine, mill, wood-ranch, mill site, water privileges, pack animals, and all the paraphernalia belonging to the mine and reduction works.

At Mrk's mill, Mono county, the old reverberatory furnaces have been torn out and a White furnace is being put in. When completed the mill will have a capacity of from ten to thirteen tons per day, and there are about 1,000 tons of roasted ore on the dump ready for work.

The bevel-screw, or ship timber saw, which the Ship-building Association of Vallejo has ordered by telegraph from the East, will be the only one of the kind on the Pacific coast, excepting at the Navy Yard. It is a most valuable invention, and will do the work of over twenty men.

Mr. BULGER, engineer of the United States Mint in this city, has recovered from the injury he sustained by a piece of iron falling on his foot recently, and is now at his post again. He has been confined to his room for nearly two months.

THE TIMBERS used at the Petaluma mine, Eureka, are from the Ruby range of mountains, and are said to be superior to the Sierra Nevada growth of pine, being more tough and less brittle.

A LARGE amount of merchandise, quicksilver, etc. has arrived at Eureka, Nev., on its way to Revelle District. It is expected that a mill will be running there shortly.

O. M. EVANS shipped last week, from Nev., 75 tons of antimony ore to this city. It is from Evan's mine near Unionville. Fifty-two more tons will be shipped this week.

A TWELVE-foot vein of antimony has been discovered about twenty miles from Cimarron, New Mexico, on Red river.

The prospects are excellent for quite a town springing up at the Galice Creek mines this summer.

THERE are forty-three quartz mills in Montana, containing 466 stamps.

A LARGE quantity of ore from Castle Dome, Arizona, is now on the way to this city, by sea.

Good Health.

Diphtheria—Symptoms, Treatment and Prevention.

The following information, from a no less authoritative source than the Report of the Sanitary Committee of New York, and which embodies deductions from the investigations of the latest and most competent medical authorities, ought to be generally diffused:

Mode of attack.—Diphtheria is caused by the inoculation of the air-passages with the diphtheritic poison, which from this point infects the whole system; the local inflammation is attended with the formation of membrane (exudation); the fever and general symptoms are the result of this local infection.

How it Spreads.—Diphtheria is therefore a contagious disease (not, perhaps, as marked as scarlet fever), induced by contact with objects infected. It may be diffused by the exhalations of the sick and the air surrounding them; or directly by the exudation, as in the act of kissing, coughing, spitting, sneezing; or by the infected articles used, as towels, napkins, handkerchiefs, etc. The poison clings with great tenacity to certain places, rooms, houses, where it may occasion cases after the lapse of months.

Symptoms.—In ordinary attacks the poison begins to act the moment it lodges upon the tissues; but, like a vaccination, at first causes but slight sensible effects. In from two to five days there is marked prostration, dryness of throat, and pricking pain in swallowing; the throat becomes red, and patches of white exudation appear, and the glands of the neck swell. In mild cases these symptoms subside on the third or fourth day from the appearance; if more severe, these symptoms may be prolonged; if unfavorable, the fever increases, the local inflammation spreads, and exhaustion rapidly follows.

Predisposing Conditions.

The Person.—Diphtheria attacks by preference children between the ages of one and ten years, the greatest mortality being in the second, third and fourth years; children of feeble constitutions, and those weakened by previous sickness, and those suffering from catarrh, croup, and other forms of throat affections.

Social Relations.—All classes are liable to diphtheria where it is prevailing, but those suffer most severely who live on low, wet grounds; in houses with imperfect drains, or surrounded by offensive matters, as privies, decaying animal or vegetable refuse; in damp rooms, as cellars; in overcrowded and unventilated apartments.

Seasons.—Diphtheria is not affected by either heat or cold, drought or rain.

Precautions—The Dwelling or Apartment.—Cleanliness in and around the dwelling, and pure air in living and sleeping rooms, are of the utmost importance wherever any contagious disease is prevailing, as cleanliness tends both to prevent and mitigate it. Every kind and source of filth in and through the house should be thoroughly removed; cellars and foul areas should be cleaned and disinfected; drains should be put in thorough repair; dirty walls and ceiling should be lime-washed, and fever occupied room should be thoroughly ventilated. Apartments which have been occupied by persons sick with diphtheria should be cleansed with disinfectants, ceilings lime-washed and wood-work painted; the carpets, bed-clothes, upholstered furniture, etc., exposed many days to fresh air and the sunlight (all articles which may be boiled or subjected to high degrees of heat should be thus disinfected). Such rooms should be exposed to currents of fresh air for at least one week before reoccupation.

Well Children.—While diphtheria is prevailing, no child should be allowed to kiss strange children nor those suffering from sore throat (the disgusting custom of compelling children to kiss every visitor is a well contrived method of propagating other grave diseases than diphtheria), nor should it sleep with, or be confined to rooms occupied by, or use articles, as toys taken in the month, handkerchiefs, etc., belonging to children having sore throat, croup, or catarrh. If the weather is cold the child should be warmly clothed with flannels.

When Diphtheria is in the House or in the Family.—The well children should be scrupulously kept apart from the sick, in dry, well-ventilated rooms, and every possible source of infection, through the air, by personal contact with the sick, and by articles used about them or in their rooms, should be rigidly guarded. Every attack of sore throat, croup and catarrh, should be at once attended to. The feeble should have invigorating food and treatment.

Sick Children.—The sick should be rigidly isolated in well-aired (the air being entirely changed at least hourly) unlighted rooms, the outflow of air being as far as possible through the external windows by depressing the upper and elevating the lower sash, or a chimney heated by fire in an open fire-place. All discharges from the mouth and nose should be received into vessels containing disinfectants, or upon cloths which are immediately burned, or, if not burned, thoroughly boiled, or placed under a disinfecting fluid.

While scarlatina, small-pox and enteric fever are scouring numerous cities in England, diphtheria is now prevailing in about half the cities with which this bureau holds correspondence in the United States, and it is more fatal in numerous interior towns and cities than it is

in this city, where its increase seems to be stayed. No other infectious malady more imperatively demands the best resources of medical and sanitary knowledge to limit its prevalence and save life. Sanitary precautions have supreme importance in this disease.

Do not Eat Raw Eggs.

One of the most common prejudices of housewives and mothers is that hard eggs are difficult to digest, especially the white, and that the less they are boiled the better they are for weak and dyspeptic stomachs. A medical journal of good authority, however, reverses the case and asserts that there is more danger of raw and soft white of an egg passing through the digestive apparatus without being really digested than when thoroughly boiled and hard; in fact, that a hard boiled egg constitutes a most excellent food for dyspeptics, as experience is proving. A writer in the *Medical Journal* says: "We have seen dyspeptics who suffered untold torments with almost every kind of food. No liquid could be taken without suffering; bread became a burning acid; meat and milk were solid and liquid fires. We have seen these same sufferers trying to avoid food and drink, and even going to the enema syringe for sustenance. And we have seen their torments pass away and their hunger relieved by living upon the white of eggs which had been boiled in bubbling water for thirty minutes. At the end of a week we have given the hard yolk of the egg with the white, and upon this diet alone, without fluid of any kind, we have seen them begin to gain flesh and strength, and refreshing sleep. After weeks of this treatment they have been able, with care, to begin upon other food." And all this, the writer adds, without taking medicine. He says, what we also have always maintained, that hard-boiled eggs are not half so bad as half-boiled ones, and ten times as easy to digest as raw eggs; and we have no doubt that an animal may be starved to death by eating only raw white of egg, for the same reason that dogs have been starved by eating gelatin alone. Only toothless babies can digest soft food, such as milk.

Unaired Rooms.—A writer in the *Country Gentleman* says: "I pass some houses in every town whose windows might as well be sealed in with the walls, for any purpose that they have but to let in light. They are never opened, summer or winter. In winter it is cold; in the summer the flies stray in, or, if they are netted, the dust sifts through the nets. Now, I can tell a person who inhabits such chambers when I see him in the street—there is such a smell about his clothing I always wish for a sniff of cologne or hartshorn, or burnt leather or something of the sort, 'to take the taste out.' A house that is never aired has every nook and corner filled with stale odors of cooked meats, boiled vegetables, especially cabbages and onions, which, as the weeks go by, literally reek in their hiding places. The very garments of their children tell the same story of uncleanness. It is bad to have unwashed clothes, but there may be an excuse for it. But what excuse can there be for unaired ones, when air is so cheap and free? There is death in such unaired chambers. Better a swarm of flies or a cloud of dust; better frost and snow in a room than these intolerable smells. The first thing in the morning, when you are ready to go down stairs, throw open your windows, take apart the clothing of your beds, and let the air blow through it as hard as it will. There is health in such a policy."

WARTS.—Dr. Guttoseit recommends rubbing warts, night and morning, with a moistened piece of muriate of ammonia. They soften and dwindle away, leaving no such white mark as follows their dispersion with lunar caustic.

Useful Information.

COLORS IN CARPETS AND UPHOLSTERY.—Put a good amount of color on ceiling, not, however, making it so dark as to bring it too close to the eye. The carpets must be either lighter or darker than the walls. This is following out the artist's rule, to make either background or foreground run into the figure. If this is not done in painting, a woman in white satin, for instance, against a dark floor and dark walls, will look like a cut-out figure stuck on, and the same sort of a result would occur in rooms. As in ordinary life, dresses are dark in color, where a light wall tone has been recommended, the carpet will have to be darker than the walls. Not too vivid in color, however, and, of course, no flowers, ferns, birds' nests, and such like fearful things. Furniture and hangings should not be too much alike in color; have, say, the carpet one tone, the coverings of furniture another, and the curtains and other hangings a third. Have summer and winter hangings and furniture coverings; those for the former light and cheerful, the others with more warmth, and suggestive of comfort and home life. A table-cloth, occasionally a chair, or a rug, may supply a bit of effective contrast with prevailing hues of hangings, etc., and a spot of vivid color in a vase or some small hanging will complete the formal decoration of the room. —*Brit. Arch. Asso. paper.*

Rock or swamp maple is a better step for a turbine than either *lignum vitæ* or elm. Cast iron is useless. So says the *Scientific American*.

The Common Hammer.

Few people, in witnessing the use of a hammer, or in using one themselves, ever think of it as an engine giving out tons of force, concentrating and applying power by functions which, if performed by other mechanism, would involve trains of gearing, levers, or screws; and that such mechanism, if employed instead of hammers, must lack that important function of applying force in any direction that the will may direct.

A simple band hammer is, in the abstract, one of the most intricate of mechanical agents, that is, its action is more difficult to analyze than that of many complex machines involving trains of mechanism; but our familiarity with hammers makes us overlook this fact, and the hammer has even been denied a place among those mechanical contrivances to which there has been applied the mistaken name of mechanical powers.

Let the reader compare a hammer with a wheel and axle, inclined plane, screw or lever, as an agent for concentrating and applying power, noting the principles of its action first, and then considering its universal use, and he will conclude that if there is a mechanical device that comprehends distinct principles, that device is the common hammer; it seems, indeed, to be one of those things provided to meet a human necessity, and without which mechanical industry could not be carried on. In the manipulation of nearly every kind of material, the hammer is continually necessary in order to exert a force beyond what the hands may do, unaided by mechanism to multiply their force. A carpenter in driving a spike requires a force of from one to two tons, a blacksmith requires a force of from five pounds to five tons to meet the requirements of his work, a stone mason applies a force of from one hundred to one thousand pounds in driving the edge of his tools; chipping, calking, in fact nearly all mechanical operations consist more or less in blows, and blows are but the application of an accumulated force expended throughout a limited distance.

Considered as a mechanical agent, the hammer concentrates the power of the arms and applies it in a manner that meets the requirements of the work. If great force is needed, a long swing and slow blows accomplish tons; if but little force is required, a short swing and rapid blows will serve, the degree of force being not only continuously at control, but the direction at which it is applied also. Other mechanism, if used instead of hammers to perform the same duty, would from its nature require to be a complicated machine, and act but in one direction or in one plane. —*Journal of Iron.*

WRITE PLAIN ENGLISH.—A very common mistake with writers on scientific and mechanical topics for popular perusal, is the indulgence in technical terms and algebraic formulas to an unnecessary extent. Such writings often fall far short of comprehension by the readers to whom they are addressed. It does not need that the scientific writer should "etooop to conquer," or simplify his lucubrations to a childish degree, but good plain English, which persists in calling a spade a spade, should be used in all cases, leaving mere jargon of nomenclature to the society meeting, or the scientific quarterly. It is no disparagement to working mechanics that they do not generally understand these things, since it is sometimes a matter of doubt whether the writers do themselves.

TO BLEACH FLANNEL.—Flannel which has become yellow with use may be bleached by putting it for some days in a solution of hard soap to which strong ammonia has been added. The right proportions are one and a half pounds of hard cut soap, 50 pounds of soft water and two-thirds pound of strong ammonia solution. The same object may be attained in a shorter time by placing the flannel for a quarter of an hour in a weak solution of bisulphite of sodium, to which a little hydrochloric acid has been added.

VAPORIZING IRON.—According to Professor Langley, five thousand tons of iron is vaporized every year by the furnaces in Pittsburgh, passing off through the chimneys, and this remarkable fact he uses as a measure to indicate the amount of the sun's heat. The volatilization of the iron is accomplished by what is a very small quantity of coal compared to all that the Pennsylvania coal fields contain; and yet the whole of the coal estimated to lie within that State would maintain the sun's heat only a small fraction of a second.

WICKS IN KEROSENE LAMPS.—The unsatisfactory light frequently given by kerosene lamps, is often due to impurities which have collected in the wick. The filtering of several quarts of oil through a wick, which stops every particle of dust in it, must necessarily gradually obstruct the pores of the wick—consequently, although a wick may be long enough to last some time, its conducting power may be so impaired that a good light cannot be obtained.

HOPS AND HOP-STALKS.—In Sweden a strong cloth is manufactured from hop-stalks. The stalks are gathered in autumn, and soaked in water during the whole winter. The material is then dried in an oven and woven as flax. The buds of hops can be used as an esculent, and when boiled will do as a substitute for asparagus. The tendrils, when young, may be used in the same way.

Domestic Economy.

Tomatoes for Supper.

Few people know how to prepare uncooked tomatoes in the way adopted in my family, and incomparably better than any mode I have ever tasted. By this mode they are very desirable for supper or breakfast. For a family of half a dozen persons take six eggs, boil four of them hard, dissolve the yolks with vinegar sufficient, add about three teaspoons of mustard, and mash as soon as possible; then add the two remaining eggs (raw), yolk and white, stir well; then add salad oil, to make altogether sauce sufficient to cover the tomatoes well; and plenty of salt and cayenne pepper, and beat thoroughly till it frosts. Skin and cut the tomatoes a full fourth of an inch thick, and pour the sauce over, and you have a dish fit for a president. Though a little troublesome to prepare, yet if once eaten by people who are blessed with palates to enjoy good things, they will be pronounced to be far superior, to any other mode of preparation. For dinner they are best stewed, but they should always be strained before sending to the table. —*Cor. Germantown Telegraph.*

TO BOIL A HAM.—Take a ham weighing about eight or ten pounds, soak it for twelve or twenty-four hours in cold water, then cover it with boiling water, add one pint of vinegar, two or three bay leaves, a little bunch of thyme and parsley (the dried and sifted will do, or even the seeds of parsley may be used if the fresh cannot be procured); boil very slowly two hours and a half, take it out, skim it, remove all the fat, except a layer about half an inch thick; cut off with a sharp knife all the black looking outside, put the ham into your dripping pan, put side uppermost, grate bread crust over it and sprinkle a teaspoonful of powdered sugar over it; put it in the oven for half an hour, until it is a beautiful brown.

Eat cold; cut the nicest portion in slices; the ragged and little odds and ends can be chopped fine and used for sandwiches; or, by adding three eggs to one pint of the chopped ham and frying brown you have a delicious omelet for breakfast or lunch. The bone should be put into the soup kettle. The rind and fat should be rendered and strained for frying potatoes or cutlets. A ham prepared in this way will go twice as far as when cooked and served in the ordinary manner, besides the conviction it gives the housekeeper of being economical, and at the same time placing neat and palatable dishes before her family.

An excellent breakfast dish can be made from the remains of a ham. Take about a pound and a half of the ham, both fat and less, put it into the mortar and pound it. Boil two large slices of bread in a pint of milk, add three boiled and mashed potatoes and one egg. Mix it with the ham, beat up well and bake it a rich brown.

GOOD TARTS.—Pare and core about a dozen nice apples, put them into a saucepan to stew, adding a little water; stir them frequently, and when they are cooked to a pulp, add a pound of currants and enough sugar for sweetening nicely. To this add a teaspoon of rich cream, flavored with vanilla. Line a deep tart dish with puff paste, pour into it the apples and cream, and cover it with another piece of paste of the same thickness and size, and press the edges closely together. Place in the oven and bake to a rich brown. Serve with wine sauce.

POTATO CHOPS.—Boil and mash some nice mealy potatoes, then, with one or two well beaten eggs, make them into a paste, work it well, dust it over with flour and roll out. Take some nice thin neck of mutton or lamb chops, carefully trim off the fat, pepper and salt them on both sides, cut the paste into shape, cover over like a puff, pinch the edges and fry of a light brown; they look better if about an inch of the bone is left visible.

ICING THAT WILL NOT BREAK.—Take one pound of pulverized sugar and the whites of three fresh eggs, well beaten. Mix them well together, and flavor with the juice of one lemon or add a teaspoonful of strong odor vinegar. Pulverize one teaspoonful of wheat or corn starch and add to it. Flour the top of the cake as soon as it is taken from the oven, and put on the icing with a large bladed steel knife into warm water, and then smooth the frosting with it.

TASTE OF PINE.—A pine curbhog to a well or spring which has but a small discharge where it comes in contact with the water, often causes it taste of the wood. If boards so used are soaked in milk of lime, or a solution of potash and soda before being put into the well, there will be no trouble.

SUGARED POP-CORN.—One cup of white sugar, half a cup of water, boil till it taffies, and sprinkle in the pop-corn as much as the pan will hold. If nicely popped this will sugar two quarts of corn. Stir well, so that it does not stick together. The grains ought to be separated.

RAISED WAFFLES.—One pint of sweet milk, one teaspoonful of butter, three eggs, a teaspoonful of thick brewers' yeast, one quart of flour, and another cup of milk, in which dissolve a teaspoonful of soda. Let it all rise until light, and then bake like other waffles. Serve with butter and sugar or maple syrup.

MINING SCIENTIFIC PRESS

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Agricultural Lectures at Berkeley.

Our readers are of course aware that several
 courses of lectures have been delivered at the
 University of California within the past few
 months, on agricultural subjects. A number
 of these lectures have been published in the
 Press for the benefit of those who could not
 attend. The courses already delivered are as
 follows: "On the Analysis of Soils," by Prof.
 Engene Hilgard, of the University of Michi-
 gan; "On the Chemistry of Household Life,"
 by Prof. Hilgard; "On Economic Botany, or
 the Plants which are Useful and Harmful in
 Human Industry," by Prof. C. E. Bessey, of
 the Iowa Agricultural College; "On the Im-
 provements of Varieties in Plants and An-
 imals," by Prof. Bessey. A course of Lectures
 will shortly be given "On Stock Breeding," by
 Prof. W. H. Brewer, Botanist of the California
 Geological Survey and Professor of Agricul-
 ture in the Sheffield Scientific School.

A miscellaneous course on subjects pertaining
 to agriculture will soon be given on the follow-
 ing named subjects: "On Insects Injurious to
 Vegetation," by Henry Edwards, Vice-President
 of the California Academy of Sciences; "On
 Forestry," by Prof. H. N. Bolander, State
 Superintendent of Public Instruction; "On
 Orange Culture," by Dr. Strenzel, of Martinez;
 "On Wheat," by Horace Davis, Esq.; "On Local
 Field Botany," by Dr. W. P. Gibbons, of
 Alameda, and Dr. A. Kellogg, Director of the
 Museum of California Academy of Sciences;
 "On Lower Forms of Vegetable Life," by Dr.
 H. W. Harkness; "On the Encalyptus Tree,"
 by R. E. C. Stearns, Secretary of Regents,
 Berkeley; "On Cotton Culture," by J. W. A.
 Wright, Lecturer of State Grade of California;
 "On the History of California Agriculture,"
 by W. B. Ewer, editor of PACIFIC RURAL
 PRESS. In addition to these lectures a course
 is now being delivered at the Mechanics In-
 stitute in this city by some of the Professors of
 the University. These lectures are of course
 free to all.

WM. A. STUART, of Napa county, has sold
 his one-twentieth interest in the Geyser and
 Mercury mines to Wm. H. Sears, of San Fran-
 cisco, for \$30,000, or at the rate of \$600,000 for
 the two mines.

QUICKSILVER has fallen in Liverpool to £23
 per flask.

The Hair Worm, or Horse-Hair Snake.

A lady friend, who resides on Russian Hill,
 has sent us a lively specimen of that singular
 species of animated nature, commonly known
 as "the hair worm," or "horse-hair snake."
 It came into the possession of our friend from
 the faucet in her dwelling, connected with the
 Spring Valley water works. She intimates that
 it is just a little dangerous to indulge in aque-
 ous potations from the faucet in the dark. We
 should think it was. In answer to her inquiries
 as to its origin, and how it came all the way
 through the pipes, we append the following:

Most of our readers are doubtless familiar
 with the form and appearance of this singular
 worm or snake, and many of us, when boys,
 and some of us when full grown men and
 women, were fully impressed with the belief
 that a hair from a horse's tail, when left in a
 pond or other still, warm water, would turn in-
 to one of these singular creatures. It has been
 a popular belief that if incautiously handled, it
 will bite the ends of the fingers and occasion
 that peculiar sore, or gathering called a whit-
 low. But the microscope shows that it has
 neither jaws nor other instruments by which it
 can either bite or sting. Indeed, it has not even
 a mouth—but obtains its sustenance by the
 absorption of fluids through a membrane over
 that part of its body where the mouth should be.
 Joseph Leidy, a well known Philadelphia pro-
 fessor, once tried a series of exhaustive experi-
 ments to prove that this popular notion of its
 origin could not be true. The microscope and
 scientific investigation, however, have more fully
 proven that this, like every other living crea-
 ture, springs from an egg in the first place.

Science informs us that this is not an insect,
 but belongs to that class of parasitic worms,
 which live and thrive, for a certain length of
 time in the intestines or substances of some
 other body, like the tape worm in the human
 system and the trichinae in the hog. The name
 of the genus to which this worm belongs is *Gordius*,
 and there are quite a number of different
 species. The most common species of this
 genus, and that to which the one now before us
 belongs, live in the bodies of grasshoppers,
 crickets and various other insects; but when
 nearly mature and full grown, they bore their
 way out of their insect home, and take to the
 water or moist earth, where after a few days
 they lay their eggs, which are almost innum-
 erable. They are laid in long strings, which look
 like very fine, white sewing cotton. One of
 these worms was seen by Professor Leidy,
 while he was experimenting, to lay a string
 ninety inches long! These eggs are exceedingly
 small—so small that upwards of 1,200 of them
 have been counted in one forty-fifth of an inch
 as thus laid in a string. This would give some-
 thing like six millions of eggs as the product of
 the single worm observed by Prof. Leidy.

The eggs, exposed to the warm summer
 sun, hatch in about one month, and liberate
 worms which have very little or no resemblance
 to their parents. The Professor, during his
 investigation, succeeded in hatching several
 eggs. They produced small tadpole-shaped
 creatures, with a spine and two circles of sharp
 hooks—six in a circle—which could be pushed
 in and down out from the head. This forms a
 kind of boring apparatus, by which the tad-
 pole can penetrate the bodies of such insects
 as may approach them. The Professor placed
 some of the larvæ of May flies in the vessel in
 which the eggs were hatched, and soon the
 young tadpole *Gordius*, were seen to bore their
 way into the larvæ. They were also seen to
 penetrate the delicate membrane at the joints
 of the legs of crickets and grasshoppers which
 were confined and placed in the vessel. They
 were carefully watched, and it was found that
 they gradually ascended among the muscles
 and other organs of the bodies, strongly
 reminding one of the similar but slower move-
 ments of trichinae in the muscles of man and
 the hog.

Of course, their change from the tadpole
 condition to the worm, takes place within the
 body of the insect in which they take up their
 temporary home, living and increasing by the
 nutritious fluids there found until nearly or
 quite fully grown. That such is the case has
 been verified by a report from Mr. Justus Gage,
 who some years since wrote to the Michigan
 Farmer, as the result of his observations, that he
 had discovered that the cricket resorts to the
 water during the month of August to rid itself
 of its unwelcome intruder. Mr. G., had
 been led to believe that the hair worms, which
 were numerous in a certain locality, issued
 from the bodies of crickets, which were also
 numerous in the same locality, although he
 was unacquainted with the manner in which
 they found their way into the crickets.

One day, after he had been experimenting
 by placing crickets in the water to obtain hair
 worms from them, and had succeeded in securing
 two specimens, he noticed a cricket crawling
 up the side of his water pail. It jumped into
 the water, lay quiet for a moment, produced a
 hair worm some six inches in length, and then
 made its escape nimbly over the edge of the
 pail. About the same time he found a worm
 some seven inches long in a dead cricket which
 he found under a stone.

Notices of Recent Patents.

Among the Pacific coast patents recently
 obtained through Dewey & Co's MINING
 AND SCIENTIFIC PRESS American and Foreign
 Patent Agency, the following are worthy of
 mention:

ROAD ENGINE.—R. R. DOSH, Sacramento.
 This invention is an improvement on road en-
 gines, and consists in so connecting the engine
 bearing portion of the machine with the front
 or steering part, that the driving belt wheel
 upon the latter will always remain in the
 proper position to receive the belt from the for-
 mer; whatever change in angle and direction
 may be given to the machine. The chassis and
 wheels for receiving and imparting motion from
 the engine, are also of novel construction.

BLIND SLAT ADJUSTER.—Aaron David, Ma-
 rysville. This invention is to improve the de-
 vice for adjusting the slats of window blinds on
 which an arm on one end of a crank shaft is
 made to raise and lower the rod which connects
 the slats, so that the slats can be adjusted and
 retained in any desired position. The improve-
 ment consists, first in securing the crank shaft
 in a suitable box upon the top or upper edge of
 the lower rail of the blind frame instead of to
 its side as heretofore, and secondly in an im-
 proved method of connecting the arm with the
 connecting rod of the slats.

IMPROVED GRIDIRON.—James H. Mitchell,
 San Francisco. The object of this invention is
 to provide a gridiron for broiling, which can be
 readily repaired in case any portion of it should
 become worn out or destroyed by use. The in-
 vention also includes an improvement by
 which the bars of the gridiron are prevented
 from being warped and bent by the heat to
 which they are subjected.

MORTISING TOOL.—Gustave Eolin, San Fran-
 cisco. In the manufacture of furniture it is
 often difficult to make a respectable mortise or
 socket for the reception of the bolt of the lock,
 which locks the drawer when it is closed, owing
 to the limited space, (only the depth of the
 drawer) in which the workmen is required to
 accomplish the work, it being necessary to
 make the bolt socket after the piece of furni-
 ture is completed, the drawers fitted and the
 lock secured in place. Ordinary chisels and
 mortising tools cannot be manipulated in this
 narrow space, and as a consequence the mor-
 tise had to be made by holding the chisel or
 other tool at an angle so that its lower end
 would be outside of the drawer, space or open-
 ing. The outside wall of the mortise thus con-
 structed would also be made at an angle or
 bevelling so that it answers imperfectly as a
 bolt socket. This improved mortising tool is
 intended to avoid this difficulty by supplying
 an implement which can be handled in a nar-
 row space to make a mortise or socket.

SHEEP SCRATCH BOX.—Ira B. Dillon, Visalia.
 This invention is a novel device for applying a
 healing ointment to the backs of sheep which
 are afflicted with scab or other sores, and con-
 sists in the use of a containing vessel within
 which the ointment is placed and it is retained
 by valves at the bottom. A series of pointed
 spikes project downward from the bottom of the
 box which is placed at a convenient height so
 that the animals can pass beneath it and the
 operation of scratching their backs will open
 the valves so as to allow a portion of the con-
 tained liquid to run out upon the back.

LAMP CHIMNEY GUARD.—Robert Priseman,
 Sacramento California. This is a device for
 guarding lamp chimneys on ship-board or rail-
 way cars and in other places where lamps are
 subjected to a motion which is liable to cause
 their chimneys to fall off. The invention con-
 sists in supporting a metal ring in such a man-
 ner either from the ceiling of the car, boat, or
 other structure or edifice or from some other
 convenient support, so that it will encircle the
 upper end of the chimney and prevent it from
 falling or being thrown from the lamp by any
 motion or jar.

THE California Academy of Sciences held its
 annual meeting at the University of California
 on February 22d. Invitations were issued to
 the Board of Regents and Faculty of the Uni-
 versity, officers of the Mechanics' Institute,
 trustees of the Lick estate, Microscopic Soci-
 ety and of gentlemen otherwise prominent in
 scientific, literary and educational affairs.
 Professor Joseph LeConte read a paper on the
 "Glaciers of Lake Tahoe," the result of origi-
 nal research and observation in that region.
 Professor John LeConte gave a brief descrip-
 tion of two new pieces of apparatus lately pro-
 cured by the University. Dr. Kellogg read a
 short paper on "Hops." A paper on "The Origin
 of California Land Shells," by J. G. Cooper,
 was read. Resolutions were adopted expres-
 sive of the relations between the Academy and
 University, and congratulating the University
 on its progress. After the meeting the guests
 amused themselves examining the groves and
 buildings, and discussing a collation. A very
 pleasant day was spent.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Fifth Lecture Delivered before the University of Cal-
 ifornia College of Agriculture, on Friday, January
 22d, by PROF. C. E. BESSEY.

Insect-Using Plants.

In that suggestive little book of Dr. Gray's,
 "How Plants Behave," some curious things
 are told about plants and insects. One chap-
 ter tells "How plants make insects work for
 them;" another, "how plants capture insects."
 Within the last few years the attention of bot-
 anists has been directed to the relation be-
 tween plants and insects. Darwin, in his
 book, which is too little known in this coun-
 try, "On the Fertilization of Orchids," showed
 that in orchidaceous plants, in every case
 almost, it is absolutely necessary that insects
 should carry the pollen from the stamen to the
 pistil and that in all cases the plants and in-
 sects were

Mutually Adapted to Each Other

And that each species of plant had each its
 particular insect, each corresponding exactly
 to the other. These facts have given to or-
 chids an interest not excelled by any other
 group of plants. For some time they were
 looked upon as somewhat exceptional in their
 need of insects. This peculiar subject has
 been well studied by Darwin, Miller, Lubbock
 and others and by them we have been shown
 that this dependence upon insects is not con-
 fined to orchids, but that on the contrary, very
 many of our ordinary flowering plants are just
 as dependent as these same orchids.

Now, a little about fertilization. The fer-
 tilization of flowers is usually effected by the
 association or union of two cells, the stamen
 or pollen cell, and the pistil or ovule cell.
 Pollen is contained in pollen sacs on the sta-
 mens, while the other cells are found in the
 cavity of the ovule. The pollen in fact comes
 in contact usually with the stigma and then
 grows down through the soft tissues to the
 ovule cell. The deposition of pollen, then,
 upon the stigma is a matter of great impor-
 tance. If it is allowed to fall upon the stigma,
 fertilization ensues; if it is prevented, there
 can be no fertilization and just here is where
 the work of insects comes in.

Now it might be supposed that each flower
 would be made so that its pollen would fall
 upon its stigma, and for a long time this was
 supposed to be the case, and then the point
 was shown that in every case the pollen
 would fall upon the stigma.

It was found in many plants that the stamens
 and pistils are in different parts of the branch-
 es; that is, they are dioecious, as we call them.
 In some cases the stamens are in one plant
 and the pistils in another. Now then, if na-
 ture intended the pollen to fall upon the stig-
 ma, this certainly is not the best arrangement
 to produce that result. In Iowa we have a
 very beautiful plant, the Claytonia, or Spring
 beauty. When it opens, the stamens are shed-
 ding their pollen. Examining the flower at
 this time, it has pretty generally the appear-
 ance of a, Fig. 1. At the time these stamens
 are shedding their pollen, the lobes of the stig-
 ma are closed up. Now, the stigmatic surfaces
 are in the inner parts, that is, they are brought
 together in their closing of the lobes, so that
 when these stamens are shedding their pollen,
 it can not possibly get upon the stigmatic sur-
 faces. In ten or twelve hours or more, these
 stigmatic lobes begin to diverge. But now see
 what follows. Just as soon as these begin to
 spread, the stamens assume the position shown
 at b, Fig. 1, that is, they are preared down flat
 against the petals, as far away as possible from
 the stigma. As soon, however, as the fertili-
 zation has taken place, the stamens again as-
 sume their original position, showing con-
 clusively that we have here an action to pre-
 vent this pollen getting upon these particular
 stigmatic lobes.

Then, you have here another case, which is
 quite common. I see, growing all along the
 roadsides, the plantain. [The speaker then
 pointed out with the aid of diagrams the pecu-
 liar arrangement in the plantain for prevent-
 ing the pollen of one flower from reaching the
 stigma belonging to that flower.] Now, in
 these two cases that I have pointed out, it looks
 very much as if it was intended that stamen
 and stigma were to be kept apart, or, as Dr. Gray
 expresses it, "as if the object were *hove not to do it*." There is no doubt that in a large num-
 ber of cases the stamens and the stigmas are
 kept apart, so that the flower shall not be

Fertilized by its Own Pollen,

And in such cases there are generally special
 arrangements made for bringing pollen from
 other flowers. In carrying out this, insects
 have a very important office. When an insect
 visits a flower, it does not simply go there to
 get honey. There are two objects. The in-
 sect gets honey for itself, and in turn it car-
 ries pollen for the flower.

I will now call your attention to a few plants
 that you may meet. I think none of them are

plants but that you can examine for yourselves. The first, is *Viola Tricolor*, the little pansy, or heart's-ease. This is the little, cultivated flower, considerably changed from the wild flower, which is found in Europe, but universally known as the pansy. And after I have told you what I have to say about these, you can make your own examination and verify my statements. I have here some diagrams to show its principal peculiarities. One peculiarity is that, take the plants as they grow wild, they grow in two forms; a large form and a small one. Now one form is large enough so that insects can visit it, but the small form is too small, so it has to take care of itself.

[The Professor then by the aid of numerous figures explained the structure of the large form of the violet, showing clearly that the pollen from any flower could not possibly fall upon or onto its stigma, but that there were special contrivances and lures for enticing the insect into certain parts of the flower, and then compelling it to carry pollen to the stigma of the next flower. On the other hand it was shown that the small-flowered form, being too small for insects, had to shift for itself; hence it is so modified that its pollen can fall upon its stigma—in other words it can fertilize itself.]

The plants belonging to the genus *Primula*, or the primroses, show some peculiarities. I have here figures showing the peculiarities of the primrose. (See Fig. 2.)

In this case we have what is called dimorphism; that is the flowers grow in two forms. The little pansy just spoken of gives you an idea of what one kind of dimorphism may be; here, however, we have another kind. By referring to Fig. 2 it will be seen that the dimorphism of the primrose relates to its stamens and pistils. In one form (shown at a) the style reaches to the top of the corolla, while the stamens are situated near the middle; while in the other form (shown at b, the style is short and the stamens are situated at the top of the corolla.

Now the explanation of it is quite simple. We find that these are always visited by insects. The arrangement is simply in order to prevent the pollen which grew in these stamens from getting upon the stigma. In all such cases, honey is placed

Down in the Bottom of the Flower.

The insect, in search of honey pushes the style of a to one side and crowds by the stamens; there it wriggles around, gets itself thoroughly covered over with the pollen and then gets back. Now it goes to the other form shown at b, enters it, and you will observe that here the stigma is just at the same height as were the stamens in the other, so that the pollen-covered portions of the insect's body will come in contact with the stigma and so cause fertilization to take place. Observe that the positions of stigma and stamens are corresponding, so that they readily can cross-fertilize.

Here, the plant takes on the habit of producing different kinds of flowers, almost always on different plants, but always belonging to the same species, for the purpose of engaging insects to carry its pollen.

[The structure of the *Drum*, an endogenous plant, was then explained with the aid of diagrams. It was pointed out that the flower first entrapped the insects and kept them prisoners for a time, when having need them as much as it wanted to, it secreted a few drops of honey for them as a peace offering and then let them go.]

There are peculiarities in the common barberry which have long attracted the attention of botanists and a great many others. [The Professor then referred to illustrative diagrams.] Now, it has long been known that when the stamens are touched, they will on account of their irritability, move up to the center of the flower with a quick jerk. If you take a pin and touch them, down at their base, they will very suddenly fly up close to the pistil. I suppose this is known to everybody who cultivates the barberry. This was formerly supposed to be an excellent arrangement for securing self-fertilization. Somebody, however, after Mr. Darwin began his shrewd and careful investigations, found that the stamens were not quite long enough to secure self-fertilization. Now, the arrangement, if we look at it from another standpoint is a very efficient one. I suppose that if the botanists of twenty years ago had discovered that the stamens were too short for self-fertilization, they would have supposed it was a blunder or something else like it, in nature. We now know, however, what it means. At the bottom of the stamens is placed a honey gland. Insects coming and plunging down into the flower always strike the stamens which makes them suddenly start up. The result is, the insect is

Covered Over with Pollen.

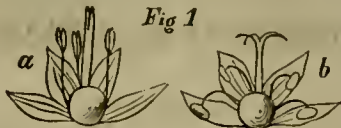
Now, when the insect gets thoroughly covered over, it goes to the next flower, plunges down on it and it cannot fail to leave some of the pollen there and so it goes from flower to flower carrying pollen from one to the other.

Another plant which you can readily find, is the little *Portulaca*, often called moss rose. It is somewhat like the barberry, only that in this case the stamens are still more sensitive.

In the sage, the one grown for its flowers, *Salvia officinalis*, we have only two stamens and they are made on a peculiar plan, having a hinge-like arrangement allowing one part to rotate upon the other. It belongs to the labiate group, and has its lower lip made very large to serve as a "lighting board," as Mr. Darwin has called it.

[Here again, by the aid of drawings, the speaker explained that when an insect attempted to enter the flower, it rotated the stamens in such a way that the pollen was thrown on the back of the insect, where upon visiting other and older flowers it would come in contact with the stigma.]

In the orchids, the arrangements are in some cases exceedingly complex, and frequently this mechanism is such as to almost pass belief; that is, it seems almost impossible that a flower should have such peculiar contrivances just for the purpose of getting its pollen upon some peculiar insect. As a rule, they are incapable of self-fertilization. That is, if insects or other



Claytonia in its First and Second Stages.

active agencies were taken away, in almost all cases, fertilization could not take place. I told the class yesterday about the vanilla plant, which was taken from America to the East Indies, but in so doing they neglected to take the insect along, and the result was, the culture of the vanilla there was not a success, until some shrewd man guessed the trouble, and took the insects along, when vanilla growing became successful. Orchids are, in almost all cases, gayly colored, or they have peculiar forms, peculiar odors or an abundance of honey—

something about them always which is attractive to insects. You may

Lay it Down as a Rule

That when a flower has need for an insect to visit it, it will hold out some inducement for that insect to come.

The arrangement of the parts of the flower is

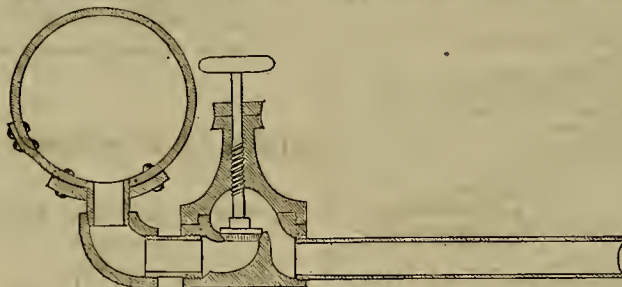
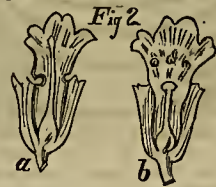


Fig. 3—Blow-off Used in Low Places on Line of Pipe.

always complex in the orchids, so that usually the young botanist is puzzled in getting at their structure. [The Professor then, by means of numerous drawings, explained the intricate structure of orchids, and the various contrivances which aid in securing fertilization through insect agency.] Sticky pads attached to pollen masses, are so placed as to adhere to the heads of insects visiting the flowers for their honey; and these pollen masses are then carried by the



Dimorphism of the Primrose. a, Long-styled Form. b, Short-styled Form.

insect to the next flower; by which time they have actually bent down at

Just the Right Position

To enter the surface stigmatic. In other cases, as in the lady slipper, the insect is compelled to go into the flower at one door and to go out at another; bringing in at one door pollen from one flower to be left, and carrying out at the other, pollen to be taken to the flower next visited.

CORRECTION.—In the short editorial comment on the "Extraordinary Change of Temperature," which appeared in our Scientific column last week—"down pour of snow," should have read "down pour of cold air."

In Utah, although there has been a considerable quantity of snow in the mountains, mining operations have continued without interruption, and much more ore has been taken out than during any previous winter.

A new 15-stamp mill is being erected at Forbestown, Butte county.

Double Fish.

The State Fish Commissioners have recently erected in the grounds of the University of California, at Berkeley, a fish hatching house, and many thousands of ova and young brook trout may be seen in the troughs. It is proposed to build dams at favorable points in the creek and its branches, for the double purpose of protecting the banks and furnishing ponds



Fig. 2—"Shingle Roof" Pipe.

for the fish. These young Eastern trout are fast being distributed in different streams in the State, by Mr. Woodhury.

While examining the hatching boxes at the propagating house one day this week we noticed several of the little trout, which are scarcely an inch long, presented a peculiar phenom-

non. In some cases there were two distinct heads and only one tail. In others there were two distinct fish, but formed together by a filmy substance, after the manner of the Siamese twins, except that the tissue extended the whole length of the body. These little fellows were swimming about without any apparent

feeling that there was anything wrong. If they felt any difference of opinion as to the direction they wished to swim it was not manifest, as a double fish and two headed fish were apparently contented. These fish are now six weeks old, and several dozen were in the troughs.

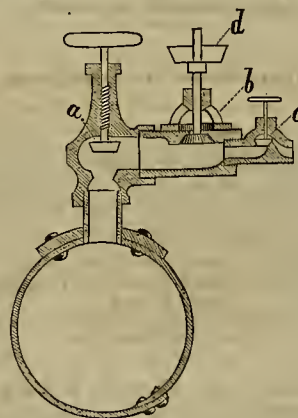


Fig. 4—Self-Acting Air Valve.

The eggs from which these fish were hatched were brought by rail from the East. We understand that the same phenomenon occurred with the fish hatched from the salmon eggs taken from the McCloud river here and transplanted to the East. Those eggs were also taken by rail, and many of them hatched out double fish, as in the case of the eggs hatched at the University. We do not know of any case where such a circumstance has happened before, or at any rate where such numbers of double fish were hatched out. No doubt it may be attributed to the railroad journey of the eggs from which the fish were hatched, as some of them may have been jarred in such a manner as to become mingled together. We cannot otherwise account for the phenomenon,

Hydraulic Mining in California.

No. 14.

Iron Pipes.

In such constructions the entrance of any floating matter should be prevented by a screen of strong wire, or iron bars, placed at some distance from the mouth of the pipe. Particularly in the autumn, when the leaves fall, care should be taken to remove the latter, whenever a quantity is collected before the screen.

The standing air-pipe mentioned above has not proved efficient for the escape of all the air which is carried down by the water. The consequence is, that from time to time, the accumulated air makes an attempt to free itself, and, in doing so, rushes up the stand-pipe with great force, throwing out a large quantity of water, and even emptying the cistern.

The writer thinks a very simple arrangement would secure the undisturbed flow of water, and permit the air to escape as it accumulates, without interfering with the water rushing into the pipe. The water will form a solid body in that part of the pipe, which is filled from the lowest depression of the inverted siphon to an equal height, or level, in each arm of the pipe.

In the diagram (Fig. 4) the undisturbed water would rest below the points A A', and only from A2 to B could air interfere with the free admission of water. According to the great or less supply of it, the water would rise or fall between A2 and B; and the stand pipes, represented by D E F, would not only become valueless, whenever the water should rise to the point of their connection with the main pipe, but would, under circumstances, discharge great quantities of water, whenever the latter should have risen in the main pipe above their height. Furthermore, there would be no continuous discharge of air, as the resistance of the flowing water against the escape of air would be comparatively as great between points G H or H I, as between A1 and B. An arrangement is therefore needed, which will not only permit the air to escape at any point between A and B, but also prevent the rushing water from interfering with the free discharge of air.

The writer proposes a simple plan, as illustrated by figure 2.

The circle A represents a pipe 30 inches in diameter, the line B C a piece of sheet iron, 23 inches wide from B to C, and 5 inches below the point D. This piece of sheet iron enters the pipe on a bevel, for a distance of two and a half or three feet, falling in this distance one inch. The sides B C are securely riveted to the pipe. A second piece of sheet iron must be inserted in such a way that the first piece overlaps it for about 2 inches, leaving at the same time an open space of one inch in depth, and 24 inches in length between the two pieces of sheet iron, where the overlapping takes place. Any number of additional pieces of sheet iron are inserted in the same manner, forming, as it were, a shingle roof on the top of the pipe, with an open space of one inch in depth and 24 inches in length between each two shingles.

The water enters at the point a, and is prevented from entering the air-chamber by the overlapping of the different iron shingles; the air, however, will, under the least pressure, escape through the open spaces, between the iron shingles, and can be conducted to any final outlet, without interfering in the least with the rush of water.

This air-chamber needs only to be constructed in a little above that part of the pipe which is subject to the rising and falling of the water, according to the greater or less supply. For instance, in a pipe like that of the Spring Valley Canal and Mining company, constructed for a head of 150 feet—when experience has shown that a hydrostatic pressure of never more than 50 feet is realized—the shingle roof, or air chamber, needs only to be applied from near the "solid water" in the bottom of the pipe to a point giving a vertical height of 75 feet above the "solid water." Of this distance, only 50 feet or less would be filled with water, to form the head or hydrostatic pressure, and the remaining 25 feet would secure a sufficient vent for all the air which possibly might come down with the rushing water.

It will be seen that the capacity of the pipe is not lessened by the introduction of the air-chamber; the latter consisting of nothing but pieces of sheet iron riveted from side to side, and permitting the rising water to fill the air-chamber from below, and thus to occupy the whole capacity of the pipe. The arrangement in itself is simple, and can be introduced into any pipe already in position, provided it is large enough to admit a workman.

For pipes conducting water to the hydraulic machines in the mines, the following plan is recommended to get rid of the air: A pipe of 4 or five inches in diameter is perforated with holes, each, say, of 2 inches diameter, and at intervals of two and a half or three feet. These holes are covered with caps of the shape of half-funnels, and in such a way that the wider part of the funnel leaves an open space, lap-

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

(Continued on Page 140.)

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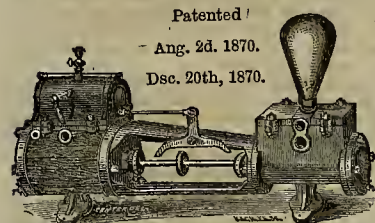
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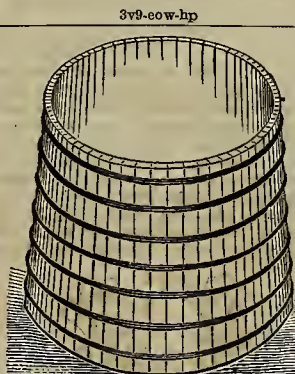
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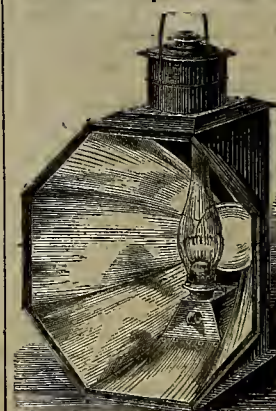
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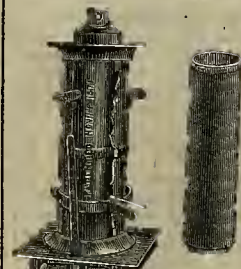
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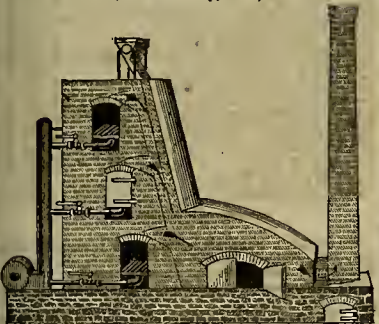
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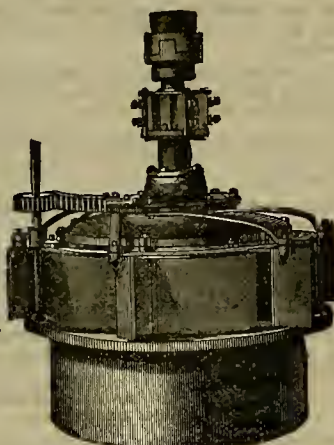
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I will sell any other Territorial or State rights (either United States or Foreign) upon the same plan and at a lower price proportionately than the rights for the Pacific Coast.

I will sell a single machine with scows and all complete, and right to use the same in a limited territory, for \$20,000 on the same plan as above stated, but will add only \$2,000 to each additional yard over the six cubic yards per minute. Each machine is not to employ more than two 10x20 inch engines.

Payments to be made in U. S. gold coin on delivery of machine, as may be indicated by agreement.

Address, JOHN A. BALL,

Oakland.

PACIFIC MACHINERY DEPOT
H. P. GREGORY
SOLE AGENT FOR THE
TANITE EMERY
WHEELS
14 & 16 FIRST ST. SAN FRANCISCO

PACIFIC MACHINERY DEPOT
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SOLE AGENT
FITCHBURG MACHINE CO'S
MACHINISTS'
TOOLS
14 & 16 FIRST ST. SAN FRANCISCO

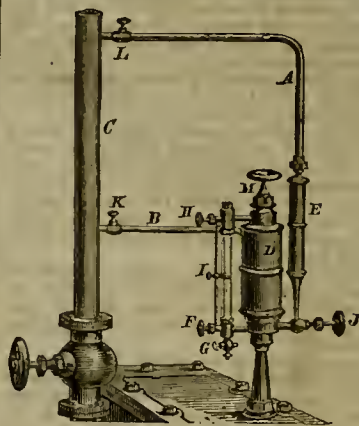
ENGINES.

Kipp's Upright Engine

Has secured merit. Its Beauty, Compactness, Strength, Durability, Economy in FUEL, Ease in Handling, and Small Space required attract the Buyer, and the Price readily concludes the Sale.
Call and see it or send for Circulars.

J. M. KEELER & CO., Agents, 306 Cal. St., S. F.

N. Seibert's Eureka Lubricators.

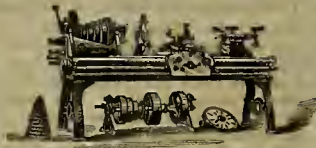


THE HIGHEST PREMIUM

Awarded by the Mechanics' Institute Fair, San Francisco, and State Fair, Sacramento, 1871.

These Lubricators are acknowledged by all engineers to be superior to any they have ever used; feed constantly by pressure of condensed water, supplied by pipe A, regulated under the oil by valve J, and forced out through check valve and pipe B into the steam pipe C; it then becomes greasy steam, passes to all the valves and cylinder at every stroke of the engine; glass tube I indicates amount used per hour. Packing on rods and stems lasts longer, and the rings on the piston will not corrode. One pint of oil will last from three to six days, according to speed and size of engine; I, sliding gauge; K, valve to shut off when engine stops; H, F, valves to shut off in case of frost; steam does not enter the cup; it is always cool; warranted to give satisfaction. Patented February 14, 1871. Made by California Brass Works, 125 First street, S. F. 24v23

MACHINISTS' TOOLS,



EXTRA HEAVY AND IMPROVED PATTERNS,

PUTNAM MACHINE CO.,

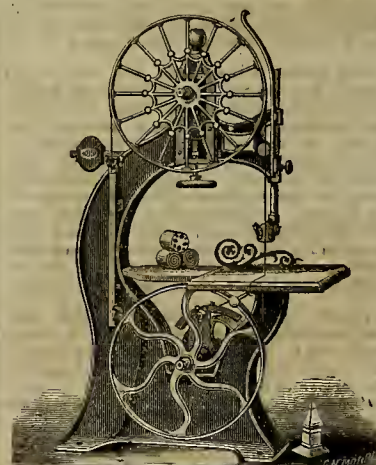
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BOLT CUTTERS, DOUBLE NUT TAPPING
MACHINES, SLOTTING AND SHAPING
MACHINES ON HAND. GEAR
CUTTERS AND MILLING
MACHINES A SPECIALTY.

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310 California Street, S. F.



Pacific Machinery Depot.

H. P. GREGORY,

14 and 16 First st., S. F.

Sole Agent for Pacific Coast for J. A. Fay & Co's Wood-working Machinery, Blake's Patent Steam Pumps, Tanite Co's Emery Wheels and Machinists' Tools, Fitchburg Machine Co's Machinists' Tools, Edison's Recording Steam Gauge, Triumph Fire Extinguisher. Also on hand and for Sale: Startovant's Blowers and Exhaust Fans, John A. Roeb-line's Sona Wire Rope, Pure Oak Tanned Leather Belting, Perin's French Band Saw Blades, Planer Knives, Nathan & Dreyfus Glass Oilers, and Mill and Mining Supplies of all kinds. P. O. Box 168.

PACIFIC MACH'Y DEPOT
GUARANTEED PURE OAK TANNED

LEATHER
BELTING

H. P. GREGORY

14 & 16 FIRST ST. SAN FRANCISCO

(Continued from Page 137.)

ping about one inch over the hole. The pipe thus prepared is inserted from 50 to 100 feet, according to the length of feeding pipe, into the latter, the open funnel downward, and is secured firmly to the upper side of the feeding pipe. The upper end of this air pipe must rise a few feet above the hulk-head from which the feeding pipe is supplied.

The air which necessarily enters the feeding pipe with the rush of water will seek the easiest way of escape, and must, consequently, enter the inserted pipe through the open funnels. The caps over the holes of the air pipes prevent the water, rushing down, from entering the air pipe, and the air can be conducted safely to a final outlet.

The above arrangement would not lessen the capacity of the feeding pipe, as the water, rising in the latter, would enter the air pipe through the funnels, and rise in both pipes simultaneously.

The advantage to be gained from this arrangement would be the almost total exclusion of air from the feed pipe, and, therefore, the certainty of a solid and even discharge of the water from the hydraulic machine, securing the greatest efficiency and force of the water jet.

[In addition to what Mr. Waldeyer says above, we give in Figures 3 and 4, the methods of regulating the air in pipes in use by the Virginia and Gold Hill water works. At their water works the body of water passed through an inverted syphon over seven miles long on very irregular ground, in doing which the enormous pressure of 1,720 feet has to be overcome. This pipe now contains the greatest pressure of any in the world. The average diameter is 11 1/2 inches. At the point of heaviest pressure the iron is No. 0 thick, and is but riveted with five-eighths inch rivets. The pressure is 1,720 feet perpendicular, or 750 pounds to the square inch. This pipe crosses a great many sags and spurs, and devices had to be arranged to relieve the air. Figure 3 shows the blow off used in every low place and Figure 4 shows the self acting air valve. The latter is used at each high point on the line of pipe. When the water is on, the valve, *a*, is kept wide open; the small valve, *c*, is shut, while the valve, *b*, is shut by the pressure. If any air accumulates in the pipe, on the elevation where this air cock is placed, it is occasionally blown off, by opening the cock, *c*. Should a break occur in the main pipe line at a point lower than the air cock, and within its district, the valve, *b*, falls down and admits the air into the main pipe so as to prevent a vacuum. Should the valve, *b*, get out of order, the valve, *a*, is shut, and the other valve, *b*, taken off and repaired. After a break on the main line is repaired, and the water let on again, the valve, *b*, being down or open, the air rushes out at *b*, its stem being weighted by the weight, *d*, so as only to close when the solid water commences to rush out. We gave a detailed description of the works above referred to, in our issue of Dec 13th, 1873, and give here what refers to the blow off's and air valves, as supplementary to Mr. Waldeyer's remarks.—*ENS. PRESS.*]

The Auburn mill at Reno, has been closed down. The lessees, Messrs. Riott and Beyea, being unable to pay the high rent charged by the English owners. Moreover, although they worked the ore satisfactorily, they could not procure enough to keep the mill steadily running on full time. If they had been able to get all the ore they wanted, the mill would still be running, notwithstanding the high rent. Mr. Riott has returned to this city, and is engaged in his old business of assaying and working ores. We are sorry to know that the experiment has been a losing one to the lessees.

DR. ST. GEORGE HOPKINS, of Virginia City, has invented a new style of ore car. It dumps itself, and if, in being run back to the shaft, the cage is missed, it precludes all danger to the carman of falling down the same by overturning and occupying all the open space in the shaft.

The New York Consolidated mining company has contracted for first-class machinery for their mine, of sufficient power to sink down to the depth of 3,000 feet, being fully equal to the machinery of Belcher and Overman, and of the same pattern as that now used by the California.

MINING interests in Lower California are looking up considerably. Some 20 persons have arrived at San Diego recently, for the purpose of prospecting in Lower California. Two old miners, Messrs. Mulligan and O'Reilly, have made a rich discovery near San Rafael, which promises well.

The Spring Valley canal and mining company, of Butte county, advertise for bids to construct a double line of levee embankment for a distance of about nine miles.

ENGLISH capitalists are negotiating for the iron mine recently discovered in Snoqualmie Pass, Washington Territory.

SIR CHARLES LYELL, the geologist, died in London, on the 23d inst.

ANTIMONY is selling at \$52 to \$54 per ton or regulus in Liverpool.

General News Items.

FIRE AT THE SARATOGA PAPER MILL.—A correspondent of the San Jose Mercury reports that on Friday night, the 19th inst., the immense straw stacks of the Saratoga Paper Mill company were destroyed by fire. The estimated loss is \$10,000. The company had laid in a supply sufficient to keep the mills running all summer, and its sudden destruction throws about twenty men out of employment. The fire is supposed to have been the work of an incendiary, and the company has offered a reward of \$1,000, and the citizens of Saratoga \$500, for the arrest and conviction of the culprit.

FIRE IN GOTTENBURG—51 LIVES LOST.—A match factory in Gottenburg, Sweden, took fire on the 10th inst., when crowded with work people. The flames spread with such rapidity that the employees on the upper floors were unable to escape, and many were burned to death or killed by jumping from the windows. Fifty-one lives are reported lost.

POSTAL CHANGES.—The following postal changes were made in California last week: Postoffice established—At Salmon Falls, El Dorado county, Thomas Orr, Sr., Postmaster. Postmasters appointed—Hiram T. Hatch, at Sherwood Valley, Mendocino county. John C. Partridge, at Susanville, Lassen county.

DESTRUCTIVE FIRE.—A terrible fire broke out at Port-au-Prince, Hayti, on February 11th, and spread with most alarming speed. Two-thirds of the city was destroyed in a few hours, involving a loss of about \$2,000,000. From 600 to 700 families were rendered homeless.

EXPLOSION—FIVE GIRLS KILLED.—An explosion occurred at a safety-fuse manufactory at Redrath, Cornwall, (Eng.,) on Saturday last, at which five girls were instantly killed. There were quite a number of almost miraculous escapes.

The Centennial arrangements are progressing finely. The expenses of the building have been cut down very materially from the original estimates—but they will be all that is really needed, either for performance or utility when they are completed.

The narrow gauge railroad from Colfax to Nevada is now well under way. The only question which remains to be settled is whether Nevada shall be the terminus. Mr. Beatty, the contractor, has sent East for the rails and locomotives.

LIBERAL DONATION.—Mr. August Hemme, of this city, has given \$30,000 to free the Tehachan church in this city from debt. He has also presented the publishers of the *Occident*—a religious newspaper—with \$500.

The young wife of the newly-elected United States Senator, James E. McDonald, of Indiana, died suddenly in Indianapolis on Thursday. She was married only six months ago.

A NOVEL LIFE PRESERVER.—A Chinaman, after the wreck of the "Japan," was rescued from a coffin which he had improvised as a life-preserver.

CREMATION.—The Municipal Council of Paris on the opening of the new cemetery at Mery-sur-Oise petitioned the legislative power for permission to practice cremation.

CLAUDIO VASQUEZ, brother of the handit, has held the position of Justice of the Peace in Los Angeles county. He is said to be a good citizen.

SUICIDE BY A WOMAN.—The wife of Edgar E. Bliss committed suicide by taking strychnine on Tuesday, the 16th inst., at Danville's ranch, on the Honcut.

HENRY S. DENT, son of G. W. Dent and nephew of President Grant, died at his residence in this city on Sunday evening. He was 31 years of age.

The San Rafael Herald states that an opposition steamer will soon be placed on the route between that town and San Francisco.

DEATHS OF THE WEEK.—Seventy-five persons died in this city, last week—seventeen in hospitals, etc., and one homicide.

A FIRE destroyed property at Kenton, Ohio, on Thursday of last week, to the extent of \$200,000.

The Selinas and Monterey railroad will be making regular trips again within two weeks.

CONGRESS.—The present Congress expires by limitation on Wednesday next.

JESSE POMEROY, the hoy murderer has been sentenced to be hung.

QUARTZ is the only thing that is talked about in Southern Oregon just now. Constant discoveries are being reported and the people are being kept in a constant state of excitement, and employ their leisure hours between making discoveries and building golden castles in the air.

INQUIRE BEFORE YOU DETERMINE.—Ask your druggist what *Hale's Honey of Horshond and Tar* is doing in cases of severe cough and cold within his own personal knowledge, before you try it yourself. Inquire of him if he has ever known a medicine of his class as popular as that pure and agreeable vegetable preparation. Be governed by the facts he will state to you. We venture to say that there is not an apothecary in the country who will not endorse it as a specific for diseases of the lungs and throat.

Hale's Tooth-Ache Drops—Cure in one minute.

Industrial Items.

PAPER BARRELS.—Although the process of making barrels from paper was patented only about two years ago, there are now two factories working; one at Winona, Wis., and the other at Decorah, Iowa, the latter turning out 1,600 barrels per day. There will be another in operation in this city in a few weeks.

The bevel-screw or ship-timber saw, which the Ship-building Association of Vallejo has ordered from the East, will be the only one of the kind on the Pacific coast, excepting at the Navy Yard. It is a most valuable invention, and will do the work of over twenty men.

It is now settled that the people of Peudleton, Oregon, are to have a woolen factory. Articles of incorporation have been filed, and all the necessary steps taken preparatory to opening hooks for stock subscriptions.

A PRISMOIDAL.—There was a railroad meeting in Sonoma, last week, to consider the question of building a prismoidal railway from the town of Sonoma to the Embarcadero.

WAVE POWER MACHINE.—The working model of the above machine is now on exhibition at the Merchants' Exchange.

The Cornell Watch Factory managers say that but two Chinamen are in their employ, and these merely as common laborers.

A PHILADELPHIA company are making arrangements for the establishment of a large agricultural manufactory at Ogden this spring.

A NEW locomotive has just been received from the East for the Monterey and Salinas Railroad.

The Pacific Bridge Company have contracted to build the trestle work at the Yuba river bridge during the next thirty days.

OPERATIONS on the fruit drying establishment to be erected in Napa will commence on Monday next.

VISALIA offers a block of land and \$5,000 to any person who will erect there a woolen mill worth \$30,000.

The Hollister Bank, organized five months since, has declared a monthly dividend of 1 1/2 per cent.

SAN MATEO COUNTY claims fifteen millionaires, the aggregate of whose wealth may be estimated at \$250,000,000.

The Carmel Whaling Company, of Monterey, have done a brisk business this season.

SALINAS CITY is discussing the advisability of having a local telegraph.

A WOOLEN mill and broom factory are to be established at Knight's Landing.

CANNING oysters is a successful enterprise at Yaquina.

LEAD in Liverpool has declined 15s per ton since the 1st of January, owing to large receipts of foreign. The closing quotations on the 1st inst. were £23 and £23 5s for good ordinary brands.

The Eagle Mill at Spring Valley, Nev., has been put in order for wet crushing. A Blake crusher has also been put up at the mill.

A VEIN of black lead has been found in the Baton Mountains, Colorado, and the owners have refused \$50,000 cash for it.

THERE are 3,000 Chinamen at work in the mines at the Lava Beds, near Oroville, Butte county.

MINING operations in Baker county will be conducted on a larger scale this year than ever before.

At Winnemucca the strike in the Pride of the Mountain tunnel, is creating considerable excitement.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

CHAS. T. BENZ—Alameda, Santa Clara and Santa Cruz Counties.

J. W. ANDERSON—Orange and Santa Ana, in Los Angeles County, Cal.

J. G. KELLEY—For Washington Territory.

E. W. CROWLEY—California.

F. B. ANDERSON—City agent, San Francisco.

J. L. THARP—Southern California.

A. C. CHAMPTION—Tulare, Fresno and Inyo Counties.

D. J. JAMES—Australian Colonies.

J. C. EWING—Contra Costa County.

JORN ROSTRAN—Sonoma County.

J. W. BILEY—San Joaquin and Stanislaus Counties.

W. C. QUINBY, Eastern and Western States.

D. M. DUNN—Yolo and Colusa County.

B. E. LEVY—Alameda County.

PACIFIC RURAL PRESS.

A first-class 16-page Agricultural Home Journal, filled with fresh, valuable and interesting reading. Every farmer and ruralist should take it. It is immensely popular. Subscription, \$4 a year.

DEWEY & CO., Publishers, No. 224 Sansome street, SAN FRANCISCO.

A GOOD PAPER.—THE MINING AND SCIENTIFIC PRESS has entered its 30th volume. It grows better as the years roll, and is, without exception, the best paper published for California miners and artisans. If such papers were more generally circulated to the exclusion of the sensation trash of the cities, the State would be the gainer in wealth, morals and general intelligence. —*Triumphant Independent.*

PATENTS & INVENTIONS

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington D. C., Feb. 23, 1875.

FOR WEEK ENDING FEB. 9, 1875.

BATH-TUB ATTACHMENT.—Thomas D. Woolsey, S. F., Cal.

VELOCIPEDE.—Walter Knight, San Andreas, Cal.

CARRIAGE SPRING.—William S. Higgins, Oroville, Cal.

QUICKSILVER FURNACE.—C. A. Luckhart, S. F., Cal.

STEAM ENOINE.—William Wilcox, S. F., Cal.

RE-ISSUE.

BROOM MACHINE.—Henry Anderson, S. F., Cal., and James F. Houghton, Sacramento, Cal.

"The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. Note.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible.

METALS.

WEDNESDAY M., Feb. 24, 1875.

American Pig Iron, 30 ton	45 00	45 00
Scott's Pig Iron, 30 ton	45 00	45 00
White Pig, 30 ton	45 00	45 00
Oregon Pig, 30 ton	45 00	45 00
Refined Bar, bad assortment, 30 lb.	25 00	25 00
Refined Bar, good assortment, 30 lb.	25 00	25 00
Boiler, No. 1 to 4	50 00	50 00
Plate, No. 5 to 9	50 00	50 00
Sheet, No. 10 to 13	50 00	50 00
Sheet, No. 14 to 20	50 00	50 00
Sheet, No. 21 to 27	50 00	50 00
Horse Shoes, per keg	7 50	8 00
Nail Rod	10 00	10 00
Norway Iron	5 00	5 00
Roller Iron	6 00	6 00
Other Irons for Blacksmiths, Miners, etc.	4 00	4 00
COPPER—		
Sheet Copper, 14 lb.	31 00	32 00
Copper Tins	45 00	45 00
O. Niel's Pat.	50 00	50 00
Sheeting, 30 lb.	24 00	24 00
Sheeting, 15 lb.	24 00	24 00
Sheeting, Old Yellow	24 00	24 00
Composition Nails	24 00	24 00
Composition Bolts	24 00	24 00
TIN PLATES		
Plates, Charcoal, 10 lb box	13 00	15 00
Plates, 10 Charcoal	13 00	15 00
Roofing Plates	12 50	15 00
San Francisco, 30 lb	25 00	25 00
Steel, English Cast, 30 lb	20 00	25 00
Anderson & Woods' American Cast	18 00	18 00
Flat Bar	18 00	18 00
Plow Steel	9 00	10 00
Zinc	11 00	11 00
Zinc, Sheet	11 00	11 00
Nails—Assorted	4 25	5 00
QUICKSILVER, per lb.	1 37 1/2	1 35 00

LEATHER.

WEDNESDAY M., Feb. 24, 1875.

City Tanned Leather, 30 lb.	25 00	25 00
Santa Cruz Leather, 30 lb.	25 00	25 00
Country Leather, 30 lb.	24 00	24 00
Stockton Leather, 30 lb.	24 00	24 00
Jodot, 8 Kil, per doz	68 00	70 00
Jodot, 11 to 13 Kil, per doz	68 00	70 00
Jodot, 14 to 15 Kil, per doz	68 00	70 00
Jodot, second choice, 11 to 13 Kil, per doz	68 00	70 00
Cornellian, 12 to 16 Kil	57 00	60 00
Cornellian Females, 12 to 13 Kil	63 00	67 00
Cornellian Females, 14 to 15 Kil	71 00	75 00
Simon Ulmo Females, 12 to 13 Kil	60 00	63 00
Simon Ulmo Females, 14 to 15 Kil	70 00	72 00
Simon Ulmo Females, 16 to 17 Kil	73 00	75 00
Simon, 18 Kil, per doz	61 00	63 00
Simon, 20 Kil, per doz	60 00	63 00
Simon, 24 Kil, per doz	72 00	74 00
Robert Calif, 7 and 9 Kil	35 00	40 00
French Kips, 30 lb.	1 00	1 10
California Kips, 30 lb.	1 00	1 10
French Sheep, all colors, 30 lb.	8 00	15 00
Eastern Calf for Backs, 30 lb.	1 00	1 10
Sheep Skins for Topping, all colors, 30 lb.	9 00	13 00
Sheep Skins for Lining, 30 lb.	5 50	10 00
San Joaquin Russell Sheep Linings	1 75	4 00
Best Jodot Calf Boot Legs, 30 lb.	5 00	5 20
Good French Calf Boot Legs, 30 lb.	4 00	4 20
French Calf Boot Legs, 30 lb.	4 00	4 20
Harness Leather, 30 lb.	30 00	37 00
Fair Bridle Leather, 30 lb.	48 00	72 00
Stirling Leather, 30 lb.	30 00	37 00
Wet Leather, 30 lb.	30 00	37 00
Buff Leather, 30 lb.	17 00	17 00
Wax Side Leather, 30 lb.	17 00	17 00
Western Wax Leather	17 00	17 00

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

To Patent Attorneys, Contractors and Inventors.

WASHINGTON, D. C. January 1st, 1875.

I have carefully prepared a complete digest of U. S. patented Paving and Roofing Compositions, up to January 1st, 1875, in which is given the name of patentee, number and date of patent, ingredients, and (where given in the specification) the proportions of ingredients. Also, all of English Patented Paving Compositions up to January 1st, 1874, amounting in all to over six hundred patents, a complete state of the art to date. It is my intention to publish this work at an early day in book form, and should you wish to subscribe should address

L. W. SINSABAUGH, Assistant Examiner, Room 21, Patent Office, Washington, D. C.

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Pocket-Book of Mechanics and Engineering. Containing a Manual of Facts and Connection of Practice and Theory. By JOHN W. NYSTROM, C. E. Seventh edition. Revised and greatly enlarged by the addition of valuable original matter. FULLY ILLUSTRATED. 16mo. Pocket-Book form. Gilt edges. 50.
Nothing seems to be wanting which an engineer needs to find in his pocket-book. The tables are more than ordinarily complete. —*Electric Engineering and Architecture.*

TABLES OF MINERALS.
For the Determination of Minerals by their Physical Properties. Translated from the German of F. LEHMAN. Enlarged and furnished with a Set of Mineral Formulas, a Column of Specific Gravities, and one of the Characteristic Blowpipe Reactions. By PERCIVAL FLAHERTY, Jr., A. M., Member of the American Philosophical Society, etc. 12mo. Roan paper \$2.00.
We have here an exceedingly useful and compendious guide for explorers, who frequently have to pronounce on substances in situ, where no laboratory is at hand. The eminent author gives many new lights on classification, and his aim has been throughout to render the science of mineralogy as clear and accessible as its complicated nature will permit. The translator's work has been done faithfully and intelligently. —*Scientific American.*
For sale by Booksellers generally, or will be sent by mail postpaid on receipt of the price by

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cow-bp.

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36, 40, 42 and 45-inch Wide Duck; 8, 10, 12, and 15 lbs. Duck.

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AND
ARTESIAN WELL PIPE.

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OR
WATER WORKS,

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Sizes Made and all Work Guaranteed.

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AND U. S. MINERAL SURVEYOR.

Salt Lake, U. T.

Working Plans and Estimates for Mines and Improvements are furnished; will superintend the establishment of Concentration of Ores a Specialty.

For the Humboldt Company, Manufacturers of and Concentrating Machinery.

Banking and Financial.

Gold, Legal Tenders, Exchange, Etc.

(Corrected Weekly by CHARLES SUTRO & Co.)

SAN FRANCISCO, THURSDAY, Feb. 25, 1875.
LEGAL TENDERS IN N. F. 100, 50, 25, 10, 5, 2, 1, 1/2, 3/4, 1/8, 1/16, 1/32, 1/64, 1/128, 1/256, 1/512, 1/1024, 1/2048, 1/4096, 1/8192, 1/16384, 1/32768, 1/65536, 1/131072, 1/262144, 1/524288, 1/1048576, 1/2097152, 1/4194304, 1/8388608, 1/16777216, 1/33554432, 1/67108864, 1/134217728, 1/268435456, 1/536870912, 1/1073741824, 1/2147483648, 1/4294967296, 1/8589934592, 1/17179869184, 1/34359738368, 1/68719476736, 1/137438953472, 1/274877906944, 1/549755813888, 1/1099511627776, 1/2199023255552, 1/4398046511104, 1/8796093022208, 1/17592186044416, 1/35184372088832, 1/70368744177664, 1/140737488355328, 1/281474976710656, 1/562949953421312, 1/1125899906842624, 1/2251799813685248, 1/4503599627370496, 1/9007199254740992, 1/18014398509481984, 1/36028797018963968, 1/72057594037927936, 1/144115188075855872, 1/288230376151711744, 1/576460752303423488, 1/1152921504606846976, 1/2305843009213693952, 1/4611686018427387904, 1/9223372036854775808, 1/18446744073709551616, 1/36893488147419103232, 1/73786976294838206464, 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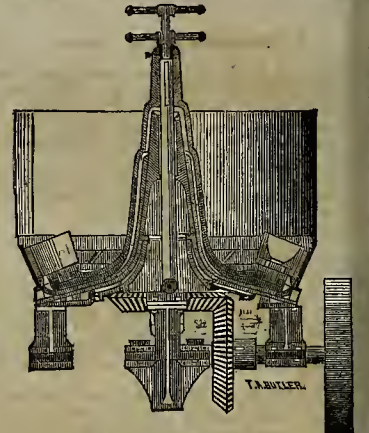
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Stroke of Piston, in inches.....	6	6	7	7	8	10	12	14	16
Capacity per double Stroke, in gallons.....	1-6	2-5	3-5	4-6	5-8	8-10	11-16	14-20	18-25
Capacity at ordinary Speed, per minute.....	10	15	20	25	30	40	50	60	70
Maximum Capacity.....	30	40	50	60	70	80	100	120	140
Boilers in horse power they will supply.....	25	35	45	55	65	85	110	140	170
Size of Exhaust Pipe, in inches.....	2	2	2	2	2	2	2	2	2
Size of Suction Pipe, in inches.....	1	1	1	1	1	1	1	1	1
Size of Discharge Pipe, in inches.....	1	1	1	1	1	1	1	1	1
Weight of Pump, in pounds.....	185	235	300	375	450	550	675	825	1000
Length over all, in feet and inches.....	3-4	3-4	4-0	4-1	4-1	4-1	4-1	4-1	4-1
Height over all, in feet and inches.....	1-6	1-9	2-3	2-3	2-3	2-3	2-3	2-3	2-3
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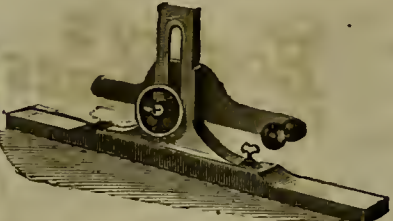
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The CALIFORNIA PLANNER AND MATCHER is got ten up from new patterns specially for this Coast. It has Cast Steel Slotted Cylinder Head, running in patent self oiling boxes; Matcher Studles also of the best cast steel. The Gears are all protected with iron covers. Will plane 4 in. wide and 6 in. thick, and tongue and groove 14 in. wide. Will make rustic and stick gutters, or heavy moldings, etc., and is the best Job Machine ever built.

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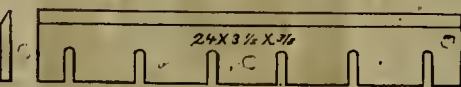
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Improved Saw Arbore.




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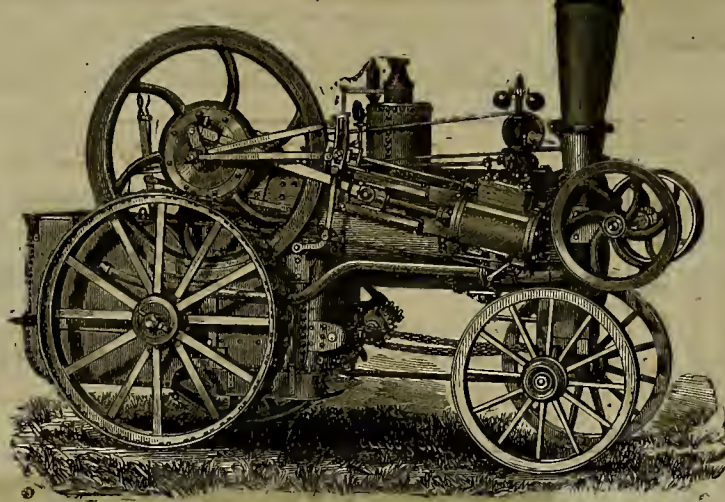
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Is no mere novelty or uncertain experiment, but is well designed, well constructed and thoroughly practical in all its operations. It is strong and substantial in all its parts, reliable and durable in action, and capable of any service for which the best of such Engines are adapted.

In its design and construction we have taken as models the best of the English engines of this class, and with modifications and improvements suggested by an experience in the construction and operation of Portable Engines, and a knowledge of the uses that will be required of them, and the conditions to which they will be subjected in this country. We thereby advertise that we are prepared to furnish a ROAD AND FIELD LOCOMOTIVE better adapted for such service and in many respects superior to any thing yet produced in that line.

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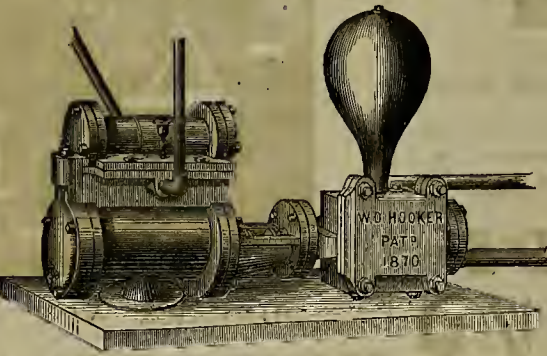
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The Best Pump in Use.

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Steam Pumps

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Hot or Cold

Water Pumps

OF ALL KINDS.

The CENTENNIAL is composed of the finest Hemp, made in strands or sections, of different sizes, each being saturated in a composition of pure German Black Lead and Tallow and covered with a braiding of the best Italian Hemp to be found in the market. It is manufactured in a shape the most convenient to use and handle, and gives from 50 to 100 per cent. more length compared with an equal weight of other makes. It runs with less friction on the rod than any other Packing made, from the fact of its being so perfectly soft and pliable, and so well lubricated so to require a minimum pressure on the rod. It cuts off smooth and makes perfect joints, is easily adjusted to any size rod, and only requires occasionally a new ring to keep the stuffing box full. **ENGINEERS, TRY IT.** For sale in any quantity by

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MACHINISTS, MILL & MINE OWNERS.

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Hamilton, Ohio.
Branch Offices, Cincinnati, O., Chicago, Ill.




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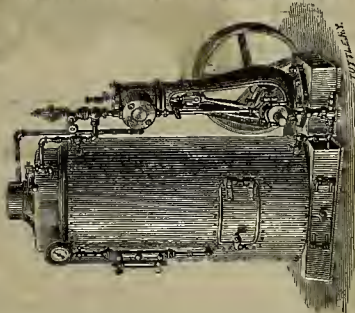
Upright Safety Engines and Boilers.

(MADE BY THE NEW YORK SAFETY STEAM POWER COMPANY.)

We would call particular attention to the graceful design and simple mechanism of this Engine Boiler, the form in not only pleasing to the eye, but is also, the most secure and durable. The boiler is of the upright type, and is made of the best material, and is of the most perfect style, with internal fire box, and is of the most perfect workmanship, and are all tested to 150 pounds per inch. The heating surface and area of grates are in excess of the quantities usually allowed for this same power, and it is therefore unnecessary to purchase a greater rated power than is actually required, while in cases of emergency these boilers are capable of being increased to 200 pounds per inch. The Engine is not fastened to or upon the boiler, and is therefore not affected by expansion, nor are the bearings over-heated by conduction, or the heat from the boiler. The fly-wheel being at the base secures perfect steadiness under the high speed which is necessary for economy of fuel. All parts are easily accessible—a great advantage. In comparison with the horizontal type, the upright boiler and engine can be detached from the boiler and run independently, if required. Its main points are simplicity, safety and economy. For printing offices, laundries, tanneries, ranches, small repair or machine shops, or for hoisting, wherever a small and safe power is required, they are peculiarly adapted. Over 500 are already in use.

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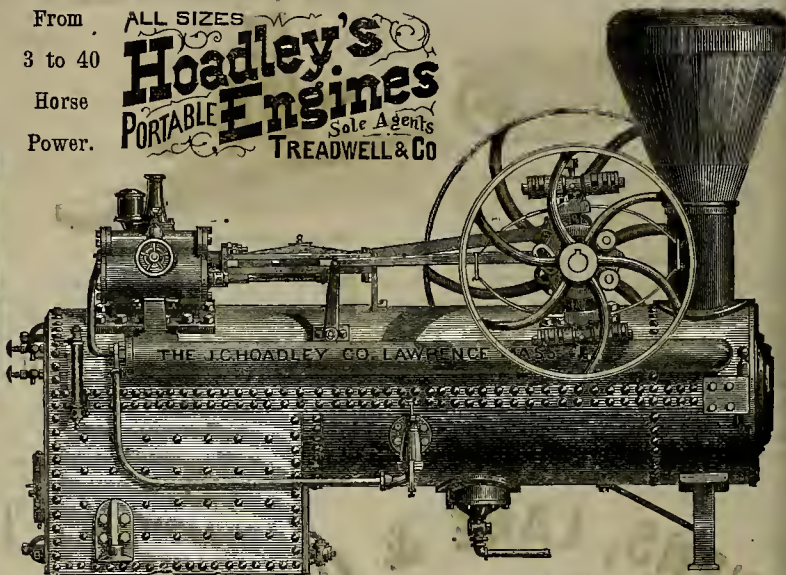
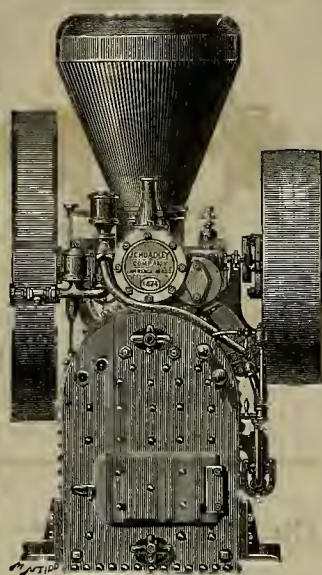
All sizes from 2 to 10 Horse-Power.



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Horse
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PORTABLE Engines
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Millmen, Mine-owners and Mining Superintendents, and all who intend buying engines, will do well to examine carefully the merits of the "HOADLEY" before purchasing. Circulars and prices sent free on application. Address

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Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

PATENTED NOVEMBER 25th, 1873.

RANDOL AND FIEDLER'S QUICKSILVER CONDENSERS,
MADE OF WOOD AND GLASS.

Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

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For hard and wet Rock, Iron, Copper, etc., and Submarine Blasting.

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For medium and sandy Rock, Lime, Marble, Sulphur, Coal, Pipe Clay and Gravel Bank Blasting, Wood, etc.

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Particular attention paid to construction of

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ELASTIC PEN-HOLDER.



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Provide an easy hold, that does not cramp or tire the fingers.

Protect the fingers and desk from ink stains. The fingers acquire a delicate touch that enables a person to obtain a beautiful hand-writing.

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A. WELDON'S PATENT
Low-Water Alarm Gauge,

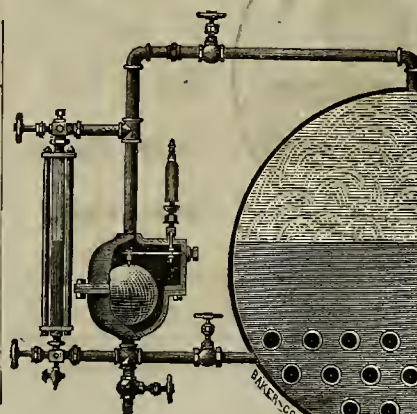
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Sole and General Solicitors.

SAN FRANCISCO, SATURDAY, MARCH 6, 1875.

VOLUME XXX
Number 10.

Hydraulic Mining in California. No. 15.

Mechanical Appliances.

Sluice boxes are the highways upon which hydraulic mining is carried on, and their greater or less efficiency has an influence upon this business like that of the establishment of railroads or common wagon roads upon general commerce.

Just as, by the cheapening of carriage, rail roads open coal fields, grain producing regions, etc., to the markets of the world and to a brisk commerce, where common wagon roads would hardly sustain a weak home trade, so well adapted sluice boxes will render inferior gravel deposits "paying institutions," while, *per contra*, rich gravel deposits, without proper facilities for the placing of sluice boxes, are worked at a loss.

The great requirement is sufficient grade, and a careful survey should always be made before the sluices are put in place, so that the existing fall or grade can be harnessed to the best advantage for the establishment of under-currents, drops, grizzlies, etc.

Hydraulic mines are worked with as little grade as three inches and as high as nine inches per 12 feet. In the first case abundant and cheap water generally makes up in some degree for the want of grade; in the second case a very high grade must make up for the limited supply of water.

Taking the above cited cases as the extremes, we may say that six inches per 12 feet can safely be established as the normal grade, though many important and prosperous mines are worked with four and a half and five inches per 12 feet.

The establishment of under-currents and drops must be kept in mind when the grade for the sluice boxes is laid out, and it is advisable to establish a number of under-currents on a long line of sluice boxes, even at the sacrifice of some grade. For instance, sluice boxes, with five inches grade per 12 feet, and with a number of under-currents, are preferable to sluice boxes of six inches grade and without the latter.

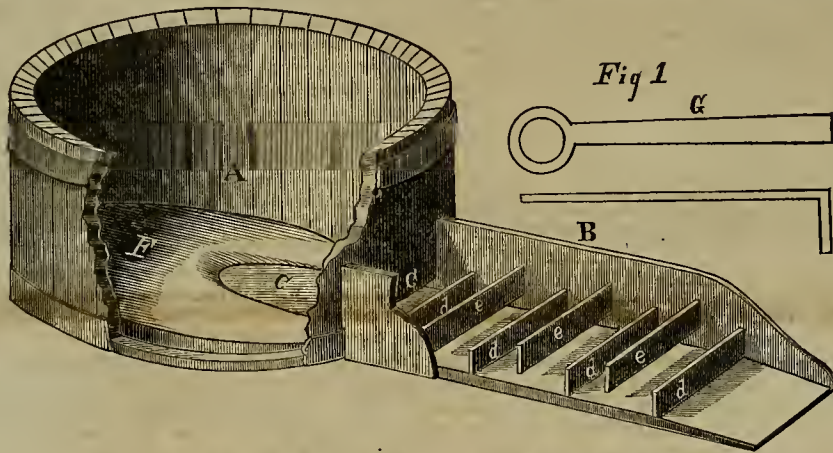
These facts must impress once more upon the mind of the miner the vital importance of sufficient fall for the working of a hydraulic mine, as such a favorable condition not only insures: First, sluice boxes over a high grade, and, therefore, able to carry immense quantities of gravel, etc.; Second, under currents, or large flat boxes, from 10 to 20 feet wide and from 30 to 50 feet long, provided through their whole extent with riffles, to catch gold or amalgam; Third, a grizzly, or an iron grating, placed in such position as to throw down an embankment or precipice large rocks which have been carried in the sluice boxes, and permit the smaller rocks and gravel to fall through the grating into a continuation of sluice boxes; but admits also any additional improvement, such as undoubtedly the future has in store for hydraulic mining.

The size of the sluice boxes must necessarily depend on the work they will have to perform, and may vary from four feet in width to six feet.

Supposing that a tunnel has opened the mine for work, of dimensions large enough to admit of sluice boxes six feet in width, and from 36 inches to 40 inches high, a grade or route will have to be prepared outside of the tunnel to receive two lines of sluice-boxes of the same width and height. Both these lines of sluice boxes must be connected with the boxes placed in the tunnel, and provided with strong gates, so as to cut off this connection at will. This arrangement permits the use of the sluice boxes outside of the tunnel alternately, and the "clean up" of one line of boxes without interruption of the work in the mine. However, when the boxes in the tunnel are cleaned up, the washing in the mine must stop till this is done and till the blocks or riffles are replaced. A day is generally sufficient for this work, since the tunnels, with a few exceptions, are short,

compared with the outside line of sluices, and since, moreover, the pavement, or riffles, in the tunnel sluice consist of blocks or sets of scantlings, which are far more easily removed and replaced than the stone pavement, which usually forms the bottom of the outside sluices.

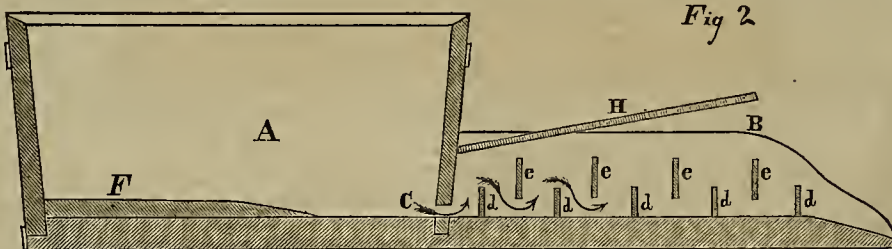
After the grading is done, according to the fall at disposal, sills are laid across the track four feet apart. These sills ought to be four by six inches, and, for a double sluice, about 15 feet long, so as to project on each side of the flume or sluice, to receive posts and braces. The posts are made of four by five inch scantlings, and either 36 or 40 inches long, according to the height of the sides of the sluices. The braces are made of one and a half



H. H. OAKES' PATENT QUICKSILVER STRAINER.

by six inch lumber, and the sides and bottom of the sluice of one and a half inch plank. A piece of board eight inches wide, nailed from post to post flush with the inside of the sluice, not only gives strength to the whole structure, but may also serve as a gangway.

of the quicksilver by means of a sponge before using the quicksilver for amalgamating the next charge in the pans. This sponging is objectionable, as particles and globules of fine flowery quicksilver adhere to the sponge and to the hands of the operator so that the process



SECTIONAL ELEVATION OF STRAINER.

Whenever a curve occurs in the sluice, the larger bend, or outside, ought to be raised from one half inch to one inch, according to the degree of the curve. This will check the force of the current toward the outside curve and distribute the flowing matter evenly over the whole bottom of the flume, preventing the wearing of a deeper channel in the pavement on the outside curve.

The pavement of the sluices should be made of hard, flat stone; schist-rock or mica slate is excellent for the purpose. These stones must be placed edgewise, with a gentle slant from their base down the stream, forming a uniform thickness of 10 or 12 inches.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

WINNEMUCCA claims the distinction of being the only place in the State of Nevada that ships bullion from the ores of the district, barley raised in the adjacent valleys, flour made from wheat grown in those valleys, and beef and wool from the herds and flocks which fatten on the extensive pasturage which surrounds it.

The California Borax company are putting up another furnace at the Sulphur Bank mine in Lake county.

An Improved Quicksilver Strainer.

The invention which is illustrated by the accompanying engravings, is intended to do away with all handling of mercury after it has been strained from amalgam, and to obtain it clear, bright and ready for the next charge in the pans immediately on its being strained from the amalgam sack. Heretofore, the quicksilver when strained from the amalgam sack was received in a tub, together with dirty water, fine pulp and greasy matter, and these impurities were removed from the surface

A false bottom, *F*, the upper surface of which inclines toward the orifice, *C*, is placed in the bottom of the tub, *A*, so as to carry the quicksilver to the orifice and direct into the spout. It also serves to take the place of quicksilver and keeps as small a quantity idle in the tub as possible.

Before using the strainer it is necessary to fill the bottom of the tub with one dipperful of clean quicksilver, sufficient to cover the slot or orifice *C*. The quicksilver may then be drawn off from the end of the settler and allowed to drain itself through the sack, which should be made of light ducking so as to obviate the necessity of squeezing the sack as is usually done, and which is always attended with some loss of quicksilver. The straining may be assisted by means of a wooden staff to press down the amalgam in the sack. As soon as the quicksilver rises to the height of one inch in the center of the tub, it will flow over and under the filtering riffles and pass out at the end of the spout *B*, into a tub half filled with clean water, which is placed to receive the strained quicksilver. The quicksilver will flow out of the spout clean, bright and perfectly free from dirt and greasy matter. In the tub will be found dirty water, together with a blue soapy mud and fine particles of floured quicksilver. The strainer may be cleaned at the end of a month, the dirty contents emptied into a tub, the water strained off and the residue dried in the sun. As it dries globules of mercury will amalgamate to a certain extent so that they may be strained off. The residue or blue mass remaining is found to contain 54 per cent. of mercury which can be restored by retorting.

When the strainer is at work the cover, *H*, of the spout *B* is kept closed in order to prevent dirt from falling into the riffles. The machine is not to be moved except for the purpose of cleaning it. The amalgamator should be careful to keep the orifice or passages clear when the machine is at work and this can be done with a suitable pick, *G*.

The advantages claimed by the inventor of this strainer are as follows: 1st, That it requires no handling or sponging the surface of the quicksilver, thus saving the cost usually attending such operation.

2d, That it saves time and labor, as the quicksilver is ready cleaned for the next charge in the pans immediately on its passing from the strainer.

3d, That the quicksilver is clean, bright and free from all mud, greasy matter or blue mass.

4th, That the quicksilver being clean and lively, better amalgamation takes place in the pans, and the ores can be worked to a higher per centage, which after repeated experiments is found to be from one to four per cent., according to the grade of ore worked.

5th, That a large proportion of blue mass or fine flowy quicksilver is saved from passing away with the tailings, and which can be restored by retorting.

6th, It will also be found advantageous to pass all retorted quicksilver through the strainer before using it for amalgamation, to clean it from all dirt and greasy matter that may have passed off the amalgam in retorting.

The machine is the invention of Mr. H. H. Oakes, of Mineral Hill, Elko county, Nevada. We made reference to the strainer in September, 1874, before the patent was obtained. At that time Mr. Oakes informed us that after running quicksilver through the strainer at his mill for two weeks, he cleaned up and found nine pounds of very good floured quicksilver, of a bluish color. This was dried in the sun and on being properly manipulated, eight pounds of quicksilver were obtained. The remaining pound was a heavy kind of blue mud familiar to most millmen. The State Assayer analyzed this pound of blue stuff and it was found to contain fifty-four per cent of quicksilver. This machine can be made cheap enough to be within the reach of any miner, and will do for an arrastra as well as a 60-stamp mill, being an independent appliance.

A company of Vallejo capitalists are now mining for chrome on Oathay's ranch in Coon valley.

CORRESPONDENCE.

Solano County Mines—The St. John.

ENRONS PRESS:—Yes, it is a fact, that the Oat Hills of Solano have a wealth of quicksilver hidden beneath the soil, and in some places not so perfectly hidden but that the wayfaring man may often see its outcrop or its float. A short visit at the St. John's quicksilver mine a few days since confirmed me in the belief that the bright, nimble metal, named after the swift messenger of the god's, exists in paying quantities in this as well as in the neighboring counties of Napa, Lake and Sonoma.

Through the kindness of the Superintendent, Mr. John Neate, and his clerk, Mr. Moran, I was favored with a few facts and items. The St. John mines are situated five miles from Vallejo, at an elevation of twelve hundred feet above tide water. The communication to railroad or steamer is by excellent wagon road, and the whole distance from San Francisco only thirty-five miles.

The mines are prospected (as it cannot yet be said worked) by twelve different tunnels, in different parts of their location, and all of them in ore. Now, also running a main drain and working tunnel five and a half feet bottom, four feet eight inches at top and seven and one half feet high, perfectly timbered with sawed lumber. This tunnel, a fair specimen of good workmanship, is now in one thousand feet, but has not reached the lode. The various necessary buildings so far erected show evidence of an economic principle of procedure, very worthy of imitation in other mining companies. Yet, in the erection of their reduction works, there seems to be no sacrifice of efficiency for any seeming temporary economy. They use the Neate furnace invented by the Superintendent, who has filed caveat for patent, and will, no doubt, furnish you a proper description of the same in short time, as I could do it no justice in the limits of this letter. The small model now working has a capacity of six tons per day and gives perfect satisfaction. The fuel used is coke, charged with the ore, forty pounds of coke being ample for a ton of ore; thus making the fuel expense not over twenty-five cents per ton of ore. The greatest yearly yield of the mine has been 1,700 flasks (76½ lbs. each). The highest per month 425 flasks.

The greatest depth of shaft 125 feet perpendicular. One incline has a length of 225 feet. The north part of the mine shows a clay slate, and the south sand stone and quartzite. On the dump 500 tons ore and 250 tons *tierras* or fine ore. At present only working about 60 men, but when running all parts of the mine will require 80 or 90 men. Pay their hands in cash and they trade where they choose, no goods or liquors being sold on or near the mines, the latter a feature worthy of the highest commendation, as promotive of the best interests of all parties at or interested in the success of the enterprise.

Other mines are being located and opened in the vicinity for several miles around. About three miles from Vallejo Mr. C. Carrington has run a prospect tunnel (on his own farm) 200 feet into very fine mineral prospect, both for mercury and more precious metals. A few years may open up vast fields for mining industries and science, right here in the midst of the cow counties. C.

Vallejo, Feb. 25, 1875.

Australian Colonies—American Patents.

ENRONS PRESS:—As is frequently the case that persons coming to or traveling between these colonies use the name of the capital cities instead of the name of the respective colonies I think it desirable to make one or two trite remarks in addition to those contained in my former letter. First, Melbourne is the capital of Victoria; Sydney is the capital of New South Wales; Wellington, of New Zealand; Adelaide, of South Australia; Brisbane, of Queensland and Hobart Town, of Tasmania. In each of these cases the capital is by far the most populous and important city with the exception of Wellington, which has an ancient and formidable rival in Auckland, and Hobart Town which is left in the lurch by Launceston. I have been told by a recent emigrant from your city that people were apt to laugh at him if he told them that Melbourne was as large and as well built as it, yet I believe it is quite true; indeed my informant says that Melbourne is much the more substantially built of the two, inasmuch as the old wooden erections of the former days have, to a very great extent, disappeared before the more substantial brick and stone. Its population too, including the suburbs, amounts to nearly 200,000. As a rule its streets are straight and wide, which, for some some 6, 7, or 8 miles round about it, in every direction are the residences of most of its population, the better class, of course, living at the greater distances, railways, cars and omni-

buses being the means of communication for travelers.

Those residing in the other colonies say that we in Victoria are more after the American pattern, than they are, meaning, I believe, that there is more bueite and more of the go-ahead-ism, which is commonly attributed to your countrymen than in any of the other colonies. One British literary genius said that we had any amount of "blow" about us and perhaps in this respect we are more like you; I leave you to judge. One gentleman, however, who had resided amongst you for nearly twenty years, told me that he found Melbourne a comparatively slow place, that there was not that tremendous strain to get ahead that there was in San Francisco, and that he thought it was much easier to make money here than there.

I have been a little surprised, however, about one thing in connection with your inventive geniuses, and that is that they don't make more frequent use of the patent laws of these colonies. It is true that by reason of the interdependency of each colony it becomes a somewhat expensive thing to patent an invention in all of them, but still in some cases it would pay, and in others it would answer to patent in two or three of the principal ones. An efficient reaper and binder would pay to patent in all of the colonies, so would an invention for preserving raw meat, or for benefitting those engaged in wool growing, whilst any really good invention which would beneficially affect the gold mining industries might be advantageously protected in some three or four of them.

A Victorian colonist recently introduced Mr. Dana's sheep and cattle tags; patented it in all of the colonies, and is likely to do well out of it. Some six months before him another gentleman introduced an earth excavator from America which was far superior to anything we had here. This also was patented for the colonies, and promises to be very remunerative. So also with the Wheeler amalgamating pans, known here as "Brown & Mansfield's," and so also with many other inventions, which I cannot just now remember. Ten times as many British inventions are patented in the colonies as American ones, and yet it is notorious that the faculty is not nearly so largely developed in them as in your countrymen.

As your space is valuable, and this letter has already reached an inordinate length, I will conclude by expressing a hope that Australians and Californians will soon learn to understand and appreciate each other, and the wants and resources of their several countries, better than they do now. Yours, etc., E. W.

Mining in Montana.

ENRONS PRESS:—We are about completely snowed in. The weather so far has been extremely cold. The great body of snow which has fallen, however, will be of immense value to the mining interests. Times are rather dull at present, but the majority of our people are of good cheer, expecting a bright future, and anticipation is certainly a source of great relief. A new impetus was given to quartz mining by the new law. Those that believe in digging to find a mine, can now go to work and know, should they discover one, whether it is their own or not.

We have several serious drawbacks still—want of sure and cheap means of transportation is the greatest; want of competent machinery and competent men to run the same. There is no question about there being good ore and plenty of it, but mine owners have very exalted ideas as to the worth of their ores, and are loath to sell at a price that would justify purchasers to buy and ship to Europe. There is plenty of ore that is not high grade enough to ship at all, if there was the proper works here to work these low grade ores, or even concentrators. The bullion product would soon be large, as nothing now but exceedingly rich ore will pay to work. The shipping season is very short, a large amount of ore shipped last fall being scattered along down the river, and cannot be removed till spring.

There is a great deal of talk about concentrators, mills and furnaces that are going to be put up. Several one-horse arrangements of each kind have already been put up, but succeeded in making a signal failure. All acknowledge that there is silver and gold enough per ton to pay if it could be saved, and proper tests show this to be the fact.

I will now give you a few items from this place and vicinity. The McDaniel company at Red mountain, eight miles distant, are doing considerable work on their lodes this winter. They have several lodes near together, which show exceedingly well on the surface and as far down as they have gone. Among the number is the National Bank, Sallie Bell and Wanderer. About 150 tons are on the dumps. Average per ton of first class ore, silver, \$75; lead, 80 per cent.; second class, silver, \$60; lead, 50 per cent.

The National mining company at Unionville are working a full force of men. Mill constantly running, working about thirty-five tons per day. Their splendid new tramway from mine to mill is nearly finished. The company will soon put to work four Burleigh drills lately arrived.

The Columbia company on the Park are driving a new tunnel. Superintendent Tatern says

he is going for it deep. The company last summer purchased all the Park lode as far as discovered, paying the different owners twenty thousand dollars.

The Harvey mill at the Park is running on rock from the Caroline lode discovered last summer about seven hundred feet south of the Park, it is owned by Harvey, McNeil and Hall. Harvey and McNeil have relocated the Fannie Hill and commenced work, in the old tunnel run by Jim Witlatch. Rock from the Caroline so far has paid very well. The results of the crushing from the Fannie Hill is not yet made known.

The old Whitlatch mill is idle. Judge Turnley's mill is no more. Quite a number of small seams of quartz are being worked, but don't amount to much. SEABROW.

Unionville, Montana, Feb. 9th.

Printing and Block Making.

New Manufacturing Enterprises for California.

ENRONS PRESS:—Some time ago, in one of the San Francisco papers, I noticed an article on "Oil-Cloth Printing," and that the blocks were made here. The incident recalls the printing days of the long ago, when the calicos and shawls were all printed by hand, requiring a large number of skilled mechanics to cut the patterns on blocks, and a seven years' apprenticeship to learn the business; a few small figures were engraved on copper rollers and printed by machinery. The engraving part was also accomplished by hand, requiring a steady hand and bright eye, and few really attained the distinction of being good workmen. Designers were another class engaged at print works, designing new patterns and preparing those accepted for the cutter and engraver. Skilled mechanics engaged at the above occupations received compensation remunerative for services, which in time established traditions, compelling owners of factories to comply with terms which at this late day seem to have been very unreasonable. My own experience leads me to the conclusion that nothing but disaster follows sooner or later all compulsory measures adopted between those who hire help and the hired. Printing by hand and block cutting are almost things of the past, and soon will not be known outside of the pages of history. When in its glory no happier people existed. Good wages were obtained, and as freely spent, and it is with a sigh we part from the long ago, when calico printing by hand was the light which brightened many a fireside. With the fall of hand printing, block cutting also fell. A remnant of the old glory still finds employment in house paper establishments and oilcloth carpet works. But as the business is a dying one few will care to learn the trade. The present skilled workmen will carry with them the secrets of the past, and machinery remain master of the situation.

Engraving

Is now performed by girls and boys. Acids and etching serving as the steady hand and engraver. Calicos and delaines are now printed with a speed and accuracy truly astonishing to behold; and so is house paper, but the house paper pattern has still to be cut on rollers, by hand, giving employment to the block makers of the past.

As oilcloth printing has been established in San Francisco, why should paper printing not follow? If one can be successfully followed, so might the other, also. If no other inducement, the large freight bills of themselves would give a large profit. If calicos are ever printed in California, those engaged will reap a rich reward from the same cause.

Delaines

Would be a profitable investment—cotton and wool supplied at home, and a good market for the goods when finished. Skilled workmen could be easily obtained if capitalists would only inaugurate the movement, giving employment to those who are fitted for such occupation, and retaining capital at home instead of enriching France, England, or Rhode Island. JOHN TAYLOR.

Mt. Pleasant, Jan. 25, 1875.

ASBESTOS.—Robert Stewart, R. Hipkins and Philip Leiby, of this county, recently located claims on an asbestos lode or deposit, about four miles east of Copperopolis, in Calaveras county. The discovery was originally made by Mr. Leiby, several years ago, while prospecting for copper, and not, perhaps, being familiar with the mineral, nothing was done with the discovery. We learn the lode or vein of asbestos is about three feet in thickness, with a smaller vein running parallel with the main one. These veins appear to have gone as deep as the shaft was sunk—60 feet—and how much deeper they may continue as a matter of course is unknown. We have several large pieces from the mine in the office which looks very well. The fibers are very fine, and the mass a very pure white. The deposit seems to be extensive, and a very large supply can be furnished from the mine. This we think is the largest discovery of this mineral yet made in the State.—*Amador Ledger*.

Tests of the Haskin's Engine.

An eight horse-power (so rated) semi-portable engine, built by the Haskin's Machine Company, of Fitchburg, has recently been pumping an average of 4,000 gallons of water per minute from 15 to 20 feet high, with a total consumption of about 1,200 pounds of coal every 24 hours. The work alleged to have been accomplished is so remarkable that we give the details, which are furnished by a correspondent of the *Technologist*. Different engines of this class may be seen in this city at Parke & Laoy, No. 310 California street.

"The boiler is of the common vertical tubular type, and contains about 120 square feet of heating surface. The smoke-stack 18 feet high, and the exhaust passes through the feed water heater into the smokestack.

"The engine is of the vertical or inverted cylinder style. Cylinder 6½ inches diameter, 7 inches stroke—with Davis' patent piston valves and case—the peculiar construction of which case amounts almost to a steam jacket for the cylinder; common eccentric valve motion; valves adjusted so that the steam follows about two-thirds of the stroke; Waters' governor, the belt of which was thrown off, leaving the valve wide open, so that the engine was regulated by the throttle; feed pump worked by an eccentric or engine shaft; coil heater, the feed water passing through a tube enclosed in a vertical cylinder through which the exhaust steam passes on its way to the smokestack.

"The pump was one of Perry's 8-inch horizontal centrifugal, and was used to drain a ditch which was about a mile long. The water was run out of a box ditch about 500 feet long—and the quantity was measured as accurately as possible, the results recorded being the means of very many trials, as the contractors were paid for the number of gallons discharged, and were paid by these measurements.

"The fuel was a mixture of Cumberland and Cannel coals, and is all the coal that was bought for the engine and charged to it, the weights being taken from the weigher's tickets, and the gross average amount being 1,461 lbs. per day.

"The steam varies from 100 to 125 lbs. pressure per square inch; engine running from 200 to 360 revolutions per minute, as the occasion demanded, and after running two months night and day steadily, without repairs of any kind, was reported apparently in as good order as when first started.

"Using Moleworth's formula for pumping engines, we find 4,000 gallons of water per minute \times 60 minutes \times 24 hours \times 17½ feet—a fair average—that the result equals 100,800,000 gallons raised one foot high in 24 hours. Dividing by 4,752,000, we find that it requires 21.2-horse power to do the work. Allowing 10 per cent for waste, ashes, etc., (which were not weighed) we have 1,467—146=1,321 pounds of coal for 24 hours, and average of 54.7 pounds per hour—so that they obtained a horse-power with the expenditure of very little more than 2.5 pounds of coal per hour. Even charging all the coal, with no allowance for refuse, the result is under 3 pounds of coal per horse power per hour—which results very few first-class engines of large calibre can or do excel.

"This report is verified by the contractor, the foreman, and the civil engineer in charge of the work, and for this class of work presents the best results of which we have a reliable record—the vertical boiler being regarded as anything but the most economical form. This shows conclusively what can be done by good proportions, good workmanship and good management, and we think it worthy of being recorded."

Mining at Grass Valley.

The present winter has been a favorable one for quartz mining, and we believe all the mines of that character have been and are doing well. There has been considerable misgivings in regard to hydraulic mining. There has considerable water fall during the winter—the average amount, we believe; but the heft of it came at the time of the heavy storm, and went in a flood down to the lower country. But little snow has been deposited in the mountains, all of which has been regarded as unfavorable to a successful mining season by most people. In a conversation with J. E. Brown, agent of the South Yuba Canal Co., we learn that he considers the season a very good one; in fact, that it will equal last year, when a much greater rainfall was had. At that time the months of February and March were cold, and flumes and ditches were frozen up, and but little mining was done. This winter has been more favorable, and the company has been selling as much water part of the time as they do in summer. Mr. Brown thinks the time gained in this manner will more than equal the length of time which would be shortened in consequence of a less rainfall. The time that the company have to let in water to their ditches from their reservoirs usually averages from ten to twenty-five days. That is to say, a dry winter makes the mining season so much shorter. As more than that time has been gained the present winter on account of the weather being favorable for work, Mr. Brown thinks the present season will be a very good one. The agricultural interests never looked better; so, take it all together, the year will be a prosperous one for the State at large.—*Foothill Tidings*.

MECHANICAL PROGRESS.

Rivets on Iron Ships—Something New.

Wm. Palliser writes: I know with absolute certainty that the rivets with which the plates of iron ships are fastened together are utterly worthless when subjected to an impulsive strain, such as would be caused by a heavy mass like a boat being dashed with violence against the side of an iron ship. Under a strain of this nature rivet-heads become as brittle as glass. I have previously pointed out this fact, but the answer has been that no proof of the failure of rivet-heads in ships at sea has hitherto been obtained. I will mention one experiment which occurred at Shoeburyness some years ago in proof of my contention. On this occasion a peculiar structure was built up with cast iron solid cylinders, laid horizontally in tiers upon each other. The face of that structure was covered with an iron plate similar to those used in ship-building. The iron face was fastened to a frame by means of a row of rivets round its edges, just as the plates of a ship are riveted together. At the first shot, the whole of the rivets, to the number of many dozens, were broken, just like a row of postage stamps; and I may state, that I felt quite certain beforehand that such would be the case, judging by the way that rivets had invariably snapped in other structures under similar circumstances. Now the strain on those rivets, although impulsive, was comparatively not very violent, and had the plate been fastened with short screw bolts, reduced in the shank to the lesser diameter of the screwed part, not a single bolt would have been broken. Could it be proved that, owing to the breakage of rivets, the plates of the *La Platte* separated and let in the sea, and, further, that the rivets were broken by the blows struck by the boats against her sides, it would follow that all iron ships are liable to a similar danger, and the hitherto unexplained loss at sea of many iron ships would be at once accounted for. Several years elapsed before I succeeded in establishing to the satisfaction of others the cause of the breaking of ordinary armor bolts, and I am certain that the same tendency to snap exists in a far higher degree in the ordinary rivet.

DISTRIBUTION OF STEAM.—M. A. Van Wacy-saberoth has invented a new arrangement for preventing the dangerous irregularities which occur in steam cylinders; he adopts two or more escapes and sets of slides, placed on different sides of the cylinder, and so arranged that they are all connected with the extremity of the cylinder by the same passage. He admits the steam and governs its introduction directly by the regulator according to the work to be done. With this object the arbor of the levers which command the valve slides forms part of a sliding sector which is furnished with clickwork, rendering it at any determined moment independent of the slides and transmission rods. When this occurs, the steam-way, which was open, closes instantaneously, and the inlet, being unoppressed, the steam acts by expansion in the cylinder until the piston has reached the end of its stroke. The discharge port then opens, and the steam passes into another cylinder, into the condenser, or into the air, according to the circumstances of the case.

BELLS AND AOR.—A fiddle improves by age and use; a piano does not, neither does a bell. There is, perhaps, a slight improvement for the first few years, but afterwards the quality deteriorates. Metal we know, is altered by repeated and long continued hammering. Thump a piece of iron, and you change the quality of its magnetism; the shock of the waves modifies the magnetism of an iron ship; and some of the music is knocked out of a bell by long continued use of the clapper. A peculiar effect is noticed in the bell of Crippletoe church when it strikes twelve. The first two or three strokes are distinct and clear, then a discord begins, which accumulates with every stroke, until with the eleventh and twelfth a complete double sound is produced.—*Chamber's Journal.*

A RAILROAD ON ICE.—A Duluth paper proposes a railroad on ice from Duluth to the Sault—the whole length of lake Superior. It claims that all that is necessary is to spike the rails to the ice, without grading, filling, excavating, ballasting, or ties. The track, it says, could be taken up every spring and stowed away. The road would be about 400 miles long, and a dead level. The ice lasts till April; a thick enough to sustain a train of cars; the freight cars could be transferred to the ice without reloading, and the rails could either be spiked to the ice or they could be fastened in a frame and laid on the ice without spikes.

IRON BRIDGES.—The first iron bridge ever built was constructed at the Colebrookdale Iron works, England, by Abraham Darby, and was erected across the Severn, near Colebrookdale, in 1778. It is of hundred and twenty feet span, and although it has been in constant use from that day to this, it is in as good condition now as ninety-seven years ago. Thome Gregory served his apprenticeship as a draughtsman and a pattern maker, and when his time was up he was engaged by Darby as foreman of his shop, and the iron bridge of Colebrookdale is one of Gregory's productions.

LEATHER BOARD FOR ROOF COVERING.—The application of board made of leather parings for covering roofs is steadily on the increase, says an exchange, especially since it has been found practicable to impart to the material the required durability, imperviousness and its *sine qua non*, a great resistance against the constantly changing influences of the atmosphere. Only by changing the mode of manufacture these properties could have been secured. According to the German edition of *Engineering*, the board formerly used for covering in roofs was a spongy, easily compressed mass, which received a single coat of tar, and which had the great fault of softening, and consequently losing its consistency in damp atmosphere. This has lately been superseded by a product manufactured by P. Desfenx and others of fibrous matters, possessing a great substance, such as leather, and which are in the process of manufacture impregnated with an oleaginous chemical composition, imparting to the material when cut into sheets like paper and dried, the appearance of real leather. This system of covering in roofs offers considerable advantages especially from an economical point of view. The new roofing board is said to be very light, and consequently, as no other material, suitable for slight constructions.

RELATIVE STRENGTH OF SOLID AND HOLLOW IRON COLUMNS.—The quantity of iron in solid columns of strength and height necessary for carrying the doors of ordinary warehouses and workshops is fully 50 per cent. greater than that which would suffice to cast hollow columns of similar strength and height. Thus a solid column of cast iron, four inches in diameter, weighing 40 pounds per lineal foot, has only the same amount of strength as a hollow column five inches in external diameter and 9.16 inches in thickness, weighing 29 pounds per lineal foot, when the height is nine feet; and a solid column 12 feet in height, seven inches in diameter, weighing 122.4 pounds per lineal foot, is only of equal strength with a hollow column of similar height, having an external diameter of nine inches, a thickness of one inch, and weighing 80 pounds per lineal foot. The late Eaton Hodgkinson ascertained that within certain limits the strength of columns is as the 3-6th power of the diameter in inches, and universally as the 1-7th power of the length or height of the column. The formulae for calculating the strength of the columns of cast iron, both solid and hollow, and of any proportion of length to diameter, is given in the second part of Tredgold's "Practical Essay on the Strength of Cast Iron and other Metals."

STEEL BRONZE.—The Vienna correspondent of the *Times* furnishes the following notice of Major-General Uchatius' "steel bronze." Above 1,000 shots have been fired with increased charges from a gun made of this bronze composition without the least deterioration being visible. The grooves, which are the first to suffer with bronze guns, are as perfect as they were on the first day. Hitherto the experiments have been made with the common projectile in use with the present bronze gun. The experiments are to be continued with closely adjusted projectiles, a battery will be formed in the arsenal to test the range and precision as well as the adaptability of the new composition for breech-loaders. If found equal in all these respects to steel guns, the steel bronze guns will have the advantage of being lighter, and consequently superior for handling and maneuvering in heavy ground, which will be a great source of saving; for it is calculated that the present bronze gun might be transformed at about one-fourth of the cost which a change to steel guns would entail. It would, too, be much cheaper, for the worn-out guns might be recast, instead, as with steel guns, of being sold for old iron.

ELEVATED RAILROADS.—In the report recently made by the American Society of Civil Engineers, upon the various plans recommended for rapid transit in New York, underground railroads are regarded as out of the question, and the plan of elevated railroads is favored. Even the imperfect road of this character already built on Greenwich street has done something to shorten the distance out of the city, and to bring its northern and southern extremes nearer together. But it is considered a very imperfect and unsafe affair. The Committee of Engineers demonstrate by figures that such a road can be built so as to be safe, meet all the wants of rapid transit, and return a fair interest on the cost. The Committee have the matter still under discussion, and wealthy citizens are said to be subscribing liberally, to demonstrate the practicability of such an enterprise.

DANGEROUS BOILERS.—The Hartford Steam Boiler Inspection and Insurance Company have issued their annual report, comprising a pamphlet of twenty pages, from which we glean the following: Inspection visits, during the year, 14,368; inspections made, 29,200; defects discovered, 14,256—about one for every two boilers examined; furnaces out of shape, 602; fractured plates, 1,127; burned plates, 867; blistered plates, 2,368; deposit of sediment and incrustation and scale, 4,816; water gauges defective, 548; defective blow out, 267; overloaded and defective safety-valves, 343; pressure gauges defective, 1,809; boilers without gauges, 714; deficiency of water, 78; broken braces and stay and insufficient bracing, 685; boiler condemned as unfit to run, 163—most of them worn out.

SCIENTIFIC PROGRESS.

Science vs. Spiritism.

At a meeting of the New York County Medical Society, January 12, 1875, Dr. J. C. Peters remarked at length upon the trickery of so-called spiritual manifestations and mind-reading, and in conclusion presented the following resolution:

Resolved, That a Committee of five be appointed by the Chair, to consider, and at their convenience report upon, the following questions:

First—Is the state or condition of mind known generally as the mesmeric state, a reality or a deception?

Second—If it is a real physiological state, what are the conditions necessary to its production, and what are the phenomena attending it?

Third—Is it a state to which one mind can submit another, or does it depend upon some conditions voluntarily submitted to by the individual?

Fourth—Is it possible, while in this so-called mesmeric trance, or at any other time, or in any other condition known to man in his mundane experience, for one person to divine what is passing in the mind of another, except through the medium of signs?

Fifth—Is there any such faculty known to our race as perceiving by some mysterious second-sight what is transpiring in places far beyond the reach of ordinary human vision, or what is written on paper when an opaque object lies between it and the person attempting to read?

Sixth—Is there any evidence that the well-known law of gravitation is ever overcome by a force hitherto unrecognized by scientists?

The resolution was adopted and the following gentlemen named as the Committee: Dr. Ellsworth Elliott, Dr. J. C. Peters, Dr. Fordyce Barker, Dr. Austin Flint, Sr.; Dr. A. B. Crosby.

Artificial Production of Precious Stones.

An address on clay and its economic application was delivered by Prof. T. C. Archer on the occasion of the inaugural meeting of the fifty-fourth session of the Royal Scottish Society of Arts at Edinburgh.

The president commenced by a reference to alumina and its various alloys. One of the greatest discoveries of the present age, he said, was the obtaining of the oxide of aluminum in a pure crystalline state. It has long been known that the precious stones were composed of oxide of alumina colored by other metallic oxides; and it was a very fair inference that if they could succeed in melting the oxide alumina, there was nothing in the world to prevent the manufacture of emeralds, sapphires, rubies, etc. This had actually been accomplished by a Parisian chemist, and the artificial gems were of the same hardness and density as, and chemically identical with the real stones. Beautiful stones were exhibited, after which the professor proceeded to explain the composition of the various kinds of clay, and to detail the uses to which they had been put from the earliest periods of history.

He spoke also of the restoration of the lost art of encaustic and mural tile making, and described how those beautiful ceramic articles were manufactured, and the manner in which they were salt-glazed. The introduction of this kind of ware into the building of houses would, he said, add much to the beauty of our architecture—the more especially as the atmosphere had no effect upon their coloring, as in the case of serpentine and even granite. He next touched on the application of salt-glazing clay to sanitary appliances and gas retorts, and concluded by a reference to the improvements made of late years in the construction of pottery-kilns, which had the effect of saving fuel to the extent of one-third.

INTERESTING EXPERIMENT.—The combustibility of iron is a well known fact, but a Berlin experimenter has demonstrated the phenomenon in a manner peculiarly his own. He takes a straight bar magnet of some power and sprinkles iron filings on one of its poles. These filings arrange themselves in accordance with the lines of magnetic force, and however closely they may appear to be placed, of course no two of the metallic filaments are parallel, and consequently a certain portion of air is enclosed, as in a metallic sponge. The flame of any ordinary spirit lamp or gas burner readily ignites the finely divided iron, and it continues to burn most brilliantly for a considerable length of time, the combustion being apparently as natural and easy as that of any ordinary substance. If the experimenter with this operation stands on a slight elevation and waves the magnet to and fro while burning, a magnificent rain of fire is said to be produced.

THE GREENWICH MERIDIAN.—The French Academy of Sciences, it is announced, are about to consider the propriety of adopting the meridian at Greenwich, which is already recognized by the other nations of the Continent, in lieu of that of Paris. The meridian would touch the French soil at Tronville, and, in the event of the Government sanctioning the change, a column would be erected on the spot.

Earth to Earth.

Science appears to be opposed to the ordinary way of committing dust to dust. The relation of the dead to sanitary conditions has been again brought up by a proposal of Mr. Seymour Haden, to bury in coffins of a light, permeable material, such as wickerwork, open at the top, and filled in with any fragrant plants that may be in season. A coffin such as Mr. Haden suggests, while satisfying every sanitary, would, he thinks, at the same time satisfy every sentimental requirement—"a layer of ferns or mosses for a bed, a bundle of sweet herbs for a pillow, and as much as it would still contain after the body had been placed in it, of any aromatic or flowering plant for a coverlet—such a covering, in short, as, while it protected the body from the pressure of the earth as effectually as the stoutest oak, would yet not prevent its resolution." Yet a good deal would depend on the nature of the soil in which interment took place. Some soils do not possess sufficient depurative power, while others, such as light, gravelly ones, would allow too free a passage to the fetid and noxious gases which arise in the first stages of decomposition. Further, it is almost certain that disease germs are not destroyed, at all events rapidly destroyed, by burial, as was shown when the people of Murchampton perished in great numbers from an epidemic which originated in the application of the rich black earth of its churchyard as a garden compost. Still, where the ground is suitable there could be no reasonable objection to the adoption of this proposal, and a covering of quicklime might be added where necessary. Cremation is undoubtedly the best and most effective mode of disposing of the bodies of the dead in the interests of the living, but there is an apparently insurmountable prejudice to its use, although it is the method which the early Tenth-century settlers—regarding their descent from whom Englishmen are so fond of boasting—brought with them from the wastes and forests of the Continent.—*Iron Age.*

SPONTANEOUS COMBUSTION OF CHARCOAL.—The woods generally used for the production of charcoal are those of the cornel tree, the willow and the alder. These are all well suited to the purpose, but the cornel tree is used for the best kinds of sporting powder. The wood is converted into charcoal by heating in cylinders of iron. When the charcoal is drawn out of the cylinders, it is placed in other iron cooling vessels, fitted with air-tight doors. It is left in these for a space of about fourteen hours, at the end of which it is generally cool. It is then taken to the mill to be ground, and afterwards to be mixed with the other ingredients to make cannon powder. But a curious phenomenon has been noticed frequently at this stage, and which might indeed be fraught with danger, if the operations should be unduly accelerated. The powdered charcoal frequently becomes hot, and has been known to fire spontaneously the day after the grinding. This is explained, no doubt, by the fact that the charcoal absorbs large quantities of oxygen into its pores by capillary attraction, and that the condensation of the gas in the interior is the cause of the heat, and the non-conducting power of the charcoal the cause of its spontaneous firing. The quantity of gas absorbed is increased by the light to which the original temperature had been raised. The absorption also of the gas is much more rapid in the powdered condition than in that of sticks.

"COOGIA'S COMET" A MASS OF METEORS.—During the recent appearance of Coggia's comet, Mr. Norman Lockyer, the English astronomer, made some valuable scientific discoveries. Every night, while the comet was visible he was on his watch tower, using the most powerful telescope in England; he mapped its march and photographed its every phase; he resolved its fan-shaped nucleus into millions of shooting meteors; and he experimented on the large number of meteorites in the British museum—meteorites that have fallen in every part of Europe—and found that when heated up to a certain point their spectroscopic signs were exactly those of the comet. Mr. Lockyer is coming to this country shortly, to confer with our scientific men, whom he accredited with the greatest achievements in the recent transit of Venus.

ECLIPSE OF THE SUN.—Astronomers, who are yet in the midst of their labors, working out the grand results of their observations as related to the transit of Venus, will have another interesting occasion presented for astronomical research on the 5th of April, when there will be a total eclipse of the sun. The course of the central line of this eclipse will be principally a sea track, in which the best opportunities for marking the phenomena attending it will be during the passage from the Nicobar Islands, in the bay of Bengal, to Siam. The King of Siam has heartily invited British and other astronomers to make the observations within his dominions, and volunteered to extend them every facility and hospitality.

COMPLIMENTARY.—An eminent English astronomer, Lockyer, said to M. D. Conway, an American journalist in London, in speaking of the results of the late transit observations: "Whatever was done was accomplished by the Americans. They seem to be the only people now that take hold of such things in the right way."

General News Items.

CHOKED TO DEATH.—A singular and very sad accident occurred near Belmont on Friday of last week. A child of Mr. Newhall, a little boy only two years and a half old, was out searching for eggs. As he was absent for some time his brother was sent to look for him, and was horrified to find the child in the stable dead, with his neck tightly jammed between two of the upright rails of a manger. The inference is that the child in his search climbed upon the manger, and missing his footing in reaching out, fell with his neck between two of these bars, which converge toward each other at the base, and was choked to death. The feelings of the bereaved mother were indescribable. Mr. Newhall is a brother of H. M. Newhall, the well known San Francisco auctioneer, and is also an esteemed member of the San Mateo Grange.

FRIGHTFUL ACCIDENT IN A CHURCH.—A frightful accident occurred at St. Andrew's Catholic church, in New York, on Thursday evening, of last week: While Rev. Father Carroll was preaching and about half through the sermon, the ceiling over the right gallery was crushed in by the fall of the brick wall of an adjoining building. The church was quite crowded, and a stampede followed. The firemen and police soon arrived and succeeded in allaying the excitement. Four persons were crushed to death during the rush for the doors. Their bodies were at the foot of the gallery stairs. Three others were also found dead and 71 wounded.

SUDDEN DEATH OF A NOTED CLARINET PLAYER.—On Sunday evening last, James R. Kendall, an old and popular clarinet player of the California theatre orchestra, dropped instantly dead in the music room of the theatre. As he entered the music room he hung up his hat and overcoat, and saying "Good evening, gentlemen," to those about him, wheeled about and fell to the floor a corpse. Physicians were summoned and several rushed in, but Kendall was beyond aid—he died instantly as he fell.

POSTAL CHANGES FOR CALIFORNIA.—Post Offices Established.—At Cinnabar, San Benito; Geo. W. Chick, postmaster. At Fountain Springs, Tulare county; Moses Davis, postmaster. Postmasters appointed: J. F. Sperry, at Big Trees, Calaveras county; W. S. Whitaker, at San Simeon, San Luis Obispo county.

ENOUGH TO KEEP HIM FROM WORK.—King Alfonso's allowance has been fixed at \$8,000,000 reals—that is \$3,500,000 which will, no doubt, prove a real comfort to him, and ought to procure him food, lodging and clothes of a superior kind.

OPPOSITION TO THE HAWAIIAN TREATY.—From the expression of prominent Senators, it is believed that the Hawaiian reciprocity treaty will meet with much opposition when it comes before the Senate for action, and there is a strong probability of its rejection.

LOCOMOTIVE WORKS DESTROYED BY FIRE.—The Cliff Locomotive works at Clifton, Penn., were burned on Saturday morning of last week, with the valuable machinery, three new engines, etc. Loss over \$500,000; insured for \$200,000, chiefly in New York.

RESIGNATION OF GOVERNOR BOOTH.—Newton Booth filed with the Secretary of State his resignation of the office of Governor, and left for Washington on the overland train of Sunday.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, FEBRUARY 25.	THURSDAY, MARCH 4.
MORNING SESSION.	MORNING SESSION.
115 Alpha.....154@154	25 Andes.....73
995 Beet & Belcher.....45@45	155 Alpha.....73
160 Belcher.....45@45	75 American Flat.....45@45
160 Baltimore.....45@45	365 Baltimore.....45@45
70 Bullion.....45@45	100 Beacon.....45@45
260 Chollar.....45@45	210 Chollar.....45@45
180 Crown Point.....45@45	365 Best & Belcher.....45@45
400 Con Virginia.....45@45	210 Confidence.....45@45
1555 California.....45@45	210 Consolidated.....45@45
230 Caledonia.....45@45	210 Chollar.....45@45
30 Dayton.....45@45	170 Crown Point.....45@45
29 Daney.....45@45	75 Con Virginia.....45@45
30 Empire.....45@45	100 Globe.....45@45
595 Gould & Curry.....45@45	215 Gould & Curry.....45@45
50 Globe.....45@45	100 Hale & Norcross.....45@45
875 Imperial.....45@45	215 Justice.....45@45
25 Justice.....45@45	170 Julia.....45@45
420 Julia.....45@45	115 Knickerbocker.....45@45
210 Knickerbocker.....45@45	65 Kentucky.....45@45
3450 L. Bryan.....45@45	75 Knickerbocker.....45@45
181 Mexican.....45@45	650 Lady Bryan.....45@45
300 Overman.....45@45	100 Mint.....45@45
470 Ophir.....45@45	590 Mexican.....45@45
300 Phil Sheridan.....45@45	200 New York.....45@45
160 Snoot.....45@45	210 Occidental.....45@45
20 Silver Hill.....45@45	605 U. Consolidated.....45@45
300 Utah.....45@45	190 Utah.....45@45
100 Yellow Jacket.....45@45	
AFTERNOON SESSION.	AFTERNOON SESSION.
1700 Andes.....45@45	460 Belmont.....45@45
350 Belmont.....45@45	400 Chariot Mill.....45@45
100 Cosmoopolitan.....45@45	400 Cosmoopolitan.....45@45
200 Eureka Con.....45@45	400 Eureka Con.....45@45
200 El Dorado.....45@45	1200 El Dorado.....45@45
230 El Dorado.....45@45	50 Eureka Grass Valley.....45@45
400 Indus.....45@45	100 Empire.....45@45
170 Kossuth.....45@45	500 Golden Gate.....45@45
260 Lady Wagon.....45@45	300 Idaho.....45@45
300 Niagara.....45@45	300 Idaho.....45@45
100 North Carson.....45@45	300 Idaho.....45@45
900 Newark.....45@45	300 Idaho.....45@45
200 Nevada.....45@45	300 Idaho.....45@45
50 O. G. Hill.....45@45	300 Idaho.....45@45
800 Poorman.....45@45	300 Idaho.....45@45
350 Prussian.....45@45	300 Idaho.....45@45
750 Raymond & Ely.....45@45	300 Idaho.....45@45
650 Rye Patch.....45@45	300 Idaho.....45@45
75 S. Justice.....45@45	300 Idaho.....45@45
15 Silver Cord.....45@45	300 Idaho.....45@45
15 South Carolina.....45@45	300 Idaho.....45@45
230 Wash. & Creole.....45@45	300 Idaho.....45@45
350 Woodville.....45@45	300 Idaho.....45@45
100 Webster.....45@45	300 Idaho.....45@45
Wells-Fargo.....45@45	300 Idaho.....45@45

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No.	Amt.	Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Andes S M Co	Washoe	4	150	Feb 25	Mar 29	April 14	M Lenders	507 Montgomery st
Adams Hill Cons M Co	Eureka Nev	6	15	Feb 16	Mar 21	April 16	W W Taylor	408 California st
Alps S M Co	Ely District	8	25	Feb 10	Mar 22	April 12	O D Squire	Cor California & Mont
American Flat M Co	Washoe	11	50	Feb 8	Mar 15	Apr 5	A Sankey	331 Montgomery st
Bellevue M Co	Cal	11	50	Feb 17	Mar 22	Apr 14	D F Verdenal	409 California st
Bowery Cons M Co	Ely District	3	20	Dec 15	Jan 25	Feb 28	O E Elliott	419 California st
Chariot Mill & M Co	San Diego Cal	2	50	Feb 17	Mar 22	Apr 14	F Swift	419 California st
Cherry Creek M & M Co	Nevada	2	35	Feb 17	Mar 22	Apr 15	D F Verdenal	409 California st
Confidence M Co	Cal	2	30	Jan 16	Feb 22	Mar 31	W S Anderson	210 Battery st
Coos Bay Oregon Coal Co	Oregon	1	100	Feb 5	Mar 10	Mar 31	J P Beach	424 Montgomery st
Daney M Co	Washoe	12	75	Jan 12	Feb 16	Mar 9	G R Spinney	320 California st
Dardanelles M Co	Washoe	2	100	Feb 5	Mar 10	Mar 31	W S Duval	424 Montgomery st
Dayton G & S M Co	Washoe	2	100	Feb 16	Mar 23	Apr 13	W E Dean	419 California st
El Dorado South Cons M Co	Nevada	5	75	Jan 15	Feb 19	Mar 12	W Willis	419 California st
El Dorado Water & D G M Co	Cal	5	100	Feb 16	Mar 19	Apr 3	H Elias	416 Montgomery st
Empire M Co	Idaho	9	10	Jan 30	Mar 5	Mar 26	W Willis	419 California st
Golden Chariot M Co	Idaho	12	150	Jan 4	Feb 8	Feb 28	L Kaplan	419 California st
Gold Run M Co	Cal	10	15	Feb 9	Mar 15	Apr 5	C C Palmer	41 Market st
Ida Billmore M Co	Idaho	16	100	Feb 8	Mar 8	Mar 29	W Willis	419 California st
Imperial S M Co	Washoe	21	100	Feb 10	Mar 10	Apr 17	W E Dean	419 California st
Iowa M Co	Washoe	2	25	Jan 13	Feb 15	Mar 10	A D Carpenter	655 Clay st
Julia G & S M Co	Washoe	21	200	Feb 12	Mar 18	Apr 6	A Noel	419 California st
Kossuth M Co	Washoe	3	50	Feb 25	Mar 13	Apr 21	E F Stern	419 California st
Macmillan Silver M Co	Nevada	1	100	Jan 19	Feb 23	Mar 10	D A Jennings	419 California st
Meadow Valley M Co	Ely District	8	100	Feb 11	Mar 23	Apr 20	J W Colburn	418 California st
Mint G & S M Co	Washoe	9	20	Jan 19	Feb 24	Mar 18	D A Jennings	401 California st
Newark S M Co	Ely District	13	100	Feb 2	Mar 10	Mar 31	W Willis	419 California st
New York M Co	Cal	3	40	Feb 24	Mar 12	Apr 12	J C Deane	419 California st
North Bloomfield G M Co	Cal	35	100	Feb 3	Mar 12	Mar 30	T Derby	320 California st
Phil Sheridan G & S M Co	Washoe	2	75	Jan 21	Mar 2	Mar 30	W R Townsend	330 Pine st
Pictou M Co	Washoe	7	25	Jan 21	Mar 3	Apr 23	S Phillips	408 California st
Plumtree S M Co	Nevada	1	100	Jan 19	Feb 23	Mar 10	D A Jennings	419 California st
Raymond & Ely S M Co	Pioche	3	300	Jan 18	Feb 26	Mar 26	T W Colburn	418 California st
Red Jacket M Co	Idaho	6	50	Feb 1	Mar 9	Mar 30	W Willis	419 California st
Rock Island G & S M Co	Washoe	6	100	Jan 13	Feb 17	Mar 9	J W Clark	418 California st
Sagehen S M Co	Washoe	17	50	Feb 19	Mar 24	Apr 12	E B Holmes	419 California st
Sagehen Silver M Co	Washoe	11	50	Feb 25	Apr 3	Apr 23	J H Sayre	10 Stevenson's Bldg
Silver Cord M Co	Idaho	8	100	Mar 27	Apr 1	Apr 22	Frank Swift	419 California st
Silver Hill M Co	Washoe	5	100	Feb 16	Mar 19	Apr 9	W E Dean	419 California st
South Chariot M Co	Idaho	12	150	Jan 4	Feb 8	Mar 31	D F Verdenal	409 California st
St Patrick G M Co	Cal	10	50	Feb 2	Mar 8	Mar 31	Louis Kaplan	409 California st
Starr King M Co	Washoe	10	25	Feb 25	Mar 31	Apr 19	G W R King	419 California st
Sutro M Co	Washoe	8	50	Feb 17	Mar 22	Apr 8	G W R King	419 California st
Utah S M Co	Washoe	8	25	Feb 24	Mar 22	Apr 8	M C Deane	419 California st
Victoria & Imperial T & M Co	Utah	4	15	Feb 16	Mar 22	Apr 7	Wm H Watson	362 Montgomery st
War Eagle M Co	Idaho	9	100	Jan 25	Mar 2	Mar 23	L Kaplan	419 California st
Ward Beecher Cons M & M Co	Nevada	4	30	Feb 27	Apr 8	Mar 5	D A Jennings	401 California st
Ward Ellis S M Co	Robinson Dist	2	100	Feb 10	Mar 12	Apr 12	J M Buffington	419 California st
Washington & Creole M Co	Ely District	14	100	Feb 18	Mar 23	Apr 12	F D Cleary	Merchants' Ex

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Alpine G M & M Co	Cal	8	125	Feb 11	Mar 23	Apr 14	J F Lightner	433 California st
California and Arizona M Co	Arizona	10	Jan 8	Feb 22	Mar 12	T E Jewell	567 Montgomery st	
Carrie Hale Hydraulic M & W Co	Cal	3	10	Jan 15	Feb 24	Mar 17	R Knapp	Merchants' Ex
Combination G & S M Co	Panamint	5	10	Dec 28	Feb 1	Mar 10	D Wilder	Merchants' Ex
Electric M Co	Cal	5	5	Feb 16	Mar 22	Apr 12	T B Wingard	318 California st
Emma Hill Cons M Co	Utah	2	40	Jan 29	Mar 8	Apr 5	G J Cole	302 Montgomery st
Equitable Tunnel M Co	Utah	9	25	Jan 12	Feb 17	Mar 9	C S Healy	Merchants' Ex
Geneva Cons S M Co	Nevada	4	100	Jan 25	Mar 6	Mar 31	I T Milliken	302 Montgomery st
Golden Mountain G M Co	Bear valley Cal	4	100	Jan 25	Mar 6	Mar 31	F P Cavalier	302 Montgomery st
Golden Crown Co	Cal	1	10	Feb 25	Apr 1	Mar 16	Dani Suck	14 Stevenson Bldg
Hasloe M & M Co	Mariposa Co Cal	3	125	Jan 13	Feb 16	Mar 16	W A M Van Bokkelen	419 Cal st
Hayes G & S M Co	Robinson Dist	2	100	Feb 10	Mar 12	Mar 8	G R Spinney	320 California st
Home G M Co	Nevada Co Cal	1	50	Feb 13	Mar 24	Apr 16	F J Hermann	418 Kearny st
Imperial S M Co	Washoe	21	100	Feb 10	Mar 17	Apr 7	W E Dean	419 California st
Independence Cons M Co	Cal	2	250	Feb 4	Mar 13	Apr 2	F J Hermann	418 Kearny st
International Gold M Co	Cal	1	15	Mar 2	Apr 6	Apr 26	H O Kibbe	419 California st
Kincaid Flat M Co	Cal	1	10	Feb 4	Mar 13	Mar 29	B H Cornell	210 Battery st
Little Panache Quicksilver M Co	Cal	1	20	Feb 1	Mar 4	Mar 30	G R Spinney	320 California st
North Fork M Co	Cal	8	25	Jan 28	Mar 12	Mar 30	A Martin	530 Washington st
New York Cons M Co	Washoe	12	50	Feb 16	Mar 23	Apr 12	H O Kibbe	419 California st
Occidental M Co	Nev	3	50	Feb 2	Mar 9	Mar 29	A K Deubrow	Merchants' Ex
Ophir G M Co	Bear valley Cal	1	10	Jan 22	Mar 2	Mar 29	J P Cavalier	515 California st
Patten M Co	Washoe	2	20	Feb 3	Mar 3	Mar 29	L Hermann	330 Pine st
Phoenix Tunnel & M Co	Utah	7	25	Feb 15	Mar 23	Apr 12	C S Healy	Merchants' Ex
Pinto M Co	White Pine	1	10	Jan 9	Feb 15	Mar 8	A K Durbrow	433 California st
Prussian G & S M Co	Nye Co Nevada	3	100	Jan 12	Feb 18	Mar 12	R H Brown	402 Montgomery st
Rocky Bar M Co	Cal	1	10	Mar 1	Apr 14	May 8	J P Cavalier	513 California st
Rocky Bar M Co	Egan Canon	4	50	Jan 27	Mar 15	Apr 13	A Cargill	109 Front st
Silver Cloud G & S M Co	Cal	25	Feb 8	Mar 15	Apr 15	Apr 12	A A Enquist	71 New Monty's st
Silver Sprout M Co	Cal	5	Feb 17	Apr 17	June 17	T B Wingard	318 California st	
Silver West Cons M Co	Enreka Nev	3	10	Jan 13	Feb 16	Mar 20	F H Rogers	606 Montgomery st
Table M Alpha M Co	Cal	6	110	Feb 5	Mar 15	Apr 15	T F Cronise	482 California st
Tuolumne Hydraulic M Co	Cal	20	Feb 23	Mar 25	Apr 17	Apr 17	I T Milliken	302 Montgomery st
Union Cons M Co	Washoe	7	50	Feb 6	Mar 10	Mar 29	J M Buffington	Merchants' Ex
Weaverville D & H M Co	Cal	3	10	Feb 28	Mar 29	Apr 21	F H Rogers	330 Pine st
Webfoot M Co	Elko Co Nev	1	25	Jan 23	Mar 29	Mar 30	D A Jennings	401 California st
Wyoming G M Co	Cal	5	50	Jan 13	Feb 27	Mar 18	J M Buffington	Merchants' Ex
Yarborough S M Co	Kern Co Cal	6	30	Dec 23	Jan 31	Feb 23	E Barry	415 Montgomery st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Andes S M Co	Cal	Called by Trustees	507 Montgomery st	Special	April 5
Baltimore Cons M Co	Cal	Called by Trustees	330 Montgomery st	Special	April 5
Banker Hill G M Co	Cal	Walter L Palmer	19 First st	Special	Mar 30
California Borax Co	Lake Co Cal	L Hermann	330 Pine st	Annual	Mar 10
Electric M Co	Cal	T B Wingard	318 California st	Annual	Mar 18
Enterprise Cons M Co	Cal	F J Hermann	418 Kearny st	Annual	Mar 18
Hale & Norcross M Co	Washoe	J F Lightner	433 California st	Annual	Mar 10
Ida Billmore M Co	Idaho	W Willis	419 California st	Annual	Mar 8
Independent & Omega M Co	Washoe	J Maguire	419 California st	Annual	Mar 8
Justice M Co	Cal	Called by Trustees	419 California st	Annual	Mar 8
Macmillan Silver M Co	Idaho	O B Higgins	402 Montgomery st	Annual	Mar 8
Nonpareil G M Co	Cal	A D Pratt	804 Montgomery st	Annual	Mar 8
Silver Peak M Co	Washoe	G T Armstrong	240 Montgomery st	Annual	Mar 8
West Crown Point S M Co	Cal	J L Grimes	302 Montgomery st	Annual	Mar 8
Wonder M Co	Cal	J T Grimes	543 Sacramento st	Special	Mar 13

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co	Washoe	H. C. Kibbe	419 California st	3 00	Jan 11
Black Bear Quartz	Cal	W L Oliver	419 California st	25	Feb 19
Chariot M & M Co	Cal	Frank Swift	419 California st	4 9	Nov 16
Consolidated Virginia M Co	Washoe	D T Baeley	401 California st	3 00	Feb 11
Crown Point M Co	Washoe	O S Elliott	414 California st	1 00	Jan 12
Diana M Co	Nev	N. C. Fasset	220 Clay st	1 00	Jan 25
Eureka Consolidated M Co	Nev	W W Taylor	419 California st	50	Mar 5
Rye Patch M Co	Nevada	D F Verdenal	409 California st	50	Mar 5

Mining Stocks.

There is no change to record in the aspect of the mining market. Everything continues dull with few sales and low prices. Some expectation of a rise seems to be entertained by the sanguine, who contend that present prices are altogether too low for the merits of the mines. This may be the case with some of the bonanza mines, but there is no doubt even in the low tide in the market, that a good many stocks are selling at more than they are worth. There is a certain class which the brokers know as wild cat in which there is hardly any probability of striking ore enough ever to pay a dividend. Nevertheless, these mines are dealt in simply for speculation, and they answer every purpose for that. The general supposition is that the "Cometock deal" is over for the season, and some hopes are entertained of a rise in Idaho or Ely stocks by outsiders. This, however, can only be determined by the "inside" whoever they may be. At present there are no special indications that it will take place. Reports from the bonanza mines continue good, but they do not seem to affect the market as such reports used to do. How long the present depression will continue, it is impossible, of course, to say.

THE Oro mining company, Sierra county, are preparing to erect a 15-stamp mill.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office at San Francisco:

EAST YELLOW JACKET M. Co. March 2.—Location: Storey county, Nevada. Directors—Robert Sherwood, C. L. Weller, C. S. Neal, H. W. Fortuna and H. C. Kibbe

while a score or more lesser veins are operated with success. Several rich strikes have been recently made, notably by Briggs & Fisher, on the North Star, Lee Ham & Co., on the old Mitchell lead, Bastian & Bryor, near town, and George Chick & Co., on the North Fork slope. Besides these, numerous soft granita leads are being worked and paying well. The custom mills are kept running night and day, upon rock taken from these various veins. The coming spring promises to be a busy season in that district, as capital has taken hold of two of the leading mines while experts have been examining other ledges.

THE LONE STAR MINE.—One day last week we paid a visit to the Lone Star, located three miles northwest of West Point. We had heard frequent mention made of the mine but were not prepared to see so good a development as is exhibited. The vein has nearly a north and south course and starts from the edge of the North Fork of the Mokelumne river, and runs along one of the ridges of the river hills. Tunnels No. three and four on the Lone Star ledge have each cut an extremely large chute of ore; in the neighborhood of 40 feet in width by 100 feet in length with a perpendicular distance between the two tunnels of 150 feet. We saw several prospects of this chute, made from rock taken at random, which would yield \$80 to \$100 a ton. The average width of the two veins, excepting this chute, is Lone Star three feet and the Reed and Hillery two feet. There are now on the dumps about 700 tons of ore, some of it very rich while a portion being surface rock is of a poorer quality. It is calculated that the rock taken as a whole will mill \$20 to \$25 a ton.

EL DORADO COUNTY.

MINING DEVELOPMENT.—Mountain Democrat, Feb. 27: Within the city limits or in the vicinity of Placerville there is an immense amount of quartz. In some cases it presents itself in ledges of enormous proportions; in others it appears in the shape of seams and stringers which experienced and well informed miners are confident come together at greater or less distances from the surface. From time to time there has been more or less of rich gold bearing quartz taken from nearly every one of these ledges, seams and stringers. But although this is a familiar fact, and although ours is one of the oldest mining camps in the State, it is yet a marvellous fact that in this whole region not a single ledge has ever been systematically and thoroughly prospected. It is perfectly manifest that nothing would so greatly and speedily benefit our section as would the development of a permanently paying quartz mine. If one ledge was sunk upon to a depth of say 800, 600, or 500 feet, and a body of ore developed which would pay even moderately for milling, it is beyond a peradventure that within a brief period there would be dozens and scores of similar enterprises set on foot and ours would at once become one of the liveliest quartz mining regions in the State. To the property holders of Placerville and vicinity we submit this proposition: That they all unite in forming a joint stock company for quartz and prospecting, each taking such amount of stock as he can conveniently carry without hampering himself; then, after a general and free conference, at a spot he settled upon which is believed to offer best promise of success, and then let us go to work—hit or miss—and see something that lies more than 200 or 300 feet below the surface.

FRESNO COUNTY.

MINING.—Fresno Exploitor, Feb. 27: We are informed that Floyd, Dodds & Co. have been making some very good quartz from their mine, situated about four miles below Crook's ranch in the Fresno river. They have just finished rushing about eight tons of ore and got over fifty ounces of gold, or about \$75 per ton from the rock. They have about ten tons of ore which they estimate will yield fully \$500 per ton. Such a mine as that, if extensive, is better than Consolidated Virginia.

NEVADA COUNTY.

ORE REDUCTION WORKS.—Nevada Transcript, Feb. 27: R. M. Fryer & Co., of New York, are erecting works near the race track, for the purpose of reducing all kinds of auriferous ores. The rock will be worked without crushing and everything works as experiments heretofore prove it will, the company will be able to work any kind of mineral, so as to secure results equal to the ordinary process of assaying. It will, in short, be assay works on a large scale. It is expected to work rock as closely as any assayer can do it. The proprietors intend to enlarge the works as the demand requires. They have perfect confidence that the process will prove a success, and they will be ready for operation in a few days. Mr. Fryer has visited different points on the coast, and thinks this the most favorable of all. We hope success will crown their efforts.

GREAT ENTERPRISE.—Foothill Tidings, Feb. 27: One of the most extensive mining enterprises in California is that of the North Bloomfield Gravel mining company, which owns some hundreds of acres of deep auriferous gravel deposits in this county. Hamilton Smith, Jr., superintendent and engineer, in a report dated the 25th ult., says the total expenditure has been \$1,979,760, including \$498,000 for the main tunnel, nearly 8,000 feet long, \$1,031,000 for ditches, reservoirs and water rights. An additional expenditure of \$50,000 will increase the storage capacity of the reservoirs to 6,500,000 gallons. The company has been working for years, but has not yet fairly commenced washing out the gold. The ground is known to

be rich and they expect to take out enough to compensate them well for the cost, delay and risk of their enterprise.

PLACER COUNTY.

GREEN MINE.—Placer Argus, February 27: An extensive building has been erected adjoining the old hoisting work to accommodate a battery of ten stamps, complete separating and amalgamating works are connected therewith, and though the works are not very extensive no better quartz mill can be found in this region. An extensive reservoir has been built, in which the water pumped from the mine, is preserved for use in the mill. The works started up on Monday last, but during the week, little more has been done than to adjust the machinery, and get things to running smoothly. The mine is now yielding an abundance of good ore to keep the mill running up to its full capacity, and we may soon look for a favorable report.

THE CRATER MINE.—At the Crater mine, the St. Patrick company is driving business with an evident determination to do something. The 212-ft level is being driven from No. 2 shaft, in good ore. From shaft No. 1, the workmen are driving the 312-ft level, and have an 18-inch ledge of good milling ore. The 360-ft level from the same shaft is in a two foot ledge, and is yielding milling ore. The work of driving the 440-ft level of same shaft is just fairly begun. The rock is improving, and the foreman expects to strike the pay-chute of the 360-ft level, in a short time. The St. Patrick mill is running steadily, and the last clean-up from Crater ore, yielded \$30 to the ton. The mine is not at present yielding sufficient ore to keep the mill going, but as soon as the lower levels are fully opened out, the supply will be ample.

THE BOOTH MINE.—The main shaft has now reached a depth of 153 ft, and the ledge now shows fully four feet in width, of high grade ore, at this point the second level will be started, and rich developments may be looked for. The appearance of the mine is of the most encouraging character, and fully meets the expectations of all interested.

PLUMAS COUNTY.

GOON QUARTZ.—Plumas National, February 20: We are indebted to Mr. H. B. Bransford, of Taylorville, for a splendid specimen of quartz from the newly discovered ledge belonging to the Taylor Bros., at Crescent. The rock is full of free gold, and the beauty of it is that it is proving to be an extensive ledge. Two tunnels are now being run, and one of them is now in some seventy feet, the other just commenced. The first shows a ledge averaging eighteen inches in width, and at the end of the tunnel it appears to be increasing in size. All the rock shows free gold in such quantities as to prove that it will pay, when crushed, at an enormous figure. One objection to it is that the ledge does not "pitch" fast enough, but if it holds out anything like that portion already developed, it will be "good enough for anybody." We certainly hope it will, and that Crescent may once more regain the life and business which it had in years gone by.

SONOMA COUNTY.

MINING ITEMS.—Russian River Flag, February 25: Eleven flasks of quicksilver came down from the Missouri retorts last Saturday, the product of ore from the Georgia. Nine and a half tons of Georgia ore was reduced in the Missouri retorts and yielded eighteen flasks and fifty pounds.

Work continues on the Lincoln silver mine. Superintendent Gilman informs us that the shaft he is sinking on the ledge is now down 80 ft. After going 20 ft deeper he will drift each way on the vein. The owners of this mine are very sanguine in their belief that it will prove profitable property. Numerous assays have shown the rock to contain silver and gold in paying quantities.

The Home company (incorporated), whose mine is on the summit above the Annie Belcher, have struck a body of black oxide ore in their shaft, similar to that in the Socrates.

The Edith company (incorporated) are preparing to put up a furnace. Their mine is on Pine Mountain, above the Georgis. They have plenty of good furnace ore in sight.

The Rattlesnake company started their furnace again about ten days ago. It is working more satisfactorily, but they will soon build a Knox & Osborne furnace.

Rich ore has been struck in the northwestern end of the Sonoma. There is enough in sight to run the furnace a year. The superintendent has been getting out ore and building a road to it. The furnace will soon be fired up.

EXCELSIOR MINE.—By invitation of Mr. Sroufe, President of the Excelsior Quicksilver mining company, we paid the mines and works of that company a visit a few days since. Their location is in Inyo district, at the mouth of Sausal creek, on the road from Healdsburg, to Pine Flat and equidistant from the two points named, or eight miles north from Healdsburg. There are two mines belonging to the company—the Excelsior and the Chapman—and containing fifteen hundred feet each. At the Chapman, five tunnels and shafts have been commenced on as many different points along the croppings. Neither one, however, has yet been prosecuted to any considerable extent, though the ore has been struck in each, and in one at least, in considerable quantity and of very good quality. At the Excelsior, which is located on the right or opposite slope of the mountain, six tunnels and shafts have been commenced, and a railway three hundred feet in length constructed down the mountain side for running ore from the mouth of the tunnel down to the road below. On this claim

also, we were told, ore has been struck in each instance. Notwithstanding that the company have a working force of near eighty men employed, a sufficient length of time has not yet transpired since the commencement of work to pronounce the mines fairly opened. The indications for a really valuable mine, however, are exceedingly encouraging, and we hazard but little in predicting that ere many months the Excelsior will rank high in the stock market. The furnace of the company, which is a most substantial looking affair, is of the Winterburn pattern and capable of running through some fifteen tons of rock every twenty-four hours.

TRINITY.

RICH CINNABAR.—Trinity Journal Feb. 27: Cañon Creek bids fair to rival if not excel the Cinnabar district in the production of the ore for which the latter was named. There is an exhibition at the Union hotel 16 pounds of as rich cinnabar as we have ever seen, taken from near the surface on the Mountain Laurel mine, near Cañon creek, where three stringers have been found. A tunnel is being run by the Mountain Laurel company, which it is expected will strike these stringers in about fifty feet, and large developments are anticipated. We shall not be surprised at any time to hear of rich discoveries of cinnabar in other sections of the county.

ANOTHER DISCOVERY.—A ledge of ore-bearing rock has been discovered near the Bush ranch, twelve miles from Hyampome. Many opinions have been given as to what kind of ore the rock contains, it being variously claimed as lead, tin and silver. Whatever it is, it is immensely rich. As yet, none of the rock has been brought to town, and no tests made. By another issue we hope to report the discovery within our county limits of a rival Comstock.

PAYING WELL.—Henry Engel has been quietly working his quartz ledge on East Fork for several years past, during which time it has paid regularly, and for the amount of work and the manner in which it has been done, paid well. A late clean-up from 13 tons of rock, worked with an arrastra, averaged \$57.50 to the ton. Becoming tired of this primitive mode of working, Mr. Engel started for San Francisco this week, intending to make arrangements for the erection of a mill. He certainly has a good thing, and one which will pay large dividends with proper machinery for working the ore.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—Gold Hill News, February 25: Daily yield, 460 tons of ore. The ore slopes throughout the entire mine are looking splendid and are yielding the usual amount of rich ore. Enlarging the drifts and laying the double car tracks on the 1500-ft level are about completed. The mills are all running steadily and are doing good work. The C. and C. shaft is down 221 ft, the sinking making rapid headway.

CALIFORNIA.—The north drift on the 1550-ft level has been driven ahead 13 ft during the past week, the face still in the richest possible character of ore, the whole drift being in fact a magnificent chamber of ore, literally bespangled with silver. On the 1500-ft level, east cross-cut No. 1 on the south line, has been stopped for the present, the face still in rich ore, and a drift north started to connect with cross-cut No. 2 to obtain a better ventilation. This drift is passing through a splendid character of ore, and is now in a distance of 30 ft. Cross-cut No. 2 east, on the same level, is also being driven rapidly ahead, the face still in rich ore. Cross-cut No. 3 east is also in fine ore, and has been advanced 20 ft during the past week. Cross-cut No. 4 on the 1500-ft level is in 67 ft, the face still in porphyry.

OPHIR.—There is little or no change in any of the ore breasts on either the 1366 or 1465-ft levels. The north winze, on the 1465-ft level, is down 125 ft, the bottom still in fine ore. The face of the east cross-cut, on the California line, on the 1366-ft level, is also looking much more favorable for a continuation of the ore body to the eastward. The north drift, on the 1700-ft level, is being driven steadily ahead toward the Mexican line, encountering frequent small kidneys of fine ore.

BELOHER.—The ore breasts on all the different levels are looking well and yielding the usual amount of good ore. Daily yield, 450 tons of ore. The three winzes being sunk below the 1400-ft level, have all been stopped for the present for the purpose of timbering. The bottom of all the winzes are still in fine ore. As soon as they are thoroughly timbered their sinking will be resumed.

CROWN POINT.—Daily yield, 400 tons of ore, keeping the mill steadily running. There is nothing new to report of the ore producing sections of the mine. The main east drift on the 1600-ft level is still pushed vigorously ahead, with every prospect of soon striking the main ore vein. The main incline is down to the 1700-ft station.

ORIGINAL GOLD HILL.—The prospects in this mine have been growing better and better of late, and especially since our last week's report. The raise above the south drift at the 340-ft level, which we then made mention of, has progressed upward to the height of 27 feet, following the east wall of the ledge, and in excellent milling ore all the way. From the track floor up 15 feet it was white ore, fine and easily worked, but above that point it changed gradually to the regular red ore peculiar to the Comstock upper levels, or to the general depth of 300 feet. The face of the

raise is now in this red ore, and from personal inspection of it this morning we consider that it has every appearance of developing into a large solid body of most excellent ore. Assays from the track floor up have averaged from \$50 to \$400 to the ton. The width of their new ore development is not as yet ascertained, of course, and cannot be until cross cutting is done.

CHOLLAR-POPOSI.—Sinking the main incline below the 1250-ft level has been resumed. The 1250-ft station is completed and a drift started to cut and prospect the ore vein in that portion of the mine. The main south drift on the 1100-ft level is still being pressed ahead without change of value to relate.

SAVAGE.—The main incline has about reached the point at which the 2200-ft station is to be opened. The north drift on the 2000-ft level is making good progress, with no change worthy of note. The foundations for the new incline machinery are completed, and the machinery is now being placed in position ready for use.

BULLION.—The north drift on the 1700-ft level of the Imperial is still driven rapidly ahead, much better progress being made during the past month than at any time previous. The quartz in the face of the drift continues of a fine, favorable character, and in a short time a cross-cut will be started east to prospect the ore vein, when there seems hardly a doubt but that a paying mine will be developed.

SIERRA NEVADA.—The old prospecting drifts on the 700-ft level of this shaft are being rapidly cleaned out, and put in condition for future operations. The ore vein at this point, and that part of it lying between the old and new shafts on the 700-ft level, is as yet almost entirely unprospected, and some excellent results may well be looked for when cross-cutting in that portion of the mine shall have been commenced.

NIAGARA.—The shaft is now thoroughly timbered, and is in the finest possible working condition. Sinking has been resumed on the ore body struck in the bottom of the shaft before the work was suspended. The ore is of high grade, and is steadily increasing in width as a greater depth is attained. Spots of black sulphure ore, carrying a large proportion of gold, are frequently encountered.

KNOTCHEROCKER.—A heavy clay wall is met with in the face of the drifts west, at both the 600 and 700-ft levels, and drifting both north and south is commenced at both of the levels mentioned. This is supposed to be the east or paying wall of the main ledges, and not advisable to cut through at present, on account of the probability of encountering a heavy flow of water. When the powerful new machinery and increased pumping facilities of the company are made available, which will be in about a week or two, cross-cuts will be made through the clay wall and into the full merits of the ledge itself.

LANY BRYAN.—The ore body developed in the southeast cross-cut on the 180-ft level, is opening out finely. It has been prospected to the east wall of the ledge, and is 39 feet in width, and will mill from \$30 to \$40 per ton. Some rich developments may soon be looked for, as the whole ore vein is undoubtedly improving in quality as a greater depth is attained.

JULIA.—Sinking the shaft is making fair progress, notwithstanding the extreme hardness of the rock penetrated. The shaft is to be supplied in a very short time with Burleigh drills driven by compressed air, which will greatly expedite that portion of the work.

IMPERIAL-EMPIRE.—Driving the south drift on the 2000-ft level is making fair progress, the quartz in the face gradually assuming a more flattering prospect for an ore development.

IOWA.—Preparations for the erection of new and powerful hoisting machinery for prospecting the mine in good shape, are rapidly approaching completion.

LEO.—Driving the main tunnel is making good progress the face still in very promising ledge material, carrying seams of fine ore. The ledge continues well defined and strong, being about five feet in width.

MEXICAN.—The north drift on the 1465-ft level, is still driven rapidly ahead, encountering frequent spots and streaks of fine ore. It is the intention to soon start a cross-cut to the eastward to cut and determine the true value of the ore vein at that point.

WELLS FARGO.—Sinking is resumed at the bottom of the shaft, with the new hoisting works in full operation. A station will be opened next week for the first drift to the ledge.

GLORY CONS.—The main west drift on the 400-ft level is still driven vigorously ahead, the quartz in the face looking quite favorable.

JACOB LITTLE CONS.—A strong force of men are now employed in the development of this mine. The several drifts and cross-cuts on the tunnel level are looking more and more favorable for the development of a paying mine.

AMAZON.—New shaft down 40 ft, in good sinking ground. It is well timbered throughout. A number of small feeders of quartz have been encountered which look very favorable.

WOONVILLE.—The new ore body in the north drift on the 300-ft level is looking finely. Sinking the new shaft is making good progress.

PICTOR.—Air pipes are being introduced into the tunnel, and drifting ahead will be resumed shortly, as soon as the requisite supply of good air can be furnished.

SENATOR.—The drift north on the 400-ft level has shown much improvement during the past week. Selected samples of the ore give large assay results.

The King-Bird.

The king-bird, or "Field Martin," as it is sometimes called in the Southern States, remains at the North during the spring and summer; and, although men destroy it, Mr. Audubon declares its occasional destruction of a honey-bee, and larceny of a few raspberries and figs, to be the only mischievous acts it commits, while, he alleges, its beneficial deeds are countless, insects chiefly caught upon the wing being its accustomed food. It appears in Louisiana about the middle of March, and continues until the middle of September. Further northward, over the entire country, it comes later and disappears earlier. For a few days after its arrival, it seems fatigued and doleful, and remains perfectly silent; but its sharp, tremulous cry is soon heard over the fields and along the skirts of the woods. It seldom enters the forests, but is fond of orchards, large fields of clover, the neighborhood of rivers, and the gardens close to the houses of planters. As soon as incubation has commenced, the male, full of ardor, evinces the most daring courage, and gallantly drives off every intruder. Perched on a twig in view of his mate, he seems to direct every thought and action to cherish and protect her; and, though he seldom meddles with small birds, yet often flies to their rescue, when he spies a crow, a vulture, an eagle, or a martin making any approach, spreading his wings to the air, and pressing toward the dangerous foe, he commences his attack with fury. Mounting above the enemy, he sounds the charge, somewhat like a watchman's rattle, repeatedly plunging upon the back of his powerful antagonist, and endeavoring to secure a hold. In this manner, he harasses him with continued blows, and follows him at times for a mile, when, the fugitive having sought refuge in the forest, with quivering wings and trilling notes, the little bird returns exultant to his nest. Audubon says, that the martin alone, of all aerial enemies, inspires him with fear; that, although this bird frequently aids him in protecting his nest and watching over the farm-yard, it sometimes attacks him, and, excelling him in quickness and power of flight, eludes his more powerful blows, and in some rare instances, destroys him. Few hawks venture to approach a farm-yard while the king-bird is near; and even the cat, tormented by his attempts to peck on all sides, retreats from before him to the house.

Agricultural Matters at the University.

After attending the meetings of the Academy of Sciences at the University of California on Washington's birthday, we took a stroll through the grounds to see what was being done in the agricultural department. A portion of the grounds, dedicated to practical agriculture, has been thoroughly plowed, graded and otherwise prepared by deep trenching and working over for nursery purposes. Work in the agricultural department, as far as out-door agricultural work is concerned, was commenced on the 1st of June, 1874.

Two propagating houses have been constructed and were ready for use in the latter part of August, 1874, and a commodious and convenient building for work rooms, with suitable benches for potting and handling plants, constructed, with storage arrangements for prepared soil, pots, tools, etc., and a suitable office for gardener, and sleeping room for watchman.

The propagating houses are of the dimensions respectively of 30 by 20 feet, and 64 by 15 feet, and in the rear of the latter is a laboratory pertaining to said houses, 64 feet in length by 12 feet in width; these buildings are arranged so as to facilitate the work and so conveniently placed that the whole is easily supervised by the gardener.

The propagation of plants of economic value, as well as such species as are more particularly required for the purpose of illustrating general botany and ornamenting the grounds, in pursuance of the general plan devised by Mr. W. H. Hall, was at once commenced, and such vegetable forms as are valuable to the pomologist, and necessary to illustrate floriculture and arboriculture have already been produced in large numbers. The entire domain belonging to the University includes 200 acres, sloping to the west, a parallelogram in general shape, and presenting quite a diversified topography; its lower portion being about 200 feet above the level of San Francisco bay, and rising towards the east into hills, the summits of which are about 900 feet above the sea level. Some 40 acres are reserved for agricultural purposes and experiments, and the remainder to illustrate the principles and methods of landscape ornamentation, forestry, botany, and allied studies.

A well designed and convenient barn, 36 by 44 feet, and a story and a half in height has been built, and the principal road which traverses the farming grounds has been marked out and partly graded, to facilitate the farm work.

From advance sheets of the "Bulletin of the University of California" we learn that since the propagating houses were ready for use on the 22d of August, 10,000 plants, 20 species of Eucalyptus, 5,000 Acacias of 25 species, 200 species of native and foreign Conifers, also

numerous rare forms peculiar to Australasia, South and Central America, and elsewhere, and many species of textile, medicinal and other economic plants have been produced. We may mention 112 varieties of Roses, 13 of Azaleas, 12 of Camellias, 6 of Magnolias, for ornamental purposes.

The planting of a standard orchard, for the purpose of correcting the nomenclature of the fruits already in cultivation, and for furnishing hereafter scions and plants for distribution through the State, as well as for the introduction of new varieties to be distributed as above, has received consideration. The following have already been planted, and it is the intention to still further enlarge the list.

Varieties.	Varieties.
Apples.....141	Blackberries.....7
Siberian Crab-Apples.....14	Gooseberries.....8
Pears.....132	Currants.....8
G cherries.....82	Raspberries.....34
Plums.....67	Strawberries.....35
Peaches.....89	Filberts.....3
Apricots.....22	Asparagus.....1
Quinces.....2	Rhubarb.....16
Nectarines.....15	Mulberries.....6
Grapes.....73	

They have also procured many varieties of

these eggs have done which were brought by rail from the East.

Mr. R. E. C. Stearns, Secretary of the Regents and Superintendent of the grounds, shows commendable zeal in the collection of favorable varieties of fruits and trees, and with the assistance of Mr. Ellis, the gardener, has already made marked progress in matters relating to the agricultural department. Mr. Stearns earnestly requests all interested in this department to visit and inspect the grounds, and will be happy to receive suggestions and carry them out as far as the means at disposal will permit. Considerable difficulty has been experienced with the soil, which is hardly adapted for nursery purposes, and this has given a large amount of extra work. It seems to us that very good progress has been made in this department, considering that out door work was not commenced until the first of June.

A WONDERFUL COAL DISCOVERY NEAR DAYTON, NEVADA.—Some wonderful coal discoveries have just been made in El Dorado canon, a few miles southeast of Dayton. A short time since there occurred a flood in the canon, which



THE KING-BIRDS.

oranges, lemons, limes, etc, and all the species of walnuts and chestnuts.

Among the apples are nine new Russian varieties, and the peaches include seventeen of Rivers' new seedlings.

It is not to be expected that with a local climate and soil, all the above can be successfully grown at Berkeley, but it is very probable that many of them can be successfully cultivated, and the University may be able to add more or less to the number of useful varieties now produced in the State.

The State Fish Commissioners have recently erected a propagating house, and many thousands of ova and young brook trout may be seen in the troughs. It is proposed to build dams at favorable points in the creek and its branches, for the double purpose of protecting the banks and furnishing ponds for the fish. We saw at the hatching house a somewhat unusual occurrence—namely, double fish, or rather young fish one week old, joined together in a peculiar manner. Some of these have two heads and one tail, while others are distinctly formed but are joined together something after the fashion of the Siamese twins. We are told that some of the salmon eggs taken from this State to the East, hatched out in this peculiar manner, as

swept away the tollroad leading up along its channel and tore things to pieces generally. The road being washed away, it appears that no one tried to travel through the ravine. A day or two since, however, the Virginia City coal company, whose mine is well up toward the head of the canon, sent some of their employees out to examine the road in order to see if it were possible to repair it. In traveling down the canon these men came to a place where the water had torn up and swept out the whole bed of the stream, exposing an immense bed of coal. The coal has been torn up and washed down the stream, and there remains a regular pavement of it across the canon and for a considerable distance along its course. The new district is not covered by the original location of the Virginia City coal company, but we understand some of the members of the said company, with their employees, have taken up a large scope of ground covering the recent find. As yet they have not dug through the bed to ascertain its thickness. A gentleman who returned from the canon yesterday, and who is a member of the company above mentioned, is of the opinion that the coal laid bare by the recent freshet is the outcrop of the second vein cut in their shaft.—Ter, Enterprise.

Sending Parcels by Mail.

By the operation of a late law the Postoffice Department has supplanted in a degree the express companies as carriers of small parcels. Under this law there may be sent through the mails, at the rate of two cents for every four ounces or fraction thereof, not above four pounds in weight, in addition to engravings, seed hulls, and all other articles which are not from their form and nature liable to destroy, deface, or otherwise injure the mail bag or the person of anyone engaged in the postal service. All liquids, poisons, glass, explosive materials, and obscene books were excluded. This opened the mails to the reception of a vast quantity of small packages which were to be conveyed from one part of the country to the other, and insured for such parcels prompt dispatch to the remotest part of the United States, at a charge of but one cent for each two ounces or fraction thereof.

In sending packages of this description it must be observed that the law directs that all packages must be so wrapped, with open sides or ends, that their contents may be readily and thoroughly examined by the postal clerks without despoiling their wrappers. No writing is permitted except the address of destination, and to enclose or conceal a letter, or write or print anything upon a newspaper or other matter enclosed as a merchandise package subjects the sender to prosecution and fine. If it is necessary to break or tear a wrapper, letter rates are to be collected on packages so wrapped when they are delivered.

From a New York paper of a recent date we notice that it appears by the returns of the Postoffice Department that there were sent through the mails, from fifty of the leading cities of the United States, during four weeks of December, 1874, 225,733 pounds, and that during the same time, at the New York office alone, the number of pieces was 85,054, weighing 36,905 pounds. This may be taken as a good average month's work, so that in the course of the year nearly 500,000 pounds of this class of matter will be sent from the office in that city.

The result of this patronage of the mails has been a corresponding loss to the express companies, who are now said to be endeavoring to secure the repeal of the law. Such a movement is likely to be met with warm opposition as the success of it would secure to the express companies a monopoly of the business.

The Stayton Mines.

Our readers will all remember the sale a few months ago, of the celebrated Stayton quick silver mines, in the Coast range mountains between the counties of San Benito and Merced, by the Stayton Bros., of this county. Their many friends here will also be glad to learn that they have received their money from the English company, which we understand was paid last week. The purchase price was \$200,000. This is but a just reward to the enterprise of these men, who labored with such zeal for the development of these valuable mines.

Robert Stayton is still retained as Superintendent, and the work under his personal supervision has been progressing all winter, with the most satisfactory results. One shaft of the Cold Spring lead, says the Hollister Enterprise, is down 102 feet, disclosing an immense bed of rich cinnabar. On the Pacific lead the shaft is 92 feet deep, exposing a four-foot vein of silver metal. A small furnace with less than a ton capacity has been in operation for some time, and the average yield of the ore has been ten per cent. With these reduced facilities retorting, the mine has paid all expenses including wages of twenty hands, mining implements, material, fuel, etc., and left a margin sufficient to pay one per cent, per month the sum paid for the property. Indeed, it is believed that there is metal enough in sight to dump to pay the \$200,000 without touching the unmined ore at all. From the production of this small furnace some idea can be formed of the capacity of the mines for producing wealth when the larger works of the company are put in motion.—Ex.

WATER GLASS deserves more extended household usage. Mixed with paint or whitewash gives increased durability and a fine gloss, is an excellent fire-proof cement, and when also water-proof. It is a good adhesive and a good material for mending china, glass, or wood, made into a wash is the best coating for barrels.

PATENTS are taken for every conceivable device for the use of man, and invention even goes beyond the coffin. We find a recent patent apparatus for depositing coffins in graves. An invention for filling up graves is now on order.

ENGLISH CAPITAL is seeking investment in the coal and iron lands of the Southwest States to a considerable extent, and the development of that section will probably be accomplished chiefly by those who represent foreign owners.

THE SPRINGING OF SHAFTS.—If a shaft is running, the trouble lies probably in either too small diameter of the shaft for its weight and velocity, a set of unbalanced pulleys, or unequal strain on either side by the belts.

PLATINUM.—Enormous deposits of this valuable metal are reported as having been found in the State of Morelos, mining district Tacala, Mexico.

Good Health.

How to Live Ninety Years.

"With a good appetite three times a day, delicious sleep, and not an ache or a pain in the whole body, the mind all the time fully alive to what is going on in the world, and all the time in good spirits." This is said of the late ex-Governor Throop, of New York. He retired at nine, and rose at six, taking a nap in the forenoon, and sometimes in the afternoon also, breakfast at eight, dinner at one, and tea at sundown. In suitable weather he spent a greater part of the forenoon in his garden, directing his men, and assisting them, and for a short time in the afternoon was employed in the same way. He used no spirituous liquors, but took claret wine every day at dinner.

There are three things in the above narration which, if persistently carried out in early life, would do more than all others towards giving all an enjoyable old age, viz: regularity in eating, abundant sleep, and a large daily exposure to out-door air.

Regularity in eating, either two or three times a day, with nothing whatever between meals, not an atom of anything, would almost banish dyspepsia in a single generation; as frequent eating is the cause of it in almost all cases, especially if irregular, and fast.

Abundant sleep and rest from childhood make nervous disease a rarity; to insufficiency of regular sleep, and insufficiency of rest, may well be attributed nine-tenths of all sudden deaths, and a premature wearing out before the age of sixty years. All hard workers, whether of body or brain, ought to be in bed nine hours out of the twenty-four, not that so much sleep is required, but rest, after the sleep is over; every observant reader knows how the system yearns for rest in bed after a good sleep, and it is a positive gain of energy to indulge in it.

Every hour that a man is out of doors is a positive gain of life, if not in a condition of chilliness, because no in-door air is pure; but pure air is the natural and essential food of the lungs, and the purifier of the blood, the want of which purification is the cause or attendant of every disease; while every malady is alleviated or cured by an exposure to out-door air. If city wives and daughters would average two or three hours every day in active walking in the open air, it would largely add to exemption from debility, sickness and disease, and would materially add to the domestic enjoyment and the average duration of life.

HYGIENE FOR THE AGED.—In one of his recent clinical lectures at Guy's Hospital, London, Dr. Haversham referred to the case of an old man who died simply from the shock produced by going out into the cold and fog, which though only an inconvenience to people generally, was sufficient to lead to a fatal result in one whose circulation had become enfeebled, and whose vital force had so nearly lost its power. Dr. Haversham also alluded to an instance of longevity of which he had been informed by a gentleman—the case being the latter's mother, who had died at the age of 102, and who, during the winter months, used to refuse to get up, saying that she was warm only in bed. To this uniform warm temperature the fact of her great age was doubtless owing, and Dr. Haversham urges that in prescribing for old people they should be advised to keep warm; and as they cannot eat much at a meal, they should take them more frequently. There are many of them also who wake up at about three or four o'clock in the morning, and it is a good plan for them to have some nourishment then; otherwise the interval between the night and morning meals is too long for their declining strength. The life of the aged may be considerably prolonged by care in these minutiae.

COUGHS AND BRONCHIAL AFFECTIONS.—Afflicted persons will find great relief, and in most cases a certain remedy, in the following prescription:

Carbonate ammonia, 30 grains; tincture cinchona comp., 1 oz.; syrup senna, ½ oz.; pargoric, ½ oz. Dissolve the ammonia in the syrup by aid of a mortar and then add the other ingredients.

Directions.—One teaspoonful half an hour after each meal, or take the last spoonful on retiring. Shake bottle before pouring.

It was written a number of years since by Dr. Edwards, one of the most eminent physicians of New York City. The object in taking after meals is to allow it to remain on the diseased parts, therefore do not take anything to remove the taste from the mouth. It will be put up by any druggist.

EATING BEFORE SLEEPING.—It is a common mistake to suppose that eating before sleeping is injurious. Not at all unfrequently does it happen that people are sleepless for want of food and a little taken when they first go to bed or when they thus awake sleepless, will generally be found more efficacious, and of course, infinitely less injurious than any drug in the chemist's pharmacopoeia. These are the physical remedies for sleeplessness which have the best recommendation. As for the moral one there is certainly a good deal more to be said. Perhaps the most stringent of all rules are to avoid anxiety and "don't go to bed owing anybody a grudge!" chewing the bitter end of a quarrel is a thousand fold more injurious to repose than swallowing a whole teapot of the very greenest of green tea.

ADVICE TO BATHERS.—Mr. Young, the Secretary of the Royal Humane Society, publishes the following excellent advice to bathers:

Avoid bathing within two hours after a meal. Avoid bathing when exhausted by fatigue or any other cause.

Avoid bathing when the body is cooling after perspiration; but bathe when the body is warm, provided no time is lost in getting into the water. Avoid chilling the body by sitting or standing naked on the banks or in boats after having been in the water. Avoid remaining too long in the water, but leave it immediately there is the slightest feeling of chilliness. Avoid bathing altogether in the open air, if after having been a short time in the water, there is a sense of chilliness, with numbness of the hands and feet.

The vigorous and strong may bathe early in the morning on an empty stomach; but the young and those who are weak had better bathe three hours after a meal; the best time for such is from two to three hours after breakfast.

Those who are subject to attacks of giddiness and faintness, and those who suffer from palpitation or other sense of discomfort at the heart, should not bathe without first consulting their medical adviser.

WHOOPING-COUGH REMEDY.—One of the London journals contains a statement by Dr. Berry of his successful treatment of uncomplicated whooping-cough with diluted nitric acid, in doses of from five to fifteen minims, according to age, with simple syrup, given every three or four hours, alleviated the cough and spasms, and apparently cutting short the disease. During an epidemic of disorder he prescribes this frequently and with very satisfactory results. He offers no suggestion as to the operation of the remedy, but he believes its action to be that of a tonic sedative, and antiseptic, and, at the same time its refrigerating properties are not to be lost sight of. In all the cases treated he has, of course, paid attention to the state of the digestive organs, and in such as require it he has given an aperient combined with an alterative.

TONICS FOR WOMEN.—Nothing makes a woman aged more rapidly than overwork—the reason, probably, that American women fade so soon. Sunshine, music, work and sleep are the greatest medicines for women, who need more sleep than men. Their nerves are more sensitive and they are not so strong, and exhaustion from labor or pleasure takes place sooner with them than with men. Never permit yourself to be roused out of deep sleep in the morning. In fact, one should never be awakened. The body rouses of itself when its demands are satisfied. Take a warm bath occasionally before going to bed—at least once a week. Retire as soon as you feel sleepy in the evening; don't rouse yourself and go to work. You need rest then, and will pay for the trespass on your physical nature the next day if you disobey.

Useful Information.

Comparative Tests of Building Material.

The superiority of American steels and irons to similar grades of metals of foreign production has been often asserted; and it is now proposed to definitely settle the point, which is of the utmost importance in engineering, mechanics and agriculture, by a Government commission. The suggestion comes from the American Society of Civil Engineers, who deputed a Committee to wait on the House Committee on appropriations, on January 26th, to urge the passage of a bill now before the House, which provides that the President shall appoint a commission, consisting of a representative each, from the Engineer, Ordnance, and Navy corps, the Coast Survey and four civil engineers, to serve without pay, to institute and carry out such a system of tests upon American building materials, particularly iron and steel, as would result in the adoption of a standard of strength to govern future construction.

Similar experiments have been made in Europe, and data, for the guidance of architects and for the use of local boards in framing building regulations, have been obtained. Hitherto our scientific men and artificers have had to use these results; but we hope that improved practice, comprehending the well known facts as to the excellence of American metals, will result from the appointment of the proposed commission.

A WORD OF CAUTION.—Experiments by Galley show how dangerous it is to allow greasy refuse to lie, even in small quantities, in warm places. He found that such waste dipped in boiled linseed oil, and wrung out, required, at a temperature of 170 degrees only 105 minutes at the most to take fire, and that the bulk need not be very great as a match-box full at 167 degrees took fire in one hour. With raw linseed oil it required 4 to 5 hours; with rape oil at 170 degrees over 6 hours; with castor oil at 185 degrees, over a day; with olive oil 1½ hours; and with sperm oil it would not take fire at all. The heavy coal and petroleum oils were found to retard oxidation by excluding the air. Silk waste did not take fire, but gun-powder placed in it was fired in an hour; and in cotton under similar circumstances only after 1½ hours.

Manufacture of Oatmeal.

After the outside hull and the stratum of down covering the kernel are removed, the clean grain is ground into meal; and being deprived of its tough outer covering, care must be taken lest it be reduced to powder.

The first and most expensive apparatus required is the kiln for drying or expelling the moisture from the grain until the kernel is hard and the hull stiff and rigid. The ordinary kiln is built of brick or stone, and so arranged as to distribute the heat equally under and around the drying floor. This floor consists of sheet-iron or cast-iron plates thickly perforated with funnel-shaped holes, the wide end downwards, thus allowing the heat and smoke to pass up, and preventing the oats and dust from passing or choking the holes. The roof is constructed like an inverted hopper, with a square opening at the top for ventilation, and surmounted by a cupola with latticed sides. The oats, which are spread upon the kiln floor, are constantly stirred, to dissipate the moisture and prevent the lower strata from being scorched, until the batch is sufficiently dried. In this way, from 150 to 600 bushels per day are kiln dried, according to the capacity of the kiln.

Another style of kiln is also in use. This consists of two or more perforated sheet-iron cylinders placed in the furnace one above the other, and so inclined that the oats gradually move from the higher to the lower end. The oats, after passing through the upper cylinder, are deposited into the upper end of the second, and from the lower end of the second into the upper end of the third, and so on, the number of cylinders, their length and velocity being governed by the capacity required. This is, undoubtedly, much superior to the old style of kiln, as it has a regular feed and dries the oats much more evenly and thoroughly. After the oats become cool, they are ready for shelling.

The stones best adapted for shelling are a coarse free sand-stone. The bed-stone is faced perfectly true, but the runner has a bosom of about three-sixteenths of an inch around the eye and running back to nothing at about two-thirds of its diameter. The outer stone is dressed to a true face, corresponding to the bed-stone. The faces are picked or roughened as for ordinary grinding, but have no furrows. The runner is set upon a stiff ryne, keyed to the spindle. The ryne has three or four arms which are let into open grains cut into the stone. The faces of the stone are not allowed to run very close to each other, being about a kernel's length apart. The dister and fan for removing the hulls and dust are simple and easily constructed. The grinding is sometimes done on the hulling stones, but it is generally advisable to use much smaller stones, furrowed, and having a smoother and much less grinding surface.

The apparatus for bolting and sifting is very simple in construction, being a series of inclined sieves placed one above the other. These sieves are usually made of tin or zinc, into which are punched round holes of suitable size and sufficiently far apart to allow the hulls to slide over. The meal passes through these sieves, while the bran passes over it at the lower end of each.

THE PRESENT TIMBER SUPPLY FOR EUROPE, and possibly, in the not very remote future, for the Atlantic States of America, comes, and will come, from Russia and Finland. Large quantities are obtained from Sweden and Norway, which contain extensive tracts of forest land; but the principal resource must be from the extensive forests of Russia, from which timber is now imported by Great Britain alone to the amount of several millions of pounds sterling annually. From Russia also ultimately will come the European supplies of furniture and wooden ware. The Russian market will be for many years to come an increasing one for all sorts of wood-working machinery. American manufacturers who have the eagacity to cultivate this market, and the enterprise to be among the first that enter it, can scarcely fail to build up a large and profitable trade in wood-working machinery.

A BEAUTIFUL ART.—The Japanese make a beautiful hrouze—five parts of tin, ten parts lead, and 100 parts copper—which is cast in thin sheets, upon which beautiful designs in silver is incrustated in the following manner: The plates are covered with a varnish upon which the designs are graved with a style, the plates are then plunged into a snitably prepared bath to receive a deposit of silver upon the graved lines. When a sufficient deposit has been formed on the parts from which the varnish has been scratched, the plates are placed in a muffle furnace, in which the bronze turns black and the silver remains white and brilliant, showing up beautifully by the contrast.

IMITATION OF MARBLE THAT CAN BE POLISHED.—An elegant imitation of marble is made in Dresden for architectural purposes, by impregnating sandstone with silicic acid and alumina. In Naundorf, such stones are prepared which are intensely white, transparent, and capable of taking a polish. By the introduction of suitable pigments in the impregnating mass any desired color is produced. It is stated that the cost is much less than real marble, while it resists heat better.

STEEL-BRONZE GUNS.—We hear from Vienna that considerable sensation has been produced in military circles by some brilliant trials of new Austrian guns in steel and bronze. They have proved superior to Krupp's cast-steel guns.

Domestic Economy.

How to Prepare Feathers for Use.

Make bags of coarse unbleached cloth—one to contain the geese and ducks' feathers, and the other for chickens' and turkeys' feathers. When plucking the poultry, cut off the wings first; and if not needed for dusters, strip off the feathers from the parts nearest the body, and then peel off the feathery part from the quill, but take care that no skin or flesh adheres to any of the feathers. Put the bags into a brick oven, if you are the fortunate possessor of one, and keep them there, excepting when the oven is used for baking purposes—taking them out into the wind occasionally, and beating them with a stick. When you have collected enough to fill a pillow, cut the shape you desire out of bed-ticking, and stitch it round on the wrong side with coarse, well-waxed thread, leaving a small space at the top to put in the feathers. Now lay it on a table, and run it over on the wrong side with a piece of beeswax, just warmed a little, so that it will besmear the ticking. If you cannot obtain the beeswax, common yellow soap will do as well.

If you do not wish to use the feathers either for pillows or sofa cushions, they can be put into beds that have become a little empty. The geese and duck feathers make the best beds, but the mixed feathers will do well for cushions. If any of the skin or flesh adheres to the feather, they will have a putrid odor, which may seem to be an unmountable objection to their use; but if, after a family wash is finished, the bag, tied up closely at the neck, is put into the boiler of soap and boiled a few moments, moving it about with the clothes stick, and lifting it up and down and squeezing it out a few times, and is then taken out and hung in the air, and shaken hard, for several days, when the feathers become dry they will be light and free from any bad smell; and they can now be put into the oven, and thus kept from moths and be always ready for use.—*Country Gentleman.*

FRENCH CREAM CAKE.—Beat three eggs and one cup of sugar together thoroughly; add two tablespoonfuls of cold water; stir a teaspoonful of baking powder into a cup and a half of flour; sift the flour in, stirring all the time in one direction. Bake in two thin cakes, split the cakes while hot, and fill with prepared cream in the following manner: To a pint of new milk, add two tablespoonfuls of corn-starch, one beaten egg, one-half cup of sugar; stir while cooking, and when hot put in a piece of butter the size of an egg; flavor the cream slightly with lemon, vanilla or pineapple.

HOW TO USE CHLORIDE OF LIME.—Eckstein, a technical chemist of Vienna, after comparative tests with the other disinfecting agents, recommends chloride of lime as decidedly the best for water closets, cesspools, etc., and attributes its efficacy and its rapid action in decomposing hydrogen compounds, such as ammoniacal sulphuretted hydrogen, etc. He regards as the chief objection to its general use, its unpleasant effect on the organs of respiration, and states that this can be remedied, and its action regulated, by enveloping it in a bag of parchment paper, which acts osmotically, and is decomposed slowly by it.

WHY BROWN OR RAW SUGARS ARE NOT GOOD FOR PRESERVING FRUIT.—Raw or brown sugars generally contain a certain proportion of glucose, a fermentable non-crystallisable sugar, which is a source of great trouble in fruit preserving. Sugar to be used for this purpose should be in crystals, as that form precludes the possibility of any impurity being present. Loaf-sugar may be used with advantage, as being free from the impurities mentioned, and not liable to ferment.

DOON-MATS.—Mats should be laid outside of all doors, to stop the currents of cold air that come from under them; and they should fit the doors exactly, for if they do not they are rather more ornamental than useful. The large, square mats are now seldom used, excepting in houses where large and handsome doors demand them; but the narrow mats, only twelve or eighteen inches in width, look best in limited space, and serve the requisite purpose.

ORANGES, BANANAS AND COCOANUTS.—Cut oranges through the sections into handsome slices. Place a layer in a high glass dish. Sprinkle the orange with fine sugar, and a layer of grated cocoanut; lay thin slices of banana on this, sprinkle cocoanut, then another layer of orange, sugar, cocoanut and banana until the dish is full. Place on ice for an hour before serving. From "Choice Receipts."

FURNITURE POLISH.—An excellent furniture polish is made of ten cents worth of beeswax placed in a tin cup and melted in a hot oven. Into this pour two ounces of turpentine and let it stand to cool. Apply it briskly to the furniture with a woolen rag, and give it a finishing rub with an old silk handkerchief. This polish is almost equal to a coat of varnish.

TO PRESERVE BUTTER.—Take two parts of the best common salt, one part of loaf sugar and one of saltpetre; beat them well together. To sixteen ounces of butter thoroughly cleansed from the milk, put one ounce of this composition; work it well, and put it down in earthenware jars when cold and firm. It should be kept from the air and not used for a month.

MINING SCIENTIFIC PRESS

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San Francisco:

Saturday Morning, March 6, 1875

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THE Virginia Enterprise states that prospect-
ing is wonderfully active at present in all direc-
tions about the city, notwithstanding the depth
of snow still remaining on the ground, and the
somewhat unsettled state of the weather. When
spring comes the hills will be alive with men,
and the clank of machinery and the scream of
steam whistles will be heard in many wild
places.

BETHESDA mineral water from Wankesha,
Wisconsin, is much used in this State. This
water, from nature's laboratories, is clear,
sparkling, and pleasant to the taste. It is
claimed to possess wonderful curative prop-
erties, and for kidney disease is a specific. For
persons who indulge in viuous and alcoholic
stimulants, the water is an invigorating drink.
It acts as a mild cathartic, which makes it in-
valuable to many persons. The agents, whose
card appears in our advertising columns, show
many testimonials to the virtue of Bethesda
water.

THE Petaluma Argus says a rich lode of
quicksilver has been discovered on the ranch
of A. P. Whitney, on the South Eel river. Nu-
merous prospectors have visited the place in
the last few days, and the ledge has been lo-
cated for nine miles in length.

THE new air shaft on the Belcher mine is
down to the 800-ft. level, and its good effects
are already being felt throughout the entire mine.
It is being thoroughly timbered, preparatory
to continuing it on down to connect with the
lower levels of the mine.

THE new or Talbot coal mines, near Seattle,
are now going forward in development. The
tunnel is now 420 feet long and still extending
day and night. There are 12 feet of coal in the
seam, with a half inch of shale or slate in the
center.

THOMAS LYONS, late Superintendent of the
Sapphire and Devil's Gate mill, has been ap-
pointed Superintendent of the Woodworth
mill, on the Carson river.

JOHN P. SHEAR has sold his interest—one-
half—in the Veith & Shear hydraulic claim on
Tunnel Ridge, Calaveras county, to his former
partner, for \$2,500.

MR. SKIDMORE tells us that while at Gold
Run the other day, the Indiana Hill cement
company washed out \$126 from one bucket full
of dirt.

Japanese Wrecks.

At the last meeting of the California Academy of Sciences, Charles Wolcott Brooks read a paper giving an account of the Japanese wrecks picked up adrift on the North Pacific, and stranded upon the different outlying islands and shores of our northwest coast, and the chain of islands extending from Hawaii toward Nippon. The paper itself was simply a record of 41 junks which had been picked up adrift or stranded from 1782 to the present time, but Mr. Brooks' conclusions were of scientific interest. His sources of knowledge are exceptionally good, as he has represented the Japanese Government in this city for 17 years, and has paid great interest to the subject. He is investigating the question of the origin of the Japanese.

Before reading his paper Mr. Brooks explained that every junk found adrift or stranded on the coast of North America or the Hawaiian Islands, has on examination proved to be Japanese, and no single instance of any Chinese vessel has ever been reported. He explains this by the existence of the "Kuro Siwa," or "Kuro Sibo" (literally black stream), a gulf stream of warm water which sweeps around past Japan toward the north and then curving around passes south along the coast of California, a branch or eddy of which strikes off toward the Hawaiian Islands. This stream corresponds somewhat to the Gulf stream of the Atlantic. It is found that this stream has swept these junks toward America at an average rate of ten miles per day. There also exists an ocean stream of cold water emerging from the Arctic ocean, which sets south close along the Asiatic coast, fully accounting for the absence of disabled Chinese junks in the Pacific, as vessels off these coasts would naturally drift southward.

About the year 1630 the Japanese Government ordered all junks to be built with open sterns, and large square rudders, unfit for ocean navigation, hoping thereby to keep their people isolated within their own islands. When forced out to sea, these rudders are soon washed away, when the vessels naturally fall off into the trough of the sea, and roll their masts out. The number which have thus suffered of which no record exists, must be very large. A noticeable feature in the list given by Mr. Brooks, is that a large number of the disasters on the coast of Japan occurred in the month of January, during which season the northeast monsoons blow the wrecks directly off shore into the Kuro Siwa.

Mr. Brooks, who, as already remarked, has studied the question thoroughly, drew some interesting conclusions from these records, showing that among the coast tribes of our northwest coast, a constant but limited infusion of Japanese blood has occurred, coming entirely from male Japanese seamen; no single record of any female exists. These unfortunate men, often illiterate, and separated from their sources of learning, necessarily lost their own language, but in doing so, doubtless contributed many insulated words to the Indian dialects of this coast; as for example, the Japanese word for quick is *hiako*, and Chenook word for speed is *hyack*. The Chenook word is always an abbreviated word, or shorter word than the Japanese, from which he argued, that the latter was the original and the former derived. The construction of the two languages is, however, different.

In giving the list of wrecks Mr. Brooks mentions a singular circumstance. He says that in 1782 a Japanese junk was wrecked upon the Aleutian islands, from which the survivors were taken in one of the Russian-American company's vessels to the town of Oobotsk, and thence to the inland city of Irkutsk. In 1792 the Governor-General of Siberia ordered the transport "Catherine," then at Oobotsk, to return these men to their native country. The Russian vessel, after wintering in a harbor at the north end of Yesso, proceeded to the port of Hakodate, where the Japanese officials politely but firmly refused to allow their countrymen to land. They were subsequently returned to Siberia again.

In 1833 a Japanese junk was wrecked on the coast of Washington Territory, between Point Grenville and Cape Flattery. Many of her crew had perished, and several dead bodies were found headed up in firkins, in the customary Japanese style, ready for burial. The only survivors, two men and a boy, were rescued from the Indians by the Hudson Bay company's vessel "Lama." Captain McNeal, who took them to England, touching at Honolulu on their way. Thence they proceeded to Canton, where they arrived in 1836, and stopped with Mr. Gutzlaff, who learned their language, and intended accompanying them to Japan. In 1837 they left Macao in the American ship "Morrison," dispatched by Clarence A. King for Yeddo bay, to bear them home. Being fired upon, and prevented from landing, she sailed for Kagosima, where, being equally unsuccessful, she finally returned with the men to Macao. In both instances the Japanese refused to receive their shipwrecked countrymen because they had been in foreign countries and might have learned something detrimental to what were thought to be the best interests of the people. Happily, Japan, is now more enlightened.

Results of Concentration of Ores.

A gentleman well known in mining circles has given us the following statement of the first run of the new concentrating works of Cazin & Fischer, in Denver, Colorado. The method of concentration is known as Cazin's one plunger jig system.

The ore operated on was twelve tons of tellurium, mixed with iron pyrites, from Gold Hill, (Col.), assaying before concentration as follows: Silver, \$14.70 (eleven and three-tenths ounces); gold, \$13.40 (two and one-tenth ounces); total coin value per ton, \$58.10. The assay after concentration gave as follows: Silver, \$117.91 (ninety-one and two-tenths ounces); gold, \$262.50 (twelve and seven-tenths ounces). Total coin value per ton, \$380.40; increase in value by concentration, \$322.31. The tailings assayed three and one hundred and eighty-seven one-thousandths ounces in silver, and one hundred and twenty one-thousandths ounces in gold; value, \$6.27 per ton.

The concentrated material could not be weighed correctly for this lot, being the first fill up of the batteries, jigs, etc. It will be seen by the concentration that about 8 1/4 tons have been concentrated into one. It will also be seen that the concentration of gold is not in the same ratio as that of the silver, the latter increase being 11.3 to 91.2, or 8.3-10 times. If the gold had increased in the same proportion they should have had 16.6 ounces instead of 12.7. It is supposed that the gold will be found in the jigs, sieves, etc., where it would probably remain on account of its great specific gravity.

Looking at this from a metallurgical point of view anyone will at once see the value of concentration. Few smelters would pay anything for ore assaying 11 ounces of silver and two ounces of gold. After concentration the smelter would pay about \$290. The cost of concentrating is about \$3 per ton or \$24 for the eight tons, leaving a balance to the miner of \$266, or \$33 per ton.

The process not only increases the amount of gold and silver but its value also. Ores assaying 50 ounces are worth about 45 cents per ounce when a 400 ounce ore is worth \$1.04 per ounce. Concentration is based on the difference of specific gravity between the metal and the gangue. The greater this difference the more easy the separation. The ore referred to above was operated on had a specific gravity of 2.7 for gangue and 4.5 for the pyrites, while a lead ore would have stood gangue 2.7, galena, 7.75. The samples assayed were taken, not when the concentrator was working at the most favored moment, but from the general average at its normal working condition. It will be remembered that we described Cazin's one plunger jig system a few months ago, and the process is probably familiar to those interested in the concentration of ores. The gentleman who furnished the above facts was staying in Denver at the time the works started and being interested in the subject paid it close attention. He is in no way or shape interested in the works mentioned.

Academy of Sciences.

A regular meeting of the California Academy of Sciences was held on Monday evening last, R. E. C. Stearns in the chair. The donations to the museum were as follows: Nine bone hawks, from an Indian mound twenty-five feet deep and covering two acres of ground, in Visitation valley, South San Francisco; also specimens of bog iron from Queen Charlotte's Island; bog coal from Oak Vale, near Victoria, and Indian stone pistols from Visitation valley—all from James Deane. Species of the ostra, much larger than the ostra or the *O. Tayloriana* of Whitney, from Mrs. John Torrence, at San Marguerite Island, near Paso Robles, San Luis Obispo county. Specimens of petrification, from James Green of Monterey county. Mandarin duck, sent by Professor Davidson from Yokahama. A lot of specimen minerals from E. O. McDevitt, of Brisbane, Australia.

The Secretary read a paper by S. P. Christy, entitled "Notes on a Meteor seen at Berkeley, December 9th, 1874."

The publication Committee recommended the reading of a paper, by E. B. Kirk, "On Changes of Life in North America," which was published in one of the magazines.

Charles Wolcott Brooks read a paper giving a record of the wrecks of Japanese junks, which is referred to in another column.

The death of Sir Charles Lyell was announced to the Academy, and a committee appointed to make fitting allusion to his death.

Mr. J. W. Taylor, formerly of the State Cabinet of Natural History and Geology, will shortly deliver a course of four lectures on Geology and Natural History, in the hall of the Academy. The lectures are independent of the Academy of Sciences, and \$2 will be charged for the course.

The main north drift on the 1500-ft. level of the California mine extending through to the Ophir, is being enlarged to 10 ft. in height by 6 1/2 ft. in width, forming a magnificent air gallery, extending from the Consolidated Virginia to the Ophir. The advantages of such an opening between two mines at such a depth is almost incalculable, and will amply repay the amount expended in its construction.

Among the Foundries and Machine Shops.

The activity in the foundries and machine shops, to which we referred two weeks since continues. A number of new contracts have been made by different firms since our last report.

The Fulton Iron Works

Are engaged in constructing twin propeller engines 14x12 for a lumber schooner now being built to the order of Messrs. A. Duncan & Co. An engine 14x18 and mill machinery complete for a saw mill at Eel river is also being built here for the Springfield Mill Co. This firm in addition to the above are building two large condensers for the New Almaden mines, and are just completing the iron work on an \$80,000 contract for Flood & O'Brien's new iron building on Montgomery corner of Pine street. A contract has also just been awarded the Fulton works for the construction of two engines 20x22 in. bore each, two 74 in. boilers and all the requisite machinery for a new steamer to ply between this city and Humboldt bay.

Pacific Iron Works.

At these works is being constructed a hoisting engine and apparatus for the new shaft of the Consolidated Virginia and California mines. The engine will be 26x72 in. and will be from two to three months in the process of building.

The Golden State Foundry

Messrs. Palmer, Knox & Co., proprietors of the Golden Gate foundry, have just finished a very complete five-stamp battery to be used in a Mexican mine. It will be sent by steamer to Mazatlan, and then packed inland on mules; its weight is but little over 800 pounds.

The firm is also engaged in filling a large contract for 2,600 ft. of 6 in. tubing for air compressor at the Imperial silver mine, Gold Hill, Nevada.

A New Foundry.

Messrs. McCormick & Lewis are actively engaged in the construction of a new foundry on Beale street just below Folsom. It is to be a frame building, at present one story high, and fronting sixty feet on Beale street. The firm contemplates the prosecution of a general foundry business, with, however, principal reference to architectural castings. They expect to have their building completed and their work in operation in about thirty days. The senior member of the firm, Mr. McCormick, has long been a partner in the Vallejo foundry. Mr. Lewis was formerly with the City iron works.

Taxing Mines.

At a most every session of Congress, some enterprising gentleman raises the question of the taxation of mines, or has a scheme for working the mines to pay off the National debt. Considering how very little attention our legislators pay to the mining interests generally, this is somewhat singular. It serves, however, to bring some one into temporary prominence, and give them a chance to air their eloquence. Of course it is only those who are entirely ignorant of mining matters who broach these questions; people who hear about and believe stories about rock assaying \$5,000 per ton and a hundred thousand tons in sight in a single mine. The latest instance of this sort occurred this week at Washington. Mr. Alcorn, of the Committee on Mines and Mining, offered an amendment to tax all corporations working gold and silver, five per cent. on all products over \$100,000 per annum. After considerable discussion the amendment was defeated by a large majority.

We must confess that we do not know anything much of Mr. Alcorn; his name expresses familiarity with agricultural, rather than mineral products; but we are glad to know that his project was defeated. He very probably like many other men, based his ideas of the profits of mining matters on the recent occurrences on the Comstock, imagining that bonanzas of greater or smaller degree, were common occurrences. He thought that since miners were making money out of the ground they were getting more than they ought to reasonably for their labor. It is, in fact, very seldom that miners now-a-days make any great fortunes without hard work for it. Speculator in mining stocks sometimes do this, but the ore not miners, nor do they usually get their riches from the mines. It seems strange that after so many years so little is known by the public generally about mining affairs. The entertain extravagant ideas about profits at cost of work, and no doubt there are plenty of people who really think the miners should pay the National debt, and believe they could do it.

THE Black Hills.—Considerable interest is still manifested in the Black Hills region, and it is probable that before many years that county will be thoroughly preoccupied. Special dispatches from Sioux city say: There is a great excitement in that vicinity at Dakota over reports brought by two returned Black Hills miners, both of whom are well known and reliable men. They represent the gold is plentiful, and that the miners now in those hills have had no trouble with the Indians, and have wintered comfortably. A immense emigration to the hills is expected this spring.

Recent Patents.

Among the Pacific coast patents recently obtained through Dewey & Co's Mining and Scientific Press American and Foreign Patent Agency, the following are worthy of mention:

GANO PLOW.—Howes, Dorr and Webster, Stockton. This invention is claimed to be an improvement on that class of gang plows in which a series of two or more plows are secured to a diagonal timber, which timber forms part of the plow frame. The plows are fastened to a diagonal timber which is strengthened by three parallel beams connected at the other end by a transverse beam. Each plow standard is cast with two arms to which a horizontal flange is secured, the standard being secured to the timber by screws. By this means the plows are easily removable. A draft attachment is provided by employing a bar where opposite ends are bent upwards and fitted in grooves or slides on the inner sides of the beams. These ends are secured at the desired point by a screw moving in a slot. The frame is mounted on castor wheels which can be adjusted up or down so as to raise or lower the plows, and a handle at the end enables the driver to shift the frame. Thus an adjustable draft attachment is provided to raise or lower the point of the plows and regulating the width of the furrow.

IMPROVED RIDDLE FOR SEPARATORS.—Nathan M. Brown, Pescadero, San Mateo county, California. This device relates to improvements in that class of riddles for separators in which one or more middle sections are hinged together and mounted inside the separator frame. The riddle is constructed in two or more sections, each of which is fitted inside of the separator frame. Across this frame are stretched parallel wires, one end of which are fastened to the under side of the frame, while the others are fastened to the upper side. The sections are connected by means of hinges, so that the end of one screen will be below the other; thus connected they are secured inside the frame by link hangers at one end, while the other is supported by a rod. A shaft, provided with arms, to each end of which is attached a crank wheel, supports the rear end of the riddle, by which means a slight inclination is provided, and a blast of wind is secured the whole length of the boxes.

MACHINE FOR TURNING GLOBULAR FORMS.—Andrew J. Kane, San Francisco. This is a machine intended more especially for turning soap balls, but which can also be used for turning globular forms in other substances. In operating, the crude material is placed upon a table directly under a ring which stands vertically and is controlled at pleasure, into which the material is forced. The ring is then turned to a horizontal position and the material is brought in contact with a machine concave in form, which cuts it into a hemispherical form. The ring is then rotated, the machine set in motion and the material shaped upon the table in a globular form.

IMPROVED SUSPENSION BUCKLE.—Edwin J. Fraser, San Francisco. This device is intended as an improvement in buckles now in use for fastening stockings or other suspenders. The buckle is constructed of a narrow strip of plate metal with an end bent so as to form a hook; to the other end is secured a wire ring through which passes an elastic band. Around the body of the plate is secured a flat, sliding hand, and to the lower edge of which is secured a bent lip, which passes over the edge of the hook, and when pushed down beside the fabric so that it can only be released at the pleasure of the wearer.

IMPROVED WATER METER.—Nathaniel W. Knowlton, Nevada City, California. This is a simple but ingenious device for measuring the flow of water through the pipes. It is operated automatically, and by means of two cylinders, one working within the other. A valve is operated which opens and closes subject to the discharge of the water. The smaller cylinder, which raises and lowers, forcing open the valve, strikes an arm in its movements, to which a register is attached, which measures the amount of water flowing through the pipes.

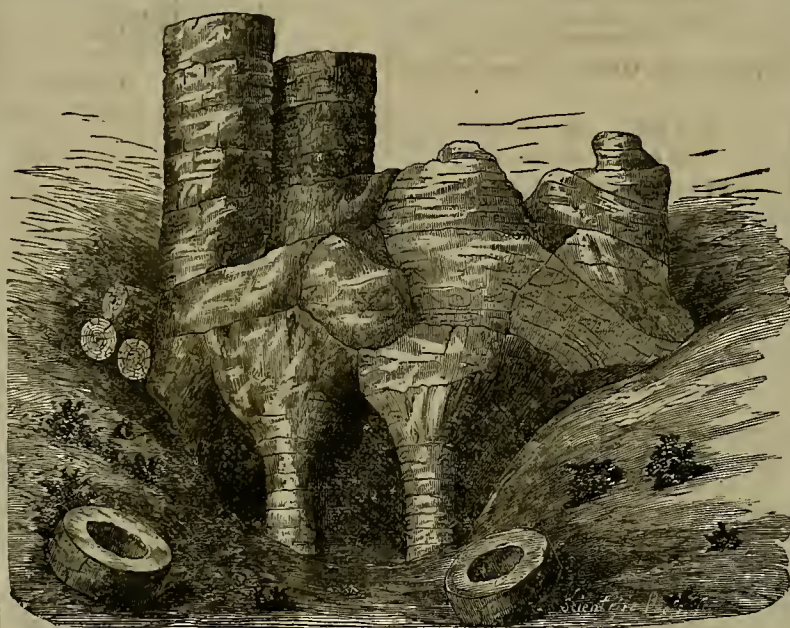
IMPROVED RIFLE SIGHT.—Thomas Dunstone, Santa Cruz, California. This invention relates to an improvement in the front sights for rifles, by means of which one or two different kinds of sights are easily and quickly substituted for the other. These sights are mounted upon a sleeve fitted to turn upon the barrel so that either sight can be brought to the top of the barrel, and there secured by a set screw after being properly adjusted by a gauge or mark. The rotating sleeve is so arranged as to be set back in case a bayonet is used upon the rifle.

DRILL.—George Atkinson, San Francisco. This is an improved churn drill for perforating rocks, and consists in a novel method of operating and rotating the drill and the construction of the frame, so that it and the machinery connected therewith can be easily taken apart. The drill may be worked vertically or at an angle, and by an ingenious arrangement of grinding arm, cam and ratchet, while the drill is allowed to fall by its own weight, or if that is insufficient for the purpose required, provision is made for adding a spring or other weight.

The Santa Cruz "Ruins."

About six miles east of Santa Cruz, and well up into the mountains, there are found some very singular samples of weather-worn sandstone, which from their remarkable resemblance to architectural remains have been designated as "The Santa Cruz Ruins," or the "Ruined City." The illustration given herewith presents a very correct representation of them as they appear when two or three feet of the surface sand is removed from the front. The "ruins" are found on a steep hillside of loose sand, almost entirely destitute of vegetation. The distance from the lowest portion of the pillars which support the arches, as shown, to the top of the highest column on the left is about twelve feet. A person can readily place himself in the opening behind the columns, but farther progress is cut off by the sand which has fallen down and appears to envelop other pillars beyond. The pillars are made up of concentric layers of stone, easily separated, and which are perforated through the center as shown in the two pieces which have fallen down. When first brought to the attention of travelers some twenty-five years ago, there were columns of concentric layers upon the right hand side, similar to those upon the left, but being less firm in position they have been thrown down and mostly carried off by curiosity hunters.

There is no doubt but that other deposits, or



THE "RUINS" NEAR SANTA CRUZ, CAL.

concretions, exist in other positions, further up the hill, but now buried in the loose sand, as detached pieces are met with at an elevation of many feet above the locality shown, which, of course, must have come from still further above.

Many persons have supposed that these are genuine architectural ruins, and an effort was made some five or six years ago to remove the sand from around them so as to lay open to view the base of the supposed pillars; but the sand flowed in about as fast as it could be removed, and the attempt was given up. These singular rocks are, no doubt, the remains of an ancient spring whose waters contained ferruginous or other solutions, which have served to so indurate the sandstone in immediate contact with the water flow, so as to admit of its withstanding the disintegrating action of the elements, which has gradually worn away the surrounding rock, and converted it into a loose sand. By such action a pile of rocks would naturally be left standing just as shown, to be gradually broken down and worn away, as are other rocks of not very firm cohesion. The country rock is chiefly sandstone, interstratified here and there with slates.

A small stream of water flows along, some three hundred feet in front and sixty or seventy feet below the spot shown; while a much larger one skirts the opposite side of the hill, into which the smaller one empties, a short distance to the west of the base of the hill. The action of these two streams, aided by the winter rains, is gradually washing away the sand hill, and will in time, no doubt, completely unearth all that remains of these singular concretions.

Several very inaccurate views of these "ruins" have been given, one of which appeared in Frank Leslie's paper of June, 1858, which represent a stream of water as issuing out from beneath the arches shown in our illustration, while as a matter of fact the stream is several hundred feet distant, and nearly a hundred feet below; otherwise that illustration was quite correct. The illustration given in the California Geological Reports is quite as far from a genuine representation as it is from the one given herewith. In fact, we believe this is the only correct representation of this singular locality which has ever been presented to the public. Those who have visited it will at once recognize its correctness. The "ruins" are located upon the ranch of Mr. D. M. Locke, the husband.

Origin of California Land Shells.

The following paper was read by Dr. J. G. Cooper, formerly of the State Geological Survey, at a recent meeting of the California Academy of Sciences:

In previous articles I have given some observations on the Distribution and Variations of the California Banded Land Shells, which naturally lead to the consideration of their probable origin or past history.

In the "Bulletin of the Museum of Comparative Zoology, Cambridge, Massachusetts, June 1873," p. 202, Mr. W. G. Binney writes: "The West alone is left to us from whence to trace the pulmonate Fauna of the Pacific region, and there the secret of its origin lies buried under the Pacific ocean."

Mr. Binney probably alluded to the supposed existence of an oceanic continent in the South Pacific, embracing the mountain summits now forming the archipelago of Oceania, which became submerged, as Professor Dana suggests, during the latter tertiary period, while most of California was emerging from the ocean.

When California Rose from the Sea.

But even if this were proved to have happened; the great distance of the nearest islands (the Hawaiian) from us, and the great depth of the ocean between, as well as north of them, besides the total dissimilarity of their living land shells from ours, forbids any supposition of a former land connection by which such animals could travel directly from one country to

present North Pole, the subsequent gradual cooling of those regions, which is supposed to have driven the living species of redwoods southward to California and Japan, as well as other trees into Europe, would, if a slow change of climate, also drive southward the land mollusks, "at a snail's pace" into the same regions, where we now find their descendants occupying countries which are about equidistant in longitude around the Northern Hemisphere, in latitude 40 deg. and 50 deg.

We have strong confirmation of this theory in the well known distribution of circum-polar species of land shells southward, on both continents along meridians of similar temperatures and along mountain ranges; (especially those running southward as in America), and which are supposed to have thus migrated south during the "Glacial epoch."

Tertiary Remains of Animals.

Besides these two groups, the "circum-polar" and the "representative" species, we also have on the west slope a very few of the Eastern American type. I do not, however, consider these as evidence of migration westward, but would explain their occurrence as proving a former existence of ancestors common to both in the middle regions of Oregon and Nebraska, where are found so many tertiary remains of animals that once inhabited both regions before the Rocky mountains became a barrier to migration or caused different climates. The few fossil land shells yet found in California are not sufficiently abundant or ancient to furnish data for their geological history. The freshwater forms, however, indicate a very different and more tropical group in the Pliocene and Miocene strata, which I hope at some future time to describe and illustrate. The occurrence of pupa and cornulus in the carboniferous strata of Nova Scotia shows that land shells existed long before the Eocene period. The great northern glacial period, and local glaciers further south, have so generally destroyed the softer tertiary deposits, that it must be long before the traces of a migration can be traced from Greenland southward, but as tertiary land plants are found there fossil, some similar deposits must have escaped elsewhere. There can be no doubt that the local migration has been westward along this coast, from the facts before stated as to the occurrence of species in the coast ranges and islands, which are unquestionably Miocene and Pliocene in age, while their allies in the Sierra Nevada may have existed there since the Eocene, but at a greater elevation than they are now found. As they move westward, we also find the few older forms developing into many "specialized" varieties. Species much like the living ones of California may be expected to occur in the Pliocene of British Columbia. Going south of California we find further confirmation of the theory of southern migration, in Mexico, where species closely resembling the *Pomatia* of Europe occur on the higher mountains, which, unless special creations, could only have reached the two regions by a process like that which I have described. The genera *Bulinus*, *Glaudiata* and *Clavusilia* may also have traversed a similar route, though their absence in

The Tertiary Strata of the Eastern States

Seems to be evidence to the contrary. They may, however, be found in the territory of the "Great Basin," which is known to contain fossils of some other genera now found only south of the United States (*Berendtia* and *Holospira*). Indications, however, are known which point to a connection of tropical regions by land in tertiary times, independent of a polar route. The supposed "Atlantis" connecting South America with Africa would also have connected it eastwardly with Asia and Oceania.

The Humble and Despised Snail

Thus become among the most important evidences of geological changes and conditions of the land, climate, etc., in the past history of the globe. Being terrestrial and easily preserved, when of moderate thickness, they furnish evidence not supplied by any other class of fossils, while their persistency of types is shown by the close resemblance of the carboniferous species to modern tropical forms. One species at least is found only fossil in England (in Pliocene or later strata) which still lives in the Eastern States, like the trees found under similar conditions, and careful examination of fossil forms on both continents will no doubt show other curious coincidences. It may be mentioned, also, that genera, of abundant occurrence in the Eastern States, have as few representatives in Europe and Asia as they have on this coast. Every fact like this tends to prove that their former migrations have not been to the east or west, but from a common northern center toward the south.

PARTIES just from Galice Creek, Oregon, says the Jacksonville Times, express the opinion that the ledge lately discovered by D. Courtney is likely to prove richer than the other quartz mines found. It is a few miles distant from the scene of the other discoveries and about 100 feet in width.

A POCKET of rich decomposed quartz has lately been found by some Portuguese over on Rush creek, Nevada county. From the same ledge a colored man took out \$12,000 several years ago. So it goes; abandoned but not played out.

MINING operations in Baker county will be conducted on a larger scale this year than ever before, and the prospects are that the results will be very gratifying to miners and advantageous to that part of Oregon.

Where the Redwoods Came From.

It is easy then to see, that having their central position (if not origin) in points so near the

Miscellaneous Notices.

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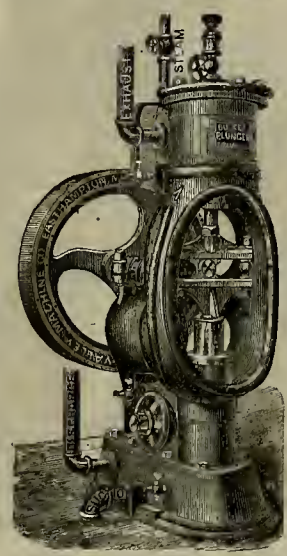
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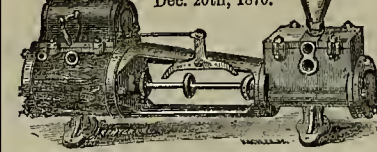
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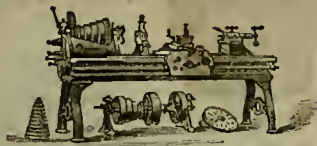
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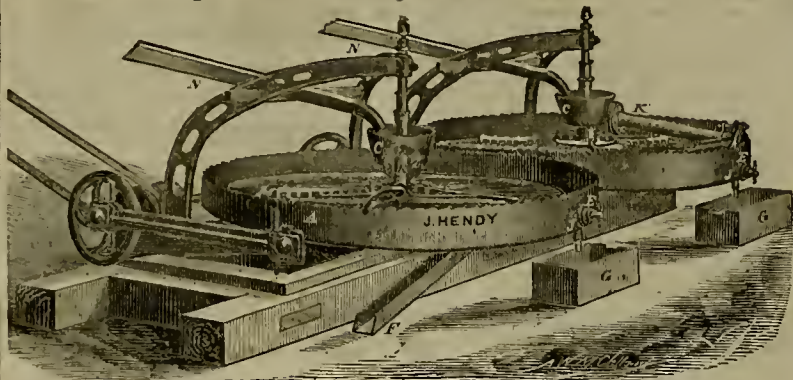
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Has decided merits. Its Beauty, Compactness, Strength, Durability, Economy in Fuel, Ease in Handling, and Small Space required attract the Buyer, and the Price readily concludes the Sale.
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OVER \$3,500 PER MONTH SAVED
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Can be seen at the Manufactory, No. 32 Fremont Street, San Francisco.

SAN FRANCISCO, April 27, 1875.
 JOSHUA HENDY, Esq.—Dear Sir:—As a practical miner and millman, I take pleasure in recommending the use of your Concentrators in all mills where gold or silver ores are reduced. No mills should be without them, for the following reasons:
 1st. They are good sizers (no perfect concentration in pulverized ores can be effected without first sizing).
 2d. The best Concentrator I have ever known—(the concentrated stuff only containing 5 per cent. of sand).
 3d. They are good amalgamators, light (leathery) particles of amalgam and particles of coated gold by attrition are brightened, and from their specific gravity and the action of the pan, fall to the bottom and adhere.
 4th. They require but little power and attention to run them, and with ordinary care will last for years.
 I have been familiar with the workings of your Concentrators for four years past; have run them myself in the North Star Mine, Orass Valley; am familiar with their practical workings on the Empire Mine, Grass Valley; St. Patrick, Placer Co., St. Lawrence, El Dorado Co.; Oaks and Reese, Mariposa Co., and most cheerfully give you this testimonial. For further information you are at liberty to refer to,
 Yours respectfully,
 JAS. H. CROSSMAN, M. E.
 409 California street, or Cosmopolitan Hotel.

OFFICE SUPERINTENDENT OF KEYSTONE CON. M. CO., AMADOR, AMADOR COUNTY.
 MR. J. HENDY—Dear Sir:—In answer to your inquiries as to your Concentrators furnished our company last July, I would say that I am more than pleased with them, and the saving to the company has been over \$3,500 per month more than with the blankets and buddles formerly in use.
 O. C. HEWITT, Supt.

OFFICE SUMNER MINE, KERNVILLE, April 27, 1874.
 J. HENDY, Esq.—Dear Sir:—Having four of your Concentrators in use at our Mills for four or five months, which for saving Amalgam and for concentrating Sulphurets, are a success, beyond a doubt, I feel it a duty due you and those interested in Quartz Mills, to recommend them.
 As further evidence of their worth, I now order TWELVE more of your Machines for our new Mill, now in course of erection.
 E. R. BURKE, Superintendent.

For description send for Circular.

Office and Works, 32 Fremont street.

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3v28-1m-1f

Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

[PATENTED MAY 26TH, 1874.]
 Price Reduced to 16 Cents Per Pound.
 SAN FRANCISCO, November 10th, 1874.

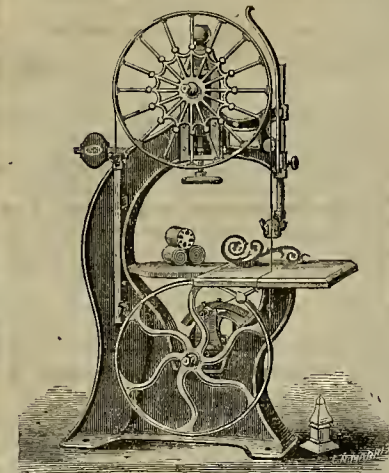
To Supts. of Quartz Mills and Mining Men generally:

We take pleasure in stating that owing to the rapid increase in our orders, our Pittsburg Manufacturers have been compelled to add largely to their works—a new gas furnace and heavier trip hammer—and are thus enabled to reduce the cost of steel and at the same time produce SHOES AND DIES superior to any yet manufactured. We have consequently reduced the price to 16 cents per pound and solicit a trial order, guaranteeing that you will find them at least 10 per cent cheaper than the best iron. There are no STEEL SHOES AND DIES made excepting under our patent and sold at this office, or by our authorized agents, though certain Eastern manufacturers advertise STEEL SHOES AND DIES which are only cast iron hardened by the addition of a composition. They will not out-wear two sets of common iron, though called steel. They are very brittle and are not capable of being tempered, flying from under the hammer like cast iron. Our STEEL SHOES AND DIES are in use in many of the largest mills on the Pacific Coast, and all who have tried them pronounce them cheaper and far superior to iron in every respect, even at the old price of 20 cents per pound. Their advantages over iron are cheapness on first cost, increased crushing capacity, time saved in changing and in setting tappets, increased value of amalgam by absence of iron dust and chippings, and a saving of 75 per cent. in freight. It takes 50 days to fill orders from the manufactory East. Price 16 cents per pound shipped at San Francisco. Terms liberal.

Address all orders, with dimensions, to

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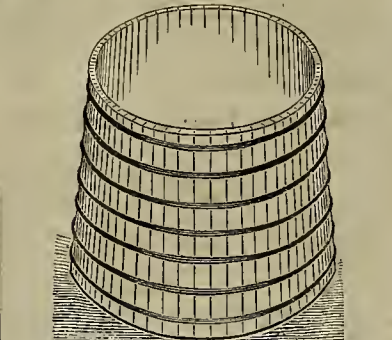


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WATER TANKS of any capacity, made entirely by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Cost less than elsewhere.

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Glasgow Iron and Metal Importing Co.

Have always on hand a large Stock of

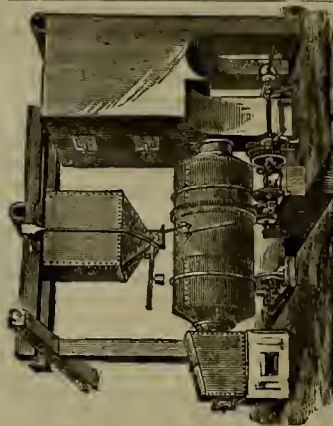
Bar and Bundle Iron, Sheet and Plate Iron, Boiler Flues, Gas and Water Pipe, Cast Steel, Plow and Shear Steel, Anvils, Cumberland Coal, Etc.

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Brittan, Holbrook & Co., Importers of
 Stores of Metals, Tinners' Goods, Tools and Machines;
 111 and 117 California St., 17 and 19 Davis St., San Francisco, and 178 J St., Sacramento.

Mining Machinery.



TEATS' PATENT FURNACE.

TEATS' PATENT FURNACE

For Roasting, Desulphurizing, Chloridizing and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces; controls them with ease; adding heat or air, stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ore, heating the water for amalgamation and the rollers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln," for drying ores direct from the mine or breaker, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to Mining and Scientific Press, No. 18, October 31, 1874. For particulars address

D. B. MILLER & CO.,

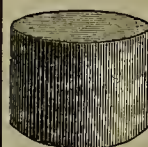
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 Circulars, etc., will be furnished, if required.
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FOR QUARTZ MILLS.

Made by our Improved process. After many years of patient research and experiment we have succeeded in producing STEEL SHOES AND DIES for QUARTZ MILLS,

which are unequalled for Strength, Durability, and Economy



Die. Shoe.

Will wear three times longer than any iron Shoes

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Of Quartz Mills, Pans, Separators, Concentrators, Jigs, Hydraulic Rock Breakers, Furnaces, Engines, Boilers and Shafting, and general Mining Machinery in all its details and furnish the Mining Supplies.

All orders promptly filled.

MOREY & SPERRY,

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Examination solicited.

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CROCKER'S PATENT

TRIP HAMMER QUARTZ BATTERY.



This machine, complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 2,000 blows per minute, in a mortar provided with screens on both sides, and crushes FINE 60 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$600.

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W. BREDEMEYER,

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Salt Lake, U. T.

Working Plans and Estimates for Mines and Improvements furnished; will superintend the establishment and working of Mines.

The Concentration of Ores a Specialty. Agent for the Humboldt Company, Manufacturers of Mining and Concentrating Machinery.

For Plans and Information apply at my Office, No. 12 Kimball Block. I am prepared to take contracts on Tunnels and the Sinking of shafts.

San Francisco Cordage Company.

Established 1856.

We have just added a large amount of new machinery of the latest and most improved kind, and are again prepared to fill orders for Rope of any special length and size. Constantly on hand a large stock of Manila Rope, all sizes; Tarred Manila Rope; Hay Rope; Whale Line, etc., etc.

TUBBS & CO.,

611 and 613 Front street, San Francisco.

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Stockholders and Mines.

In the Nevada Legislature they have been having quite a little breeze over Shepherd's bill allowing a stockholder owning five shares of stock of the par value of \$500 in a mine to have the right to inspect the same. It was considered that the bill gave poor men the same rights as rich ones, and it provoked considerable discussion. An amendment was offered that any person representing \$20,000 in stock should be allowed to inspect the mine, but this was lost.

Stevenson opposed the bill, because although the principle is good, if it became a law it would prove inoperative. If a man owning this stock went down the mine he would know nothing about it, the mine being all in darkness and the stockholders not being acquainted with drifts. If the bill was to become a law it should have been drawn so as to include the providing of guides, and should be prepared by some one knowing the "tricks that are dark and the ways that are vain" of mining superintendents.

Clapp said that there were other places in the State beside the Comstock where mining was carried on, and there were several mining camps where such a law would prove effectual and be a good one.

The bill was finally defeated by a vote of ten to fourteen.

It seems but simple justice that a stockholder owning five shares should have the same rights in the mine as those owning five hundred, as far as examining it is concerned. But, after all, it would be sure to work serious inconvenience in large mines were every stockholder allowed to go and come in the mine when he pleased. It would really be detrimental to the interests of those stockholders who have not time to examine the mine. Almost the entire machinery would be used in transporting visitors, as the stock could be loaned to any person who desired to visit the mine. It would inconvenience the workmen and cause considerable expense and trouble.

On the other hand why a small stockholder should not visit the mine as often as a large one if he chose, is not clear. It might do something to prevent "corners" in stock jobbing operations, if all holders of stock could visit mines. But after all a law such as is proposed would be inoperative and of no avail with the majority of stockholders. Most of the stock in Comstock mines is held in this city, and few real owners here would ever have a chance to go to the mines. Moreover, very few would want to as they care little really about the mines and simply speculate in the stock. If a law was passed such as above referred to, the people here might give a few shares to some individual in Virginia, so that he could report, and that is all the good it would do to citizens here. Stockholders, in Virginia, however, might have been benefited to some extent.

Another Arctic Expedition.

A Washington dispatch says it is proposed to provide a small sum in the Sundry Civil Appropriation bill for an Arctic expedition. The Secretary of the Navy favors it, also a number of Senators and members. The Navy Department will be authorized by the bill to provide and fit a proper ship and man it with officers and men already under pay and awaiting sea duty. The extra expense will not be more than \$50,000, but it is proposed to take action by the Government, contingent on private subscriptions to the amount of \$25,000. The President of the Geographical Society says it will heartily co-operate in any expedition, whether undertaken by the Government or private enterprise. The very bad luck of the last Government expedition to the Arctic, when poor Hall met his death, will probably, prevent many people from looking with favor on the idea of another expedition. On the other hand, the success of the Austrian party last year is an incentive to the Government to maintain an honorable position in the history of Arctic research. It is not in keeping with the American character to back out because obstacles are great, but to endeavor to overcome them. An English expedition reassured by the results accomplished by the Austrians, has been formed; and after the United States has spent so much money, and lost so many valuable lives, the Government does not like to retire from the field and acknowledge itself defeated, more especially, since it now has Arctic possessions—Alaska. There is one thing, however, that we think should be inquired into. That is, the feasibility of attempting to reach the much talked of "open polar sea" by trying on this side of the continent. The obstacles on the other side are great and difficult to be overcome. We all know what and where they are. A beaten path is laid out and the only difference in many of the expeditions was as to where they were frozen in, and how far north they got. No attempt has been made on this

side. The young Frenchman Pavy, who came here a few years ago to start up on this side, never made the attempt; simply, however, from lack of means. At the time he was in this city, the writer heard him give, before the Academy of Sciences, his reasons for believing that an expedition would be more successful, which made an attempt to reach the open polar sea by going up through Behring's straits. His argument was good and the plan was looked upon as very reasonable by those familiar with the subject. It seems to us, accordingly but proper, that the Government should take into consideration the fact that no attempts have ever been made on this side of the continent to solve the questions, which Arctic expeditions are expected to solve. The majority of people do not see the benefit of such expeditions at all, but scientific men and other searohers after knowledge do not like to rest on hard earned but insufficient results, without solving the whole problem. Accordingly expeditions will continue to be sent in all probability until all questions concerning the North Pole are at rest. We have perhaps learned all we ever will of Sir John Franklin and his men. But the "North-west passage," the open polar sea and what lies beyond must be studied up. Perhaps when governments get tired of trying to find a passage through the icy barriers of the North on the other side, some one of them will send an expedition to the North Pacific and attempt to learn the mysteries of the Arctic by taking a new road. There is no question but that the idea should be investigated by those in authority, and some steps taken to see what could be accomplished.

METALS.

WEDNESDAY M., March 3, 1875.	
American Pig Iron, #100.....	46 00
Scottish Pig Iron, #100.....	45 00
White Pig, #100.....	46 00
Oregon Pig, #100.....	46 00
Reinforced Bar, #100.....	3 1/2
Reinforced Bar, #100.....	3 1/2
Boiler, No. 1 to 4.....	5 1/2
Plate, No. 5 to 9.....	5 1/2
Sheet, No. 10 to 13.....	5 1/2
Sheet, No. 14 to 17.....	5 1/2
Sheet, No. 18 to 21.....	5 1/2
Sheet, No. 22 to 27.....	5 1/2
Horse Shoes, per keg.....	7 50
Nail Rod.....	10 00
Norway Iron.....	9 00
Roller Iron.....	6 00
Other Irons for Blacksmiths, Miners, etc.....	4 1/2
COPPER.	
Brass.....	31 00
Copper Tin'd.....	45 00
O. N. E. Pat.....	50 00
Sheathing, #1.....	50 00
Sheathing, #2.....	50 00
Sheathing, Old Yellow.....	12 1/2
Composition Nails.....	24 00
Composition Bolts.....	24 00
T. & P. IRON.	
Plates, Charcoal, IX #100.....	12 00
Plates, I C Charcoal.....	12 00
Roofing Plates.....	12 50
Sheet, Yellow.....	12 50
STEELE.—English Cast, #100.....	20 00
Anderson & Woods' American Cast.....	16 1/2
Drill.....	18 00
Flat Bar.....	18 00
Plow Steel.....	9 00
ZINC.....	11 00
Zinc Sheet.....	11 00
Nails—Assorted.....	4 25
QUICKSILVER, per lb.....	1 3/4

LEATHER.

WEDNESDAY M., March 3, 1875.	
City Tanned Leather, #100.....	26 25
Santa Cruz Leather, #100.....	26 25
Country Leather, #100.....	26 25
Stockton Leather, #100.....	26 25
Jodot, 11 to 13 Kil, per doz.....	58 00
Jodot, 14 to 15 Kil, per doz.....	58 00
Jodot, second choice, 11 to 13 Kil, per doz.....	57 00
Corneillon, 12 to 15 Kil.....	57 00
Corneillon Females, 12 to 15 Kil.....	57 00
Corneillon Females, 14 to 15 Kil.....	57 00
Simon Ulmo Females, 12 to 13 Kil.....	50 00
Simon Ulmo Females, 14 to 15 Kil.....	50 00
Simon Ulmo Females, 16 to 17 Kil.....	50 00
Simon, 18 Kil, per doz.....	65 00
Simon, 20 Kil, per doz.....	65 00
Simon, 24 Kil, per doz.....	72 00
Robert Call, 7 and 9 Kil.....	35 00
French Kip, #100.....	1 00
California Kip, #100.....	4 00
French Sheep, all colors, #100.....	8 00
French Sheep, #100.....	8 00
Sheep Roans for Topping, all colors, #100.....	9 00
Sheep Roans for Lining, #100.....	9 00
California Russell Sheep Linings.....	1 75
Jodot Calf Boot Legs, #100.....	5 00
Good French Calf Boot Legs, #100.....	4 00
French Calf Boot Legs, #100.....	4 00
Harness Leather, #100.....	30 00
Fair Bridle Leather, #100.....	48 00
Skirting Leather, #100.....	33 00
Welt Leather, #100.....	30 00
Buff Leather, #100.....	17 00
Wax Side Leather, #100.....	17 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by CHARLES SUTRO & Co.]

SAN FRANCISCO, THURSDAY, Feb. 25, 1875.
LEGAL TENDERS IN S. F., 11 A. M., 87 1/2 to 88 1/2.
GOLD BARS, 80. SILVER BARS, 95 per cent. discount.
EXCHANGE ON N. Y., 1/2 per cent. premium for gold; Mexican Dollars, 1/2 and 2 per cent. discount.
CURRENCY, 1 1/2 per cent. On London—Bankers, 4 1/4; Commercial, 5.
LONDON—Consols, 92 1/2 to 93; Bonds, 90 1/2; Liverpool Wheat 8s. 11d. @ 3d.; Oats 3s. 3d.; 9s. 10d.
QUICKSILVER IN S. F., by the flask, per lb, \$1.32 1/2.

AN AWFUL RESPONSIBILITY.—Everybody has something to say about consumption. We all deplore its terrible ravages, but only a few of us have common sense enough to take the proper means of preventing it. It is a fact as easy of proof as that two and two are four, that *Hale's Honey of Horehound and Tar*, taken as a remedy for cough, cold, difficult breathing, hoarseness or any other of the symptoms, which, as it were, pave the way for that terrible destroyer, will effect a radical and rapid cure of the ailment, and avert all danger. Whoever, knowing this, neglects to resort to the true specific under such circumstances, assumes a fearful responsibility.

Pike's Tooth-Ache Drops—Cure in one minute.

STEEL SHOES AND DIES.—There is an exhibition at the office of the Cast Steel Shoe and Die Company, 330 Pine street, a shoe and die that were used constantly at the Morgan mill, Empire city, for over four months. The shoe is worn down to within less than an inch of the stem, but still presents a remarkably even surface. The die lasted nearly six months, and there is nearly two inches of it left. Those interested in such matters should call and examine these samples.—Exchange.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SOLENTIFIO PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch. Dated Washington, D. C., March 2, 1875.

FOR WEEK ENDING FEB. 16, 1875.*

DREYER FOR REFINED SUGAR.—August F. W. Partz, Oakland, Cal.
CAR SPRING.—Andrew Jackson Culbertson, San Andreas, Cal.
SEWING MACHINE FOR STITCHING SACKS, San Francisco, Cal.
FLUX FOR TREATING ORES.—P. N. Mackay.
EYELETING MACHINE.—John Coombe, San Jose, Cal.
SMOKE CONSUMING FURNACE.—W. L. Powelson, S. F. Cal.
HOOF TRIMMER.—Andrew Shitran and Wm. J. Givens, Pacheco, Cal.

*The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with effect and security and in the shortest time possible.

Banking.

DIVIDEND NOTICE.

French Mutual Provident Savings and Loan Society.—Thirtieth Semi-Annual Dividend.—A dividend of eight 1/10 per cent. per annum (net 8 1/10 per cent.) has, in conformity with the report of the Committee of Verification appointed by the members of the Society, been declared at the annual meeting, held on the 15th instant. This dividend will be payable on and after the 18th instant, at the office of the Society, 411 Bush street. GUSTAVE MAHE, Director French Savings Bank.

DIVIDEND NOTICE.

Masonic Savings and Loan Bank, No. 6 Post street, Masonic Temple, San Francisco. At a meeting of the Board of Directors of this Bank, held January 18th, 1875, a dividend was declared at the rate of nine and one-half (9 1/2) per cent. per annum on Term Deposits, and seven and one-half (7 1/2) per cent. per annum on Ordinary Deposits, for the semi-annual term ending January 21st, 1875, payable on and after January 28th, 1875, free of all taxes. H. T. GRAVES, Secretary.

Anglo-Californian Bank.

LIMITED.

Successors to J. Seligman & Co.

London Office.....No. 3 Angel Court
San Francisco Office.....No. 412 California street.

Authorized Capital Stock, \$6,000,000.

Subscribed, \$3,000,000. Paid in, \$1,500,000. Remainder subject to call.

DIRECTORS IN LONDON.—Hon. Hugh McCulloch, Reuben D. Sassoon, William F. Schellfield, Isaac Seligman, Julius Sington.

MANAGERS:

F. F. LOW and IGNATZ STEINHART, SAN FRANCISCO.

The Bank is now prepared to open accounts, receive deposits, make collections, buy and sell Exchange, and issue Letters of Credit available throughout the world, and to loan money on proper securities. 2v27-cowbp

The Merchants' Exchange Bank

OF SAN FRANCISCO.

Capital, Five Million Dollars.

O. W. KELLOGG.....President.
H. F. HASTINGS.....Manager.
R. N. VAN BRUNT.....Cashier.

BANKING HOUSE,

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KOUNTZE BROTHERS, BANKERS,

12 WALL STREET, NEW YORK,

Allow interest at the rate of Four per cent. upon daily balances of Gold and Currency.
Receive consignments of Gold, Silver and Lead Bullion, and make Cash advances thereon.
Invite Correspondence from Bankers, Mining Companies, Merchants and Smelting Works.

French Savings and Loan Society,

411 Bush street, above Kearny..... SAN FRANCISCO

4v274f

G. MAHE, Director.

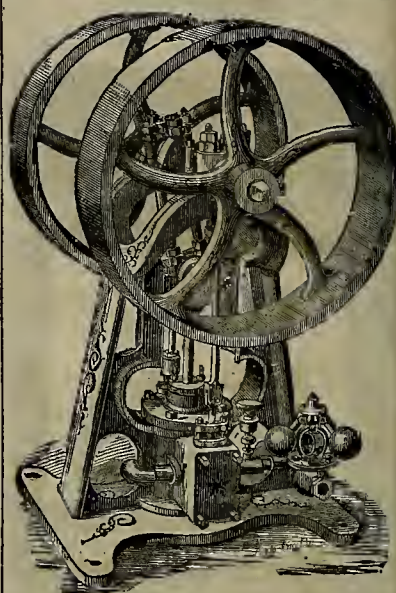
To Patent Attorneys, Contractors and Inventors.

WASHINGTON, D. C. January 1st, 1875.

I have carefully prepared a complete digest of U. S. patented Paving and Roofing Compositions, up to January 1st, 1875, in which is given the name of patentee, number and date of patent, ingredients, and, (when given in the specification) the proportions of ingredients. Also, all of English Patented Paving Compositions up to January 1st, 1874, amounting in all to over six hundred patents, a complete state of the art to date. It is my intention to publish this work at an early day in book form, and should you wish to subscribe should address

L. W. SINSABAUGH, Assistant Examiner, Room 21, Patent Office, Washington, D. C.

KIPP'S UPRIGHT



ENGINE

HAS DECIDED MERITS.

Its Beauty, Strength, Durability, Economy in the use of fuel, the small space required, and the superior workmanship, attract the buyer, and the price readily concludes the sale. Call and see it, or send for Circulars.

J. M. KEELER & CO., Agents, 308 California Street, S. F.

THE AMERICAN

TURBINE

Water Wheel.



Power Pledged Equal to any Over-shot Wheel Ever Built.

Recently improved and submitted to thorough scientific tests by James Emerson, showing the following useful effect of the power of the water utilized, being

THE HIGHEST RESULTS EVER KNOWN.

Percentage of part gate, 1/2 50.08; 3/4 59.64; 5/8 78.73; 1/2 82.53; 3/4 82.90. Percentage of whole gate, 83.14.

Mr. Emerson says: "These are the best average results ever given by any Turbine Wheel in my experience."

A splendidly illustrated descriptive catalogue, or any further information desired, furnished on application to

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J. H. CARROLL.....Vice-President
JOS. CRACKBON.....Secretary

All Policies issued by this Company, and the proceeds thereof, are exempt from execution by the laws of California. THE ONLY STATE IN THE UNION that provides for this exemption.
Policies issued by this Company are non-forfeitable, and all profits are divided among the insured.
Policies may be made payable in Gold or Currency, as the applicant may elect, to pay his premium.

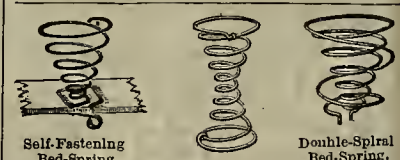
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SCHREIBER & HOWELL,

17-29-cow-hp-3m

General Agents, Sacramento.



Self-Fastening Bed-Spring.

Double-Spiral Bed-Spring.

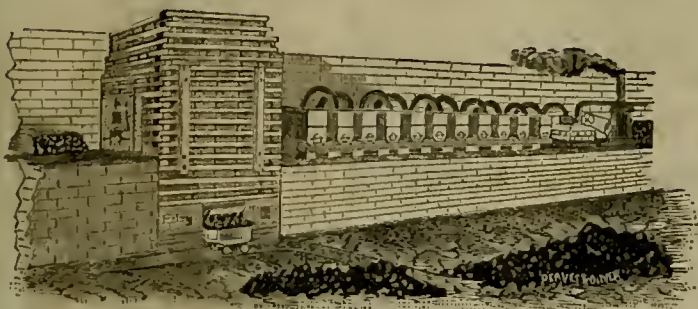
We manufacture all sizes of BED and FURNITURE SPRINGS, from No. 7 to the smallest Pillow Spring; also, the Double Spiral Spring, which is the most durable Bed Spring in use. It is adapted to upholstered or skeleton beds. We have the sole right in this State to make the celebrated Obermann Self-Fastening Bed Spring. Any man can make his own spring bed with them. They are particularly adapted to Farmers' and Miners' use. Send for Circulars and Price List to

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147 New Montgomery St., S.

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QUICKSILVER FURNACE.

THIS FURNACE REDUCES CINNABAR, AND

WORKS CLOSER TO AN ASSAY

And at LESS COST per ton than any other furnace. It will work continuously Twelve to Twenty-four months without stopping.

NO MAN HAS EVER BEEN SALIVATED

Or otherwise affected by the mercury about the furnace, either in operating it or making repairs. For full particulars, plans, &c., apply at

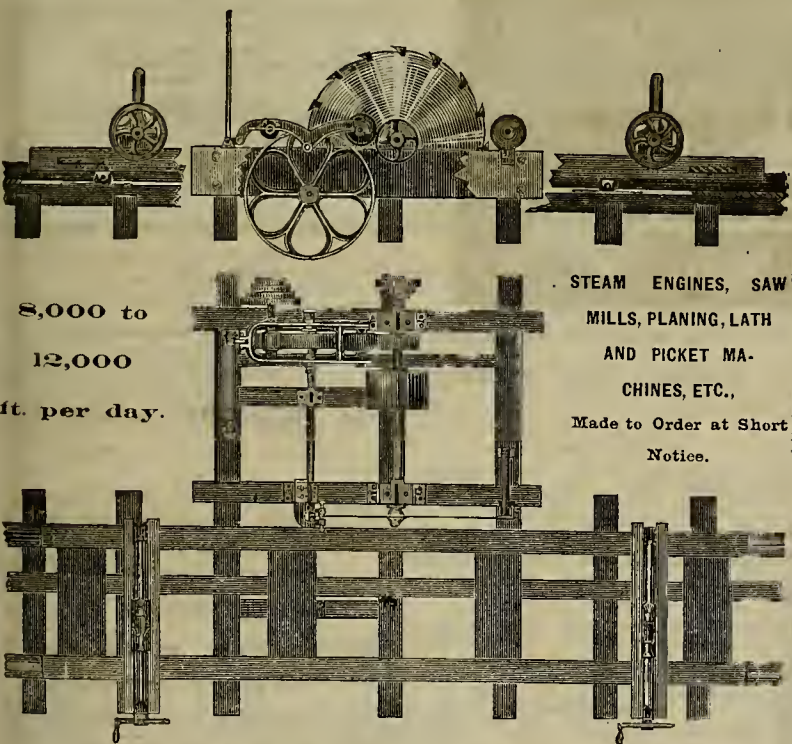
NOS. 19 AND 21 FIRST STREET, SAN FRANCISCO.

We refer any party desiring a good furnace to either of the following Mining Companies, where the furnace may be seen in successful operation:

- The Manhattan Mine in Napa County.
- The Redington Quicksilver Mining Company, Napa County.
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- The Ida Clayton Quicksilver Mining Company, Sonoma County.
- The Annie Belcher Quicksilver Mining Company, Sonoma County.
- The Geyser Quicksilver Mining Company, Sonoma County.
- The Cloverdale Quicksilver Mining Company, Sonoma County.
- The California Borax Company (Sulphur Banks), Lake County.
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- The Buckeye Mine, Colusa County.
- The Cerro Bonito Mine, Fresno County.

KNOX & OSBORN.

PORTABLE SAW MILLS.



8,000 to
12,000
ft. per day.

STEAM ENGINES, SAW
MILLS, PLANING, LATH
AND PICKET MA-
CHINES, ETC.,

Made to Order at Short
Notice.

These Mills are built in the Strongest, Most Durable, and Workman-like Manner; and are capable of driving any size Saw up to 64 inches; they are furnished with improved friction feed and gig back, both being operated by the same lever, no belt being used to gig backs.

GLOBE IRON WORKS.

F. A. HUNTINGTON, Proprietor, 143 & 145 Fremont Street, San Francisco.

STEAM ENGINES AND BOILERS

Of all sizes—from 2 to 60-Horse power. Also, Quartz Mills, Mining Pumps, Hoisting Machinery, Shafting, Iron Tanks, etc. For sale at the lowest prices by

J. HENDY, No. 32 Fremont Street.

SETTER CREEK, February 26th, 1875.
Messrs. Dewey & Co.—I have received my Letters Patent through your agency. And, for your promptness, accept my thanks. Yours,
S. N. KNIGHT.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

MAGAZINES.	P. A.
Harper's.....	\$4 00
Atlantic.....	
Godey.....	
New York Ledger.....	
Blackwood.....	
Hours at Home.....	
Good Words.....	
Peterson's.....	3 00
Arthur.....	
Lady's Friend.....	
Harper's Weekly.....	5 00
Chimney Corner.....	
Literary Album.....	
London Society.....	6 00
All the Year Round.....	
London Ill. News.....	15 00

W. E. LOOMIS.
News Dealer
AND STATIONER,
S. E. corner of Sansome and
Washington streets.
SUPPLIES ALL
Eastern Periodicals
BY THE
Year, Month, or Number

TO COPPER SMELTERS, BLUE-STONE
and Sulphuric Acid Manufacturers.

For sale or to lease, the LEVIATHAN COPPER MINE, in Alpine county, California.

The ore, which is in the form of silicate, black and red oxide, and gray sulphide, with metallic copper finely disseminated, averages from two to five feet thick, and 15 to 50 per cent. copper. A few parcels taken out during exploratory operations realized \$30,000 for Bluestone. In sight, 2,000 tons 20 per cent. ore; on dump, 300 tons 15 per cent. Supply inexhaustible. Title perfect. Minimum present capacity, 10 tons per day, which may be extended indefinitely. Cost of extraction, \$1. There is also a stratum of sandstone 20 feet in thickness, impregnated with 26 per cent. of pure sulphur. To a coin purchaser highly advantageous terms will be offered. For further particulars apply to Louis Chalmers, Silver Mountain, Alpine county, Cal.

Cazin's Combination Ore-Sizer and Concentrator—One Plunger System.

[Covered by Letters Patent of July 2d, 1872, and recent applications.]

Containing a sizing apparatus, (revolving screen) delivering two or four sizes of ore to two or four rows of sieves, each row independent of the other, and each having five sieves, each row concentrating according to specific gravity the special size automatically fed into it, resulting in the simultaneous continual delivery of separated materials, working 2d and 3d-class ores into 1st-class ores of perfect cleanness. It thoroughly separates native gold or copper from quartz or any other lode matter—galena and silver sulphurets from pyrites, baryta and quartz; and pyrites from quartz. Added to a battery of stamps these machines constitute a full system of ore concentration, sufficient in most cases for the requirements of western mines, with a capacity of 15 or 20 tons per 24 hours.

For particulars apply to,

F. CAZIN, M. & C. E.

Supt. Denver Concentration and Smelting Co
At Denver, Colorado, Lock-Box 2226, or corner of
Blake and 32d streets. ags-16p

WM. HAWKINS. T. G. CANTRELL.

HAWKINS & CANTRELL,

MACHINE WORKS,

210 & 212 Beale St.

Near Howard. - - - SAN FRANCISCO.

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Steam Engines and all kinds of Mill
and Mining Machinery.

Also manufacture and keep constantly on hand a
supply of our

Improved Portable Hoisting Engines

From Ten (10) to Forty (40) Horse Power.

N. B.—Jobbing and Repairing done with Dispatch.

EDWIN HARRINGTON & SON,



Manufacturers of ENGINE LATHES, 48 inches swing
and smaller; VERTICAL BORING MACHINES, suitable
for jobbing and boring Car Wheels; UPRIGHT
DRILLS, 36 inches and smaller, and other Machine-
Tools.

COOR. NORTH FIFTEENTH ST.
AND PENNSYLVANIA AVENUE,
Philadelphia, Pennsylvania.

Mining and Other Companies.

California Beet Sugar Company.—Loca-
tion of principal place of business, San Francisco,

Notice.—There are delinquent upon the following
described stock, on account of assessment levied on
the 26th day of January, 1875, the several amounts
set opposite the names of the respective shareholders,
as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Thomas S. Beckwith.....	75	15	\$1 250
Thomas S. Beckwith.....	38	42	210
And in accordance with law, and an order of the Board of Directors made on the 26th day of January, 1875, so many shares of each parcel of such stock as may be necessary will be sold at the office of the Com- pany, No. 314 California street, San Francisco, on the twenty-second day of March, 1875, at 1 o'clock, P. M., of said day, to pay delinquent assessment, together with costs of advertising and expenses of sale.			
Office No. 314 California street, San Francisco, Cal. LOUIS FRANCONI, Secretary.			

Confidence Mining Company.—Loca-
tion of principal place of business, San Francisco, Cal.
Location of works, Tuolumne county, State of California.

Notice.—There are delinquent upon the following
described stock, on account of assessment levied on
the 16th day of January, 1875, the several amounts set
opposite the names of the respective shareholders, as
follows:

Names.	No. Certificate.	No. Shares.	Amount.
James Bell.....	38	338	\$101 40
And in accordance with law, and an order of the			

Board of Trustees, made on the 16th day of January,
1875, so many shares of each parcel of said stock as
may be necessary will be sold at public auction at the
office of the Company, 210 Battery street, San Francisco,
California, on the 17th day of March, 1875, at the hour
of two o'clock P. M., of said day, to pay said delinquent
assessment thereon, together with costs of advertising
and expenses of sale. W. S. ANDERSON, Sec'y.
Office, 210 Battery street, San Francisco, Cal.

Electric Mining Company—Principal
place of business, San Francisco, State of California.
Location of works, Lincoln Mining District, Butte
County, California.

Notice is hereby given, that at a meeting of the Board
of Directors, held on the 16th day of February, 1875, an
assessment of five cents per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold and silver coin, to the Secretary, at
the office of the Company, in San Francisco.
Any stock upon which this assessment shall remain un-
paid on the 2d day of March, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Monday the 15th day
of April, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.
J. T. WINGARD, Secretary.
Office—Room 13, No. 318 California street, San Francisco.

Geneva Consolidated Silver Mining Com-
pany.—Principal place of business, City and County of
San Francisco, State of California. Location of works,
Cherry Creek Mining District, White Pine County, Ne-
vada.

Notice is hereby given that at a meeting of the Board
of Directors, held on the 2d day of January, 1875, an assess-
ment of twenty cents per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold coin, to the Secretary, at the office
of the Company, Room 14, 302 Montgomery street, San
Francisco.

Any stock upon which this assessment shall remain un-
paid on the 5th day of February, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Monday the 1st day
of March, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.
J. T. MILLIKEN, Secretary.
Office—Room 14, No. 302 Montgomery street, S. F.

POSTPONEMENT.—The time when the above assess-
ment will become delinquent is postponed to the eighth
(8th) day of March, and the sale of stock for delin-
quency is postponed to Wednesday, the thirty-first
(31st) day of March, 1875, at the usual hour and place
above mentioned. By order of the Directors.
J. T. MILLIKEN, Secretary.
San Francisco, Feb. 2, 1875.

Kearsarge Consolidated Quicksilver Min-
ing Company.

Notice is hereby given that at a meeting of the Board
of Directors, held on the 29th day of December, 1874,
an assessment, No. 1, of 30 cents per share was levied
upon the capital stock of the corporation, payable im-
mediately in United States gold and silver coin to the
Secretary, No. 408 California street, San Francisco, Cal.

Any stock upon which this assessment shall remain un-
paid on the eighth of February, 1875, will be delin-
quent, and advertised for sale at public auction, and
unless payment be made before, will be sold on Wed-
nesday, the 22d day of February, 1875, to pay the delin-
quent assessment, together with costs of advertising
and expenses of sale.

JAMES McHAFFEE, Secretary.
Office Rooms, 10 & 11—No. 408 California street, San
Francisco, Cal.

Kincaid Flat Mining Company—Loca-
tion of principal place of business, San Francisco, Cal.

Location of works, Sonoma, Tuolumne county, Cal.
Notice is hereby given, that at a meeting of the Board
of Directors, held on the 4th day of February, 1875, an assess-
ment of sixty cents per share was levied upon the
capital stock of said Company, payable, immediately in
United States gold coin, to the Secretary, at his office, 210
Battery street.

Any stock upon which this assessment shall remain un-
paid on the 8th day of March, 1875, shall be deemed
delinquent, and will be duly advertised for sale at public
auction, and unless payment shall be made before, will
be sold on the 29th day of March, 1875, to pay the delin-
quent assessment together with costs of adver-
tising and expenses of sale. By order of the Direc-
tors.
H. CORNELL, Secretary.
Office, 210 Battery street, San Francisco.

Manhattan Marble Company of Califor-
nia. Location of principal place of business, San
Francisco, California. Location of works, Oakland,
Alameda County, California.

Notice.—There are delinquent upon the following
described stock, on account of assessment levied
on the 8th day of January, 1875, the several amounts
set opposite the names of the respective shareholders,
as follows:

Names.	No. Certificate.	No. Shares.	Amount.
E P Flint.....	299	5	\$10 00
C Beach.....	75	25	50 00
C Beach.....	76	25	50 00
C Beach.....	77	25	50 00
C Beach.....	78	25	50 00
C Beach.....	79	19	38 00
C O Tripp, Trustee.....	150	10	20 00
L E Dam.....	130	10	20 00
L E Dam.....	131	10	20 00
L E Dam.....	132	10	20 00
Mrs Matilda Dam.....	211	20	40 00
Murray Curtis.....	230	10	20 00
W H Hanscom.....	296	50	120 00
W H Hanscom.....	297	59	118 00
W H Hanscom.....	298	62	104 00
James L Barker.....	301	50	100 00

And in accordance with law, and an order of the
Board of Directors, made on the 8th day of January,
1875, so many shares of each parcel of such stock as
may be necessary, will be sold at the office of the com-
pany, 18 and 15 Fremont street, San Francisco, Califor-
nia, on the 18th day of March, 1875, at 12 o'clock, M., of
such day, to pay delinquent assessments thereon, to-
gether with costs of advertising and expenses of the
sale.

L. L. ALEXANDER, Secretary.
Office—13 and 15 Fremont street, San Francisco, Cal.

Silver Sprout Mining Company—Princi-
pal place of business, San Francisco, State of Califor-
nia. Location of works, Kearsarge Mining District,
Inyo County, California.

Notice is hereby given, that at a meeting of the Board
of Directors, held on the 17th day of February, 1875, an
assessment of five cents per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold and silver coin, to the Secretary, at
the office of the Company, in San Francisco.
Any stock upon which this assessment shall remain un-
paid on the 17th day of April, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Thursday, the 15th day
of June, 1875, to pay the delinquent assessment, together
with costs of advertising and expenses of sale.

T. B. WINGARD, Secretary.
Office—Room 13, No. 318 California street, San Francisco.

Tuolumne Hydraulic Mining Company.
Principal place of business, city and county of San Fran-
cisco, State of California. Location of works, Tuolumne
county, State of California.

Notice is hereby given, that at a meeting of the Board
of Directors, held on the 23d day of February, 1875, an assess-
ment of twenty (20) cents per share was levied upon the
capital stock of the corporation, payable immediately in
United States gold coin, to the Secretary, at the office
of the company, room 14, 302 Montgomery street, San Fran-
cisco, Cal.

Any stock upon which this assessment shall remain un-
paid on the 23rd day of March, 1875, will be delinquent,
and advertised for sale at public auction, and unless pay-
ment is made before, will be sold on Saturday, the seventh
(7th) day of April, 1875, to pay the delinquent assessment,
together with costs of advertising and expenses of sale.
J. T. WINGARD, Secretary.
Office, Room 14, 302 Montgomery street, San Francisco,
California.

Iron and Machine Works.

San Francisco Boiler Works,

123 and 125 Beale Street.....SAN FRANCISCO

F. I. CURRY.

Late Foreman of the Vulcan Iron Works, Proprietor

High and Low Pressure Boilers of all Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED
SPIRAL BOILER.

SHEET IRON WORK of every description done at the Shortest Notice.

All kinds of **JOBING** and **REPAIRING** promptly attended to. 17v25-3m

THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868.
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,
SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

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HINCKLEY & CO.,

MANUFACTURERS OF

STEAM ENGINES.

Quartz, Flour and Saw Mills,
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Empire Foundry,

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RICHARD SAVAGE, Proprietor.

Heavy and light Castings of every description. House Fronts, Mining and General Machinery estimated and constructed at shortest notice. On hand the celebrated Occident and French Ranges, Burlal Castings, Grates and Fenders, Road-Scrapers, Hydraulic, Tugboat Irons, Ploughwork, Sash Weights, Ventilators, Dumb Bells, Gipsies, Ship Castings, SOIL PIPE of all sizes, Fittings and Cauldron Kettles in stock at Eastern rates. SHOES and DIES a specialty. Ornamental Fences in large variety. 4v30-lyr.

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MANUFACTURERS OF

STEAM ENGINES, BOILERS,
CROSS' PATENT BOILER FEEDER and SEDIMENT COLLECTOR

Dunbar's Patent Self-Adjusting Steam Piston PACKING, for new and old Cylinders.

And all kinds of Mining Machinery.

Front Street, between N and O streets,
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PRESCOTT & ECKART,

Manufacturers of Quartz and Amalgamating Machinery. Hoisting Machinery, Saw and Grind Mill Irons, House Fronts, Car Wheels, and Castings of every description made to order.

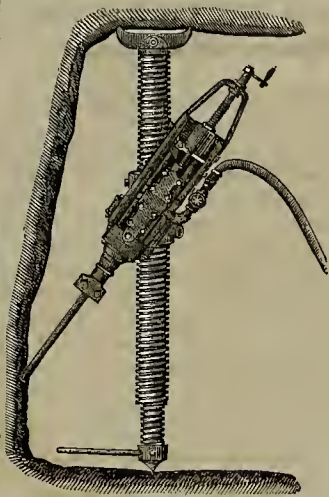
Steam Engines constantly on hand for sale. 9v23-ly

Miners' Foundry and Machine Works,

CO-OPERATIVE,

First Street, bet. Howard and Folsom, San Francisco.

Machinery and Castings of all kinds.



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SOLE AGENTS FOR THE

Burleigh Rock Drill Company.

—MANUFACTURERS OF—

PNEUMATIC DRILLING MACHINES,

AIR COMPRESSORS AND OTHER MACHINERY.

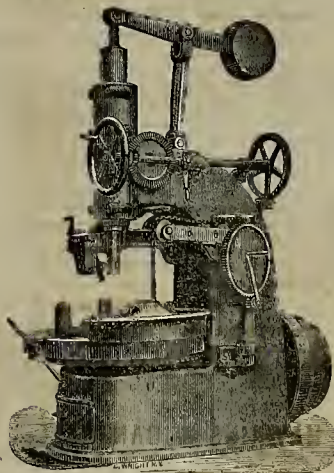
Also, Farmers' Dynamic Electric Machine and Hill's Exploders for Blasting, Putnam Machine Company's Tools, Wright's Steam Pumps and Haskin's Engines.

Address

PARKE & LACY,

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310 California St., S. F.



No. 4 Car Wheel Borer.



We have the best and most complete assortment of

Machinists' Tools

In the Country,
Comprising all those used in

MACHINE, LOCOMOTIVE,

AND

R. R. REPAIR SHOPS.

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NEW YORK STEAM ENGINE CO.,
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Golden State Iron Works.

(CO-OPERATIVE.)

PALMER, KNOX & CO.,

19 to 25

FIRST STREET, SAN FRANCISCO.

MANUFACTURE

Iron Castings and Machinery

OF ALL KINDS.

Stevenson's Patent Mould-Board Pan

THE BEST IN USE.

QUICKSILVER FURNACES, CONDENSERS, &c.

Having much experience in the business of the Reduction of Ores, we are prepared to advise, understandingly, parties about to erect Reduction Works as to the better plans, with regard to economy and utility.

CALIFORNIA BRASS FOUNDRY,

No. 125 First street, opposite Minna,
SAN FRANCISCO.

ALL KINDS OF Brass, Composition, Zinc, and Babbitt Metal Castings, Brass Ship Work of all kinds, Spikes, Sheathing Nails, Rudder Braces, Hinges, Ship and Steamboat Belts and Gears of superior tone. All kinds of Cocks and Valves, Hydraulic Pipes and Nozzles, and Hose Couplings and Connections of all sizes and patterns, furnished with dispatch. PRICES MODERATE. J. H. WEBB. V. KINGWELL.

THOMPSON BROTHERS, EUREKA FOUNDRY,

129 and 131 Beale street, between Mission and Howard, San Francisco.

LIGHT AND HEAVY CASTINGS,
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JNO. P. RANKIN. Established 1850. A.P. BRAYTON

Pacific Iron Works,

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Geo. W. Fogg, Supt.

MACHINERY AND CASTINGS
OF EVERY DESCRIPTION.

Heavy Forging Boilers, Stationary and Marine.

JOBING AND REPAIRING WORK OF EVERY KIND. SPECIAL ATTENTION GIVEN TO MINING AND HOISTING MACHINERY.

Sole Manufacturers and Agents of

PRATT'S PATENT STEAM PUMP.

GODDARD & CO., Props.

SHEET IRON PIPE.

THE

Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make **SHEET IRON AND ASPHALTUM PIPE**, of any size and for any pressure, and contract to lay the same where wanted, guaranteeing a perfect working pipe with the least amount of material.

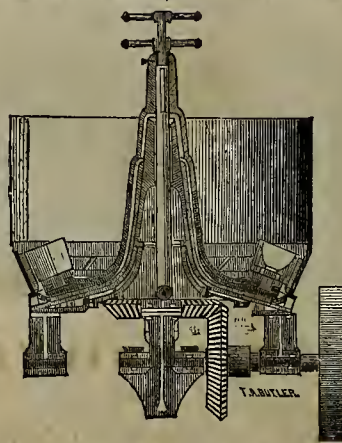
Standard sizes of railroad Car Wheels, with special patterns for Mining Cars. These small wheels are made of the best Car Wheel Iron, properly chilled, and can be fitted up with the improved axle and box—introduced by this company, and guaranteed to outlast any other wheels made in this State.

All kinds of Machinery made and repaired.

24v22-3m JOSEPH MOORE, Superintendent.

Occidental Foundry,

137 and 139 FIRST STREET, SAN FRANCISCO.



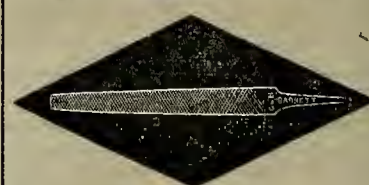
STEIGER & KERR,

IRON FOUNDERS.

IRON CASTINGS of all descriptions at short notice. Sole manufacturers of the Hepburn Roller Pan and Callahan Grate Bars, suitable for Burning Screenings.

NOTICE.—Particular attention paid to making Superior Shoes and Dies. 20v26-3m

BLACK DIAMOND FILE WORKS.



G. & H. BARNETT,

Manufacturers of Files of every Description

Nos. 39, 41 and 43 Richmond street,

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Sold by all the principal hardware stores on the Pacific Coast. 18v25-ly

PACIFIC

Rolling Mill Company.

SAN FRANCISCO, CAL.

Established for the Manufacture of

RAILROAD AND OTHER IRON

Every Variety of Shafing.

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and connecting Rods, Car and Locomotive Axles and Frames

—ALSO—

HAMMERED IRON

Of every description and size

Orders addressed to PACIFIC ROLLING MILL COMPANY, P. O. box 2032, San Francisco, Cal., will receive prompt attention.

The highest price paid for Scrap Iron.

California Machine Works,

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BIRCH, ARGALL & CO.,

Builders of QUARTZ, SAW AND FLOUR MILLS

Keating's Sack Printing Presses,

THE ECONOMY HYDRAULIC HOIST FOR STONES,

And General Machinists. 25v28-3m

The Phelps' Manufacturing Co.,

(Late S. F. Screw Bolt Works.)

MANUFACTURERS OF ALL KINDS OF

Machine Bolts, Bridge Bolts, and Ship or Band Bolts.

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McAFEE, SPIERS & CO.,

BOILER MAKERS

AND GENERAL MACHINISTS,

Howard st., between Fremont and Beale, San Francisco

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RICHARD O. HANSON.

RICHARD C. HANSON & Co.,

Block and Pump Makers,

IMPORTERS OF ALL KINDS OF

Patent Bushings & Gearing Apparatus,

STEEL FRICTION ROLLERS,

MINING BLOCKS OF ALL DESCRIPTIONS,

PRESSED LEATHER FOR PUMPS,

Lignum Vitae for Mill Purposes.

NO. 9 SPEAR STREET,

near Market, SAN FRANCISCO

IMPROVED HOISTING ENGINES.

HOISTING ENGINES.

SEND FOR
Circular
and Prices.

COOK, RYMER & CO.'S Celebrated Hoisting Engines have been too long in use on the Pacific Coast to require any special recommendation from us. We refer with confidence to any one of the hundreds now in use. We simply state that they still sustain their old reputation, the manufacturer not having followed the now too common practice of reducing the quality of material and workmanship for the sake of competing with cheaper engines. For details of sizes send for price list. We desire to call particular attention to our new

MINING HOISTING ENGINES.

(Manufactured by the same parties.)

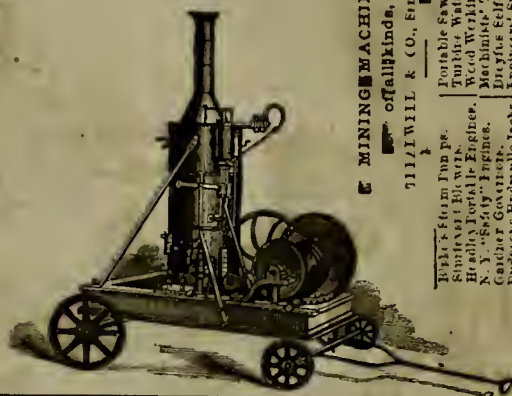
Which have just been introduced on this Coast. The plans and specifications are the combined efforts of our most successful MINING ENGINEERS, and the result is the most complete

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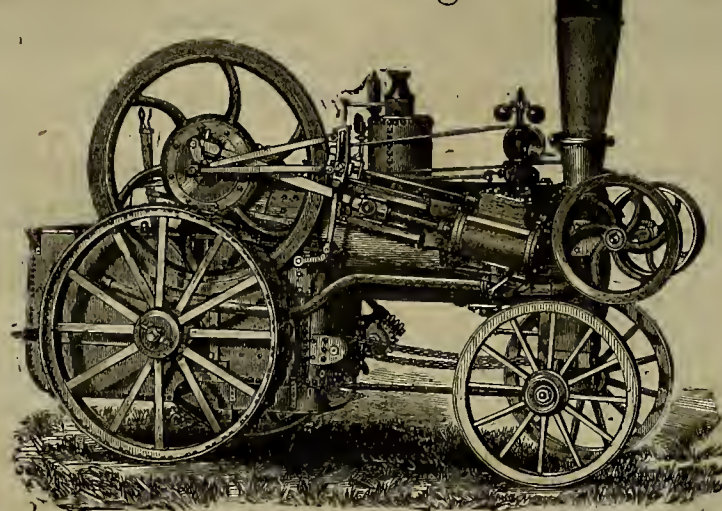
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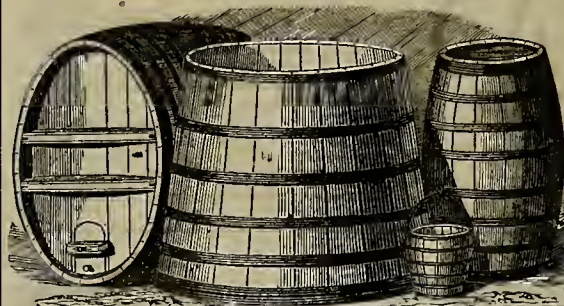
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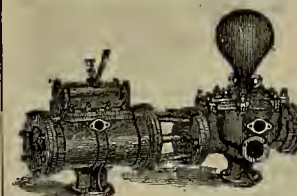
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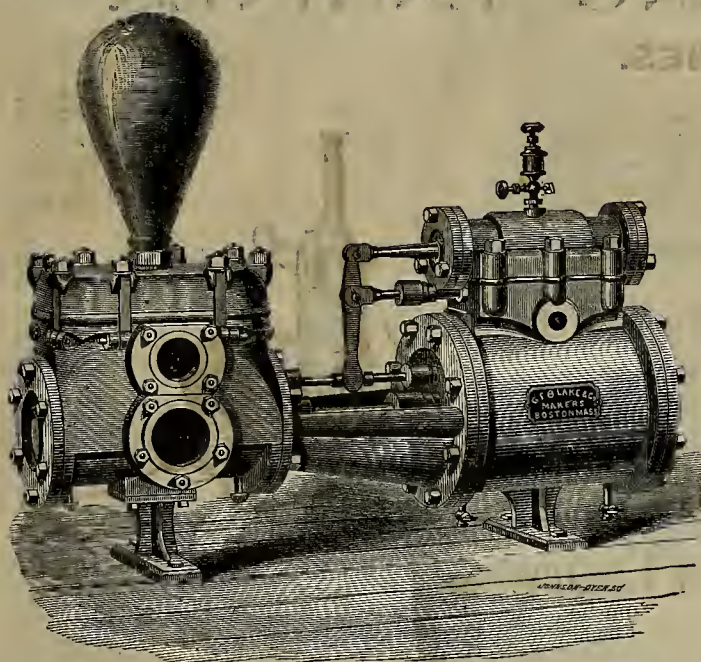
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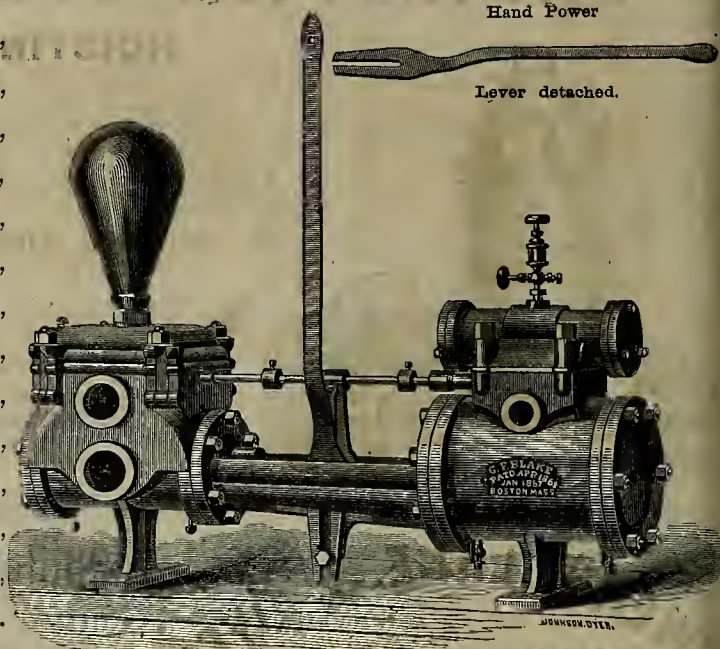
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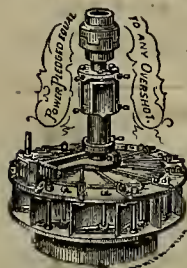


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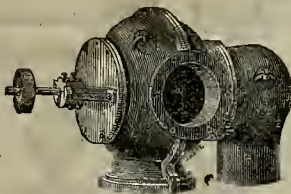
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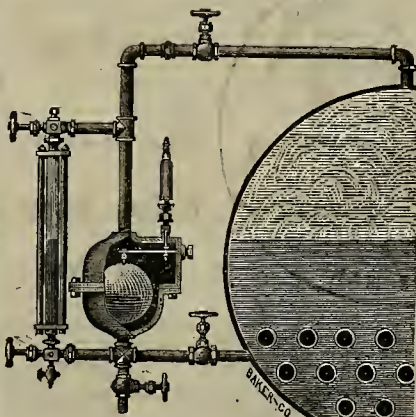
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MARCH 13, 1875.

VOLUME XXX
Number 11.

Hydraulic Mining in California. No. 10.

Sluice Boxes.

This pavement should be built in separate compartments of six or eight feet length, confined by pieces of strong plank or scantling fixed permanently across the bottom of the flume, to protect the pavement against a wholesale destruction in case the current of the stream should dislodge some stones in one or the other of the compartments. For 12 feet of double sluice, equal to 144 square feet, about nine tons of stone are required for paving. (See Fig. 1).

The sluice boxes should be lined above the stone pavement with two inch planks or two inch blocks, for a height of 10 or 12 inches, to protect the real sluice against the wear and tear of the swift gravel stream. (See Fig. 2).

The single sluice in the tunnel must be paved with square pine blocks, about 10 inches deep. These blocks are laid across the flume, close together, and a piece of plank one and a half by six inches is nailed to the lower part of the blocks with headless nails. These headless nails are not driven home, but project about an inch on the face side. A new tier of blocks is inserted and driven on the projecting nails till the blocks touch the intervening board or plank, and are therefore within one and a half inches of the first tier. Another piece of plank is put in position and the same process continued. The lining of the sluices is placed so low down that it touches the tops of the planks in the bottom, and keeps them in position. These spaces of one and a half inches in width separate the different layer of blocks and form the real riffles to catch gold or amalgam. The lining in those sluices which have rock pavements is, in many instances, placed so low that the rock pavement covers about two inches of it. This is done to prevent the wear of the rock pavement leaving a part of the sides of the flume, or sluice, unprotected. This, however, may be an unnecessary precaution, as the lining of the flume wears out much faster than the rocks, and can, when it has to be renewed, always be placed close to the rock pavement.

The expense of constructing a double sluice of the above dimensions depends both on the cost of material used and the difficulty of establishing the proper grade. In localities where lumber can be furnished for \$20 per M, and where the grading can be done without blasting, double sluices have been laid and paved in the most substantial way for \$2 per foot. A single sluice, six feet in width and three feet high, can be constructed, under similar favorable circumstances, for about \$1.25 per foot.

Under Currents.

These are large flat boxes, or platforms, placed beside and a little below the main sluice boxes. Their size and shape depend, to some extent, on the facilities which the place offers where they shall be constructed. Triangles, irregular oblongs, and parallelograms, containing a surface of from 500 to 1,000 square feet, are the forms often resorted to. The under current is destined to receive from the main sluice boxes a certain portion of the finer gravel-wash, black sand, quicksilver, and amalgam, and to afford to the particles of gold and amalgam a better chance to settle permanently in the riffles, which are evenly distributed over the whole surface of the platform. For this purpose an opening is cut across the bottom of the main sluice boxes from 15 to 18 inches in width. In this opening are inserted steel bars, one inch square and one inch apart, generally fixed in a cast iron frame. The small particles of gravel, sand, gold, etc., which pass through this grating are caught in a box placed below the sluice boxes, on a pitch of about one inch per foot, whence they are carried upon the large platform provided with riffles.

This platform is placed on a grade of from 10 to 12 inches per 12 feet, and is provided with an opening at the lower end to return the bulk of the material received to the main sluice boxes below.

To distribute evenly the water and gravel received from the main sluices a number of check boards are placed at the upper part of the platform, in a direct line with the box under the grating of the main sluice, which receives the discharged matter. As the water,

etc., rushes out of this box part of it strikes against the nearest check board and is turned down the platform; the remainder, rushing on, is diminished by each succeeding check board, and an even distribution over the whole platform is gained. At the lower end of the platform the discharge of the water, etc., into the main sluice below may be arrested by the insertion of a small box, on a grade, into which the material drops from the riffles. These riffles can be made either of two by three inch scantlings, laid down lengthways and two inches a part, or of common blocks or stone pavement.

The under current and main sluice boxes discharge their contents into a deep and strongly

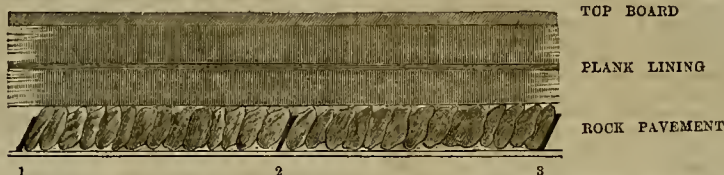
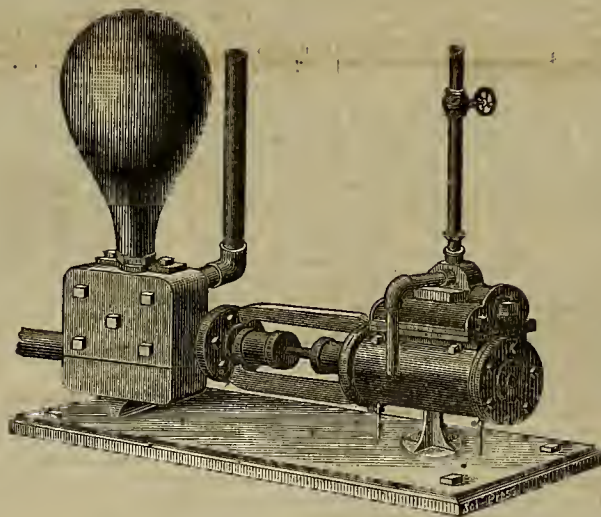


Fig. 1. Sluice-boxes; grade 6 in. per 12 ft.; sides 36 in. high; 1, 2, 3, compartments.

built box, provided with a heavy stone pavement. From the upper part of this box a continuation of the main flume leads the gravel-stream to other under currents, drops, etc., and to a final discharge. The lower part of this box must be four or five feet deeper than

Wilcox's Improved Steam Pump.

William C. Wilcox, of this city, recently obtained through the MINING AND SCIENTIFIC PRESS Patent Agency, a patent for an improvement in steam pumps. The improvement consists in certain novel arrangements of valves and the means of operating them, by which greater effectiveness of action is obtained for the engine, while the pump is so constructed that it will throw water in unlimited quantities without choking thus allowing the engines to be run at a high rate of speed.



W. C. WILCOX'S PATENT STEAM PUMP.

the point from which the main sluices are continued—ad and be found of great service in catching amalgam, etc.

The gratings in the main sluices deprive the latter of a quantity of water. To counteract

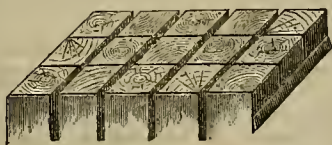


Fig. 2. Block Pavement for Sluices.

this loss the main sluices are narrowed about six inches to condense the current of water till both streams, that of the under current and that of the main sluice boxes, re-unite as described above.

These under currents are of the greatest service in catching rusty gold, which cannot be touched by quicksilver, and which, lessened in specific gravity by foreign matter clinging to it, is very liable to be carried entirely through a long line of sluices to the final discharge.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

apart and put together again. Still another desirable quality is the wonderful velocity at which they can be run, the inventor claiming that they can be run at least one-third faster than any other pump in use, and at the same time can be run as slowly as may be desired.

From the construction of this pump it must of necessity be durable. Their work is almost noiseless and the stream thrown very steady. From the simplicity of construction they are very cheaply built. This is a recent California invention, and has attracted considerable attention from machinists and others. The pump is adapted for feeding boilers with high or low pressure engines, for tank purposes, for railroad and residences, irrigating purposes, and for water works of any magnitude. They are furnished under a strict guarantee as to the work they will perform. We have seen this pump at work, and are satisfied that it will be well liked wherever introduced.

The pumps are being made in Jonathan Kittredge's building, No. 18 and 20 Fremont street, opposite Spaulding's saw factory, where they can be examined by those interested.

The construction of the Richmond refining works has opened a new branch of industry, that of bone gathering. Bone-dust is required in large quantities for refining, and it will take all that can be found in Nevada to meet the demand.

California Woods — Useful and Ornamental.

Messrs. Editors:—A correspondent's inquiry of J. O. C., as to where specimens of California woods can be obtained for the purpose of manufacturing presents for Eastern friends, has been accidentally overlooked.

In reply I would say that A. Sinning of Coulterville, lately in the Yosemite Valley, would be the best person to apply to for strips of rare woods, suitable for paper folders. I have obtained strips and very beautiful veneers from Strable & Co., billiard table manufacturers in San Francisco, which I have had finished at cabinet makers, or in ordinary carpenter shops. Portfolio covers, made of Oregon cedar, and ornamented with photographs of the same tree are cheap and pretty. Redwood is rather dark, and is improved by gluing on a light border of some other wood which makes the frame to the picture. For paper folders, the small stereographic photographs to be had at Houseworth's or Watkins', of the Big Trees, yellow pines, sugar pine and other Sierra trees are large enough. They should be put on with the decalcomanie process. Below is a list of dark and light colored woods suited to ornamental works. Two years ago, my son collected thirty species of woods in and around the Yosemite, some of which exceed in beauty any foreign woods I know. The two-leaved pine is exquisitely marked, and watered like the richest brown moire antique. Manzanita has the lines of old wine. "Granite" is curiously waved with brown and amber. When we get our shops for the education of female artisans many beautiful pieces of cabinet work will demonstrate the aptitude of our native woods for the finest uses of art. But here is the list: Light woods—Willow, Maple, Frangula, (very fine spotted); Torreya, (California nutmeg); Ceanothus, Silver Fir, Box, Oregon Cedar, Yellow Pine, Two-leaf Pine, Madrone, Buckeye. Dark woods—Manzanita, Granite, Big Tree, Black Oak, Mountain Mahogany, Bear Berry, Live Oak, Red Oak, Redwood (root), Alder. This list is by no means complete, our coniferous trees alone furnish more than thirty different kinds. These suggestions will do for a beginning. JEANNE C. CARR.

GROWTH OF MAN.—Observations regarding the rate of the growth of man have determined the following interesting facts: The most rapid growth takes place immediately after birth, the growth of an infant during the first year of its existence being about eight inches. The ratio of increase gradually decreases until the age of eight years, at which time the size attained is half that which it is to become when full grown. After five years the succeeding increase is very regular till the sixteenth year, being at the rate for the average man of two inches a year. Beyond sixteen the growth is feeble, being for the following two years about two sixteenths of an inch a year; while from eighteen to twenty the increase in height is seldom over one inch. At the age of twenty-five the growth ceases, save in a few exceptional cases. It has furthermore been observed that, in the same race, the mean size is a little larger in cities than in the country, a fact that will be received with doubt by many who have come to regard the rustic as the true model man.

On the 26th ultimo the Oceanic company in San Luis Obispo shipped the last of 300 flasks of quicksilver, being the product of eight weeks' run. The last 100 flasks came out in the last 10 days, being at the rate of 10 flasks per day, or about 800 pounds, worth at the mine \$1,200.

The narrow-gauge company of Salinas and Monterey has just received another locomotive from Philadelphia, at a cost of \$8,000.

The avalanche in Big Cottonwood, Utah, which buried five men and seven teams, was a mile and a half long and half a mile wide.

DURING the last fifteen years Vancouver Island has sent to San Francisco 259,341 tons of coal.



CORRESPONDENCE.

Reveille Mining District.

[From our Regular Correspondent.]

EDITORS PRESS:—Some of the mining camps of Nevada appear to be as little exempt from the laws of change as are nations and individuals. They have their intervals of prosperity and adversity, their periods of brilliant promise and unclouded hope, bright and radiant as the noonday sun, as well as their moments of midnight gloom, neglected and uncared for by the denizens of more fortunate sections. These experiences are, of course, inseparably connected, in a greater or less degree, with the history of silver mining on this coast. They not unfrequently result, however, from the carelessness and lack of energy and vigorous enterprise displayed by early discoverers, who oftentimes leave fortunes behind them in the ground which others by and by successfully develop. Time, labor and money are the three greatest essentials to success in connection with mining, and without the judicious association and co-operation of the two latter there cannot much permanent prosperity result from it. Nature has lavished her treasures with no sparing hand on the bleak and rugged hills and mountains of Nevada, and though she has in some instances largely exposed her mineral wealth, in huge deposits above their rock ribbed sides, with a view to tempt the cupidity and enterprise of the votaries of fortune, she has more generally hoarded it with jealous care, away down in the primitive vaults and channels artistically fashioned by her own imperishable hand. She has, however, left behind her ample evidences of her good will to man, by seeming the otherwise barren rocks and soil with the external indications which, if followed, eventually leads to success. Her vast resources, however, are reached by the same means that subjects the lightning's flash to man's imperious will. The twin sisters, Art and Science, furnish the keys that unlock the chambers where silently repose the mighty secrets and illimitable resources that are stored in the treasury of Nature for the uses and purposes of the material world. Art creates and fashions the plastic material according to prescribed rules while the unerring principles of science direct and instruct in all that relates to its application.

But to resume. The district whose name forms the caption to this letter furnishes an apt illustration of the truth of its opening sentence. It has had its days of gloom, neglect and idleness; it now promises to have the reverse of these; i. e., if I am permitted to draw my deductions from surrounding objects and circumstances, this

Once Famous

District is again beginning to attract the attention of the mining world. Already the fame of its recent discoveries has resounded throughout the State, gladdening the hearts of many who for long years have clung tenaciously to its fortunes, fervently believing that some day they would be amply rewarded for their toil and patience. The citizens of the "Queen City of the Pacific," too, it would appear, have caught the inspiring sound, to judge by the evidences before me. These glad reports reached myself at Tybo, and in order to test their truth I came here on the 16th instant to see and be convinced if possible; if not, to return a sadder and wiser man. I did not return as yet, however, for I have not only seen and examined, but have also become thoroughly convinced of the correctness of the first intimations which I received of its mineral developments; and since one attested fact is worth a score of grape vine reports, I submit the following for the consideration of the numerous readers of the Press:

Reveille District

Was organized some time in 1866, and flourished apace for a considerable time, or until the imbecility, inexperience and mismanagement of the Manager of a New York company, which was formed for the purpose of reducing its ores, had well nigh plunged it forever into the abyss of total oblivion. The structures (wood and brick) that composed the former town, are still standing, and in a tolerable state of preservation, but are no longer tenanted, for they have lately fallen to the lot of the stalwart new comers who, like myself, have been attracted hither. The mines are located on the elevated chain of hills that stretch parallel to and midway between the Diamond range on the west (sometimes called the Hot Creek range), and the White Pine range on the east, which courses north and south. Enclosed between these extended barriers is a broad and fertile valley, suitable for either cultivation or pasture, to the latter of which it is at present devoted, there being

thousands of head of fat, sleek stock roaming at will over its broad expanse. Here too are found a few comfortable grain, hay, and vegetable ranches, whose products find ready market in the neighboring settlements of Reveille, Tybo, Hot-Creek, etc. It lies about 135 miles due south of Eureka, and 35 miles south of Tybo, and is on the direct line of the proposed narrow-gauge to the Colorado river. There is an abundant supply of wood and water for all practical purposes both at the town and mill-site, of which more anon. The geological formation is of limestone, and it is extending in huge projections above the general surface are great veins or belts of quartzite, rich in chloride and sulphurets of silver. Many of these masses of quartz are upward of 100 feet in thickness, and extend longitudinally many times that distance. Great dikes of porphyry are also found coursing in parallel lines to the quartzite and lime. The silver-bearing veins occur most frequently between the two former, the quartzite in most instances forming the foot wall, while the porphyry forms the hanging wall to nearly all the veins examined. The mineral characteristics are quite different from those exhibited at Tybo or elsewhere, though the dip of the lodes is usually to the east and northeast, the same as at Tybo, while the angle of inclination is considerably greater. A large amount of work appears to have been done near the surface, but no great depth has been attained, and herein lies the true cause of the failure of Reveille in early days to meet the expectations formed of it.

The Gila

Mine owned by the company of the same name of which I will speak by and by, makes a fine showing of the sulphuret and chloride ores which give assay values ranging from \$80 to \$1,400 per ton and in a few instances even higher results have been obtained. Three samples recently taken at random from the inclined winze now being sunk on the vein, which shows a thickness of four feet between walls, yielded as follows: No. 1, a fine chloride ore, \$883 35; No. 2, \$405 15; No. 3, \$150 20; an average of \$479 23, in silver; no assay being made for gold, though I am certain that it is present in greater or less amounts. Quantities of this ore worked at the Tybo furnace, gave returns of \$850 per ton. The percentage of lead is very light, being hardly 3 per cent., thus giving promise of being easily and profitably melted. This mine is located on the northern point of a conically-shaped hill, and its outcrop can be traced for hundreds of feet along the quartzite formation which is largely impregnated with richest mineral in seams and large patches. The ore was found within a foot of the surface on the northern slope of the aforesaid hill, close by huge masses of quartz, which tower several feet above the outline of the hill. It overlies the quartzite in a strata or deposit from three to five feet thick, and of indefinite extent laterally and longitudinally. It has been penetrated by a tunnel 100 feet, running lengthwise in the hill, without discovering its southern boundary, neither has its western boundary been reached, although a drift of 25 feet in extent has been driven across it. Midway from the office of the tunnel, a shaft, or rather incline winze of respectable dimensions, was commenced some days ago. It is now down 65 feet, exposing an immensely rich body of ore, four feet thick between a quartzite foot wall and a porphyry hanging wall. The latter contains large masses of oxide of iron, manganese and talc. The latter has a fine pearly color, is unctuous to the touch, and streaked like marble and looks, when polished, or cut with the knife, exactly like that mineral. Magacian lime is also sometimes mixed with it, but in small bunches generally. The above are about the main facts connected with this wonderful bonanza of ore. The mine is a valuable one and already bids fair to realize the just expectations of its lucky owners. There is considerable ore in sight and the developments that are being vigorously pushed ahead, are bringing to light still larger masses of it. The mine has not been worked much more than 22 days, and yet in that time, there has been not less than \$65,000 to \$75,000 worth of ore extracted from it, that is now piled upon the dump awaiting the packers.

The Gila Company

Was incorporated in San Francisco toward the end of January last, with a capital of \$10,000,000, divided into 100,000 shares, of \$100 each. The incorporators are J. M. English, J. B. McGee, Arthur K. Hawkins, Camille Martin, of the London Chartered Bank, and W. R. Barnes, of Reveille, one of its original owners and locators. The three former gentlemen are co-owners in that other brilliant mining operation known as the Tybo Consolidated S. M. Company (Limited) of London, which I formerly made mention of in the Press. Themselves and the two latter constitute the first Board of Directors, with J. M. English, Esq., President, George E. Clarke, one of the former owners, as Superintendent, and J. A. Knapp, as Secretary, at the San Francisco office. The stock has not been as yet placed upon the Stock Board but will be, most likely, sometime during the ensuing month, in order to afford an opportunity of purchase to the large number of persons, who desire to possess an interest in it. In connection with the property is an excellent

Ten Stamp Mill

In complete running order, lately purchased by the company, and is in thorough repair throughout. This mill was erected here in 1871 by a New York company that subsequently collapsed, after extracting in the neighborhood of \$30,000 in bullion from the ores of the district.

Companies organized in the Excelsior State have never yet done other than the deepest injury to the mining interests of Nevada. Ignominious failures have been the general result of all of their undertakings. Two of them at one time threw a blight upon the mining interests of Eureka. Reveille was the next sufferer and now comes Morey district to appeal to our sympathies and excite our indignation and contempt. The mill is a wet-crusher, and is copiously supplied with water from a neighboring spring. Wood, too, is found within convenient reach, on the eastern slopes of the Diamond range, distant about one and a half miles from the mill. The buildings comprise an office, Superintendent's and Secretary's residence, an assay office, a spacious boarding house, a lodging house, a blacksmith's shop, together with a commodious stable, corral, etc., and all the other appliances. The mill is being overhauled with a view to the immediate resumption of active operations, after its long idleness. The necessary supplies of quicksilver, sulphate of copper, etc., have been already received from San Francisco, and salt, which is the most important element, is found in large quantities at the marshes, a few miles to the east and northwards of here, and it can be laid down at the mill at a cost of about \$40 per ton. The standard of fineness ranges from 70 to 95 per cent of pure chloride of sodium, the residue in soda and insoluble matter. The ore has to be hauled a distance of eight miles, and will cost from \$7 to \$8 per ton, but either of these is a moderate sum enough when the quality of the ore, and stretch to be traversed are taken into account. Hauling commences in a few days, and it is expected that the music of those long dormant stamps will greet our ears sometime about the first proximo, and then add to the general activity and enlivenment of the scene.

From the foregoing sketch, imperfect and all, though it is in character and detail, it will be readily seen under what favorable auspices the Gila company flings its symbolical banner to the not over gentle zephyrs of this long neglected section of the State. Long may it float in triumphant brightness and beauty, the representative of not alone a nation's greatness and glory, but the symbol of corporate honor, energy and enterprise. With such a union, success is the inevitable result. Prosperity is bound to exist wherever nature has laid the foundation as broad and deep as she has here, and its march cannot very well be retarded if there is a reasonable amount of care, economy and judgment exhibited in the management and general direction of affairs. These, however, will not be wanting. The character of the gentlemen at its head, coupled with the discretion and practical experience of its superintendent, are the best guarantees which the public can have of the bona fides of the undertaking. These gentlemen have already purchased the property, and subscribed largely to a fund to meet current expenses.

There are many other deserving mines located here that I cannot at present find time to fittingly describe. Besides, I have only examined a few of them, and since I do not desire to pass aught that cannot be substantiated, I forbear until such time as I can do so with propriety and confidence. The old town of Reveille is once more donning the habiliments of every day life, such as becomes an active, hopeful camp. It contains already a butcher shop, a boarding house, and a commodious store, filled with a large and varied assortment of merchandise, owned by Messrs. Clark & Barnes, who have resided for the past eight years in the district. Excelsior Reveille!

J. D. P.

Reveille, Nye county, Feb. 27th, 1875.

Mammoth District, Nevada.

EDITORS PRESS:—In the language of the immortal Webster, I wish to inform the public through your valuable paper that the old Mammoth district, in Nye county, Nevada, "ain't dead yet." She still lives rich in silver and a fair scattering of gold. Within the last year her mines have been prospected, and such results obtained as to remove all doubts as to their value and permanency. And for the benefit of all whom it may concern, I propose to give a brief sketch of some of the mines now being worked.

The Silver Wave,

Situated half a mile west of the town, has an incline 120 feet, drifted 50 feet north and 25 feet south on the ledge, which is on an average 2 1/2 feet wide producing rich ore. From assays, it goes from \$150 to \$300 to the ton.

The character of the ore is black metal and chloride. There is no waste in the lode; all of it producing good milling ore.

It is a well-defined lode with good hanging walls, and has every indication of a permanent mine. They have from 75 to 100 tons of ore on the dump.

The mine is worked by the owners, all persevering men. Frank McPherson is Superintendent, an energetic man and good miner.

The Empire

Situated about half a mile west of the Silver Wave, has an incline 125 feet, a good track and car, and have struck good ore in the bottom of the incline. They have a ledge about three feet wide, and a splendid prospect. The char-

acter of the ore is the same as the Silver Wave. This work is prosecuted by a Mr. Beon, President of the company in Syracuse, New York, and who is having other mines prospected in the camp under the supervision of a Mr. Rider, a very fine business man and a good miner.

Another Mine

Lying a short distance northeast of the Empire, has an incline about 50 feet, rich ore and a well-defined ledge and a good prospect. The work is being prosecuted by Messrs. Welch & Hawke, both long residents of the camp. Other mines are being prospected not far from this locality by Mr. Downey & Bro. with good encouragement.

Rich Strike.

I wish to make special mention of a mine about 3 1/2 miles west from the town, lying on the west side of the Mammoth range of mountains, a short distance below the Summit, near the head of a large canyon. It was discovered by James K. Evans on August 28th, 1868. It is called the Lisbon. Mr. Evans was formerly an old lumber dealer in California, between Auburn and Illinoistown. Within the last month they have struck the bonanza of this district. Or, as it is said by old miners, they have struck a chimney of ore "bigger than a man can think." It was found by running a tunnel at right angles 250 feet, and they struck the ledge 140 feet below the surface. In addition to this prospecting they came back to the mouth of this tunnel and ran another so as to strike the ledge squarely, and at a distance of 120 feet they struck this body of ore 90 feet below the surface. They are now 16 feet in the ledge, and their tunnel is seven feet high and five feet wide, and they intend to go through it, be the distance what it may. From some half dozen assays that have been made, it goes from \$300 to \$600 per ton. The ores consist mostly of a carbonite with some chloride, resembling the ores found in Cerro Gordo; so it is said by those who have seen both. The ledge so far is soft, so that it can be abstracted with a pick, and two men are now taking out four tons a day. It is thought by experienced miners that the prospect in sight will run a 20-stamp mill right along. A man by the name of Henry Ragins has become half owner in this mine, and he is thought to be the right sort of a man.

Several other mines in this locality show good ore and fair prospects. In addition to these, in another belt only a short distance, is reported to be fine smelting ore, but nothing of this kind having ever been tested here, no definite opinion can be given at this writing.

A short distance north of Mr. Evans' mine, Mr. Crowell is making preparation to prosecute work on the Cadiz mine, which has indications of a large and well-defined ledge.

To return to our little town. It is situated in a beautiful canyon pleasantly located for residents and well supplied with timber and water. We have a ten-stamp mill here and are confidently looking forward to a lively time the coming season. PINE NUT.

Ellsworth, Nevada, Feb. 20.

DISPOSING OF SEWER GAS.—How effectually to get rid of sewer gas is a problem that has long puzzled engineers and sanitarians. Most of the experiments have resulted in failures, and none have thoroughly succeeded, except in making what was a great deal worse. An English inventor has recently patented a new mode of dealing with the gas, which is ingenious and promises to be effective.

Connected with the main sewer is a pipe two inches in diameter, and at the top of the pipe is a ball, so fixed that it allows an aperture of a quarter of an inch all round, through which the sewer-gas may escape from the pipe. Running up outside the large pipe is an ordinary gas-pipe, and underneath the ball at the top of the sewer-pipe a set of burners is so arranged that when lighted they make a complete circle of fire. The ball prevents the sewage-gas from rising through the center, and it cannot escape through the flame, which entirely surrounds the aperture. The invention may be easily applied to the public lamps.

A WIRE TRAMWAY FOR MT. DIABLO.—A company has been formed to build a wire rope tramway—similar to that exhibited at several Mechanics' Fairs in this city—to transport people from the foot of Mt. Vesuvius to its top. The mountain, very properly suggests the *Alta* of this city is about as high as Mt. Diablo, or as the top of Sentinel Dome above Yosemite Valley, and if such an enterprise will pay in Italy, it may be worthy of consideration here, though the tourists who go to Naples probably are a hundred fold more numerous than those who come to California.

THE NEW, OR TOLBUT COAL MINES, near Seattle, are going forward in development. The tunnel is now 420 feet long, and still extending day and night. There are 12 feet of coal in the seam, with a half inch of shale or slate in the center.

PACIFIC COAST WOODS.—A collection of Pacific Coast woods is to be formed at the State University, and tests will be made of their capability and peculiarities. Some useful knowledge may be thus obtained.

MINING has begun on the placers of Santiam, fifteen miles from Smith's Ferry, Oregon.

AN ASBESTOS mine of very fine quality has been discovered near Eureka, Sierra county.

MECHANICAL PROGRESS.

Action of Zinc on Boilers.

Reports have from time to time appeared of late with regard to the usefulness of a piece of zinc in a steam boiler as a preventative against incrustation. Quite a number of engineers have expressed approval of it. Some say they have used it for many years, and that it not only prevents the deposit in the boiler from becoming scaly and adhering, but that it also prevents rust in all the pipes connecting with the boiler, so that in one case where zinc was used the pipes did not want any extraordinary repair in twenty years, while without the use of a piece of zinc in the boiler, they were all leaking in three years, especially at the elbows and T's.

One engineer mentions, to the *Scientific American*, a drawback, namely, the deposit of a material like calamine in the cylinder, piston head and pump, causing them to work badly.

A later correspondent of the same journal, L. T. Wells, of Carondelet, Mo., says: Seven or eight years ago, I tried the experiment, under the idea that an electrical condition might probably have something to do with boiler incrustation. The boiler I had was an upright one. I placed a piece of zinc weighing about two pounds on the dome inside, between the tubes; it remained there about two months, and during that time the boiler was opened at the bottom, on three sides, for a weekly cleaning. I noticed that the mud (Mississippi mud) was quite different from that previously deposited. Before it was mostly made up of scales; but after the zinc was put in, the deposit was soft, and scarcely a sign of scale was visible, the surface of the iron within looking fresh and new.

Notwithstanding this favorable action of zinc, it is not to be recommended for this purpose. I found the cylinder, piston rod and piston head badly incrustated by something which I could not understand; the pump worked badly and frequently failed, becoming incrustated within. I sent it to be repaired to the maker, who on opening it, expressed his surprise at its condition, and said: "How came this stuff on the pump? It looks like calamine." Zinc as a preventative of boiler incrustation will not do; if, however, the zinc produces a galvanic current, and renders the iron negative, then the experiment is suggestive of a principle that can be used by external application of the galvanic force.

Another, writing from Utica, N. Y., alludes to a previous correspondent as follows: I saw in your issue of December 12th, that an engineer on the steamship *St. Laurent*, running between New York and France, had left an ingot of zinc in one of his boilers; and on looking for it at the end of the next trip, he found it all wasted away to a mere mud. This is not new here. Mr. J. J. Illingworth, chief engineer of the Utica Steam Cotton mills, first introduced zinc in their boilers nearly twenty years ago, and by his recommendation it is now used in the New York Mill's boilers and in many boilers and in many other places. Mr. I. claims that the zinc has a great affinity for oxygen, and therefore absorbs the oxide in the water, and thus prevents its affecting the iron of the boiler. I herewith send you a couple of pieces which I obtained from him; and you will see that they are not all gone to mud, as they would have been if they had been left in the boiler a week or two longer. These pieces have been in the boiler about four weeks. In the New York mill where soft water is used, the zinc will lay there without being affected; but as soon as the hard water of the Sangquit creek is used, it begins at once to affect the zinc. Nor is this all of the effect of the zinc in the boilers; it prevents the steam pipes (running round the mill for heating purposes) from rusting.

To show this more conclusively, I will say that the piping in the above mill, where zinc has been so freely used, has been in twenty-five years, and has needed no more than the ordinary repairs that such pipes require. But on the other hand, the company built a new mill (which was started in October, 1869), and, for some reason not explained, there was no zinc put into the new boilers for about three years. The result of this neglect or oversight was that the heating pipes all through the mill began to leak at the elbows, couplings and T's; and on taking the pipe apart for repairs, it was found that wherever the steam struck the T or elbow or dripped into it, there was a hole eaten into it; and when a piece of pipe was to be taken down, there was no telling where the workmen could stop, because the pipes, T's, elbows and couplings were generally eaten away. I also send you a T, which is a fair sample of all the pipe and other joints connected with it.

When this was brought to the knowledge of Mr. I., he began at once to put zinc into the boilers of that mill, and the result of it is that the rusting of the pipes has entirely stopped and the bill of repairs has lessened accordingly. I am told that the above engineer has used zinc in his boiler, for over twenty-five years, with the same result in all cases.

STEEL RAILS.—Steel rails appear to be everywhere exceeding those of iron. All of the contracts lately given out by the Belgian Government for the State lines are steel. It is stated that steel rails are about as cheap now as iron rails were two or three years ago.

Aluminium Utensils.

Seventeen years have passed since Deville first produced aluminium on a commercial scale; but the expectations regarding this very interesting and meritorious invention of the distinguished French chemist have not as yet been fulfilled. Although many of these expectations were somewhat exaggerated, they were not so unreasonable as many people believed them to be; for a metal with so many valuable properties would be useful in many of the technical arts. Among these properties are a beautiful color that does not change in the air, nor yet in sulphurous exhalations, and further, remarkable lightness, an agreeable resonance, and a capability of being worked into any shape. Moreover, in the use or manipulation of aluminium there have not hitherto been observed any deleterious effects.

It is generally conceded that the cost, and not the absence of properties which make other metals valuable, has prevented the more extensive application of aluminium; and the price, although it is considerably less than it was at first, has remained high for many years. The cost of production of this metal, which can only be extracted by the use of sodium, cannot possibly be the only cause of its high price; for the commercial manufacture of sodium may be considered as a solved problem, and, as soda ash is very cheap, sodium might be produced at a moderate cost if the demand were greater than it is. Large production is caused by large consumption, and the use of aluminium has been hitherto limited, mainly because custom and use have in a measure opposed the introduction of such a novelty, except for fancy articles.

Stories have been written and told about poisoning by cooking vessels made of copper, by glazings containing lead, and the formation of verdigris on spoons of (alloyed) silver; but if people were only determined to produce these utensils from aluminium, all danger from poisoning would be removed, and they would have vessels, the appearance and durability of which would leave scarcely anything to desire. They would be more convenient to handle than our light crockery ware, for they can be made as light and, what is important, cannot be broken. Splendid pitchers, plates, goblets, lamps, etc., might be manufactured from deadened and embossed aluminium; and the lightness of spoons of this metal would make them more convenient than those of silver now in use. In this case it is not the price, but only prejudice, which presents itself as a drawback, for the price is only half of that of good silver; beside, the difference in the specific weights of both metals and the consequent cheapness in the use of aluminium are so great that, for the value of one silver spoon, at least even equally large aluminium spoons might be bought. True, aluminium is neither a rare nor a noble metal but it possesses, nevertheless, advantages over alloyed silver which give it a much finer appearance; it does not get black, nor does it form verdigris, and what it lacks in brilliancy and appearance is well compensated for in its agreeable lightness. But, unfortunately it has been found impossible to plate with aluminium either by the galvanic or foil method.

IRON AND STEEL TIRES.—A description is given of an improved method, recently introduced abroad, of reducing the inner diameter of tires which have been unduly enlarged by the hammer or the rolls so that they cannot be put on when hot in the usual manner. This plan consists in heating the tire to redness and then plunging it horizontally, but only to half its breadth, in water, and leaving it there till quite cold. The operation is then repeated in the same position, after which the tire is turned over and the heating and plungings applied to the other half of the ring. The first cooling produces a contraction of which the half not immersed partakes, and thus undergoes a molecular retraction, resulting in a reduction of diameter; of course the same is produced in the other half during the second operation. In this way, it is said, a tire has been reduced 7 in 895; and four immersions will double the shrinking. In the same manner a ring of Bessemer steel, which had not only enlarged under the hammer, but had also become conical in form in the interior, was brought to the exact diameter by heating and immersing thirteen times successively—first, the side which was contracted, and afterwards that which had become enlarged. The correction amounted to nearly four inches, though the diameter of the steel ring is not given.

IRON FURNITURE.—Amongst recent industrial developments in Germany is the hollow iron furniture, which has been popular for years in Austria. In Germany, however, it is only quite lately that the first large factory for making this class of goods has been opened. Ribbon-iron of the best quality is taken and converted into tubing in pieces of about 16 feet long, which can be bent cold into any form suitable for the making of bedsteads, doors, tables, etc. Hollow iron is stronger and lighter than the solid iron usually employed heretofore, and possesses the special advantage that the rivets hold better and that it does not break so easily, as is frequently the case in solid iron, which gives way wherever there is a flaw.

Russia has hit upon the original device of building wooden-clad vessels of war, the outer coating of timber being intended to protect the iron from injury.

GUNPOWDER EXPERIMENTS.—Certain experiments which have been made at the Chemical Department, Royal Arsenal, by Professor Abel and Captain Noble, relative to the properties of gunpowder, have reached a definite stage, and a preliminary report has been made. The objects of the investigation were to ascertain the products of explosion when fired in guns or mines, the tension, the effect of various sized grains, the variation produced by various conditions of pressure, the volume of permanent gas, the heat, and the work performed on a shot in the bore of the gun. For these purposes a steel chamber was used, closed with a screw plug, through which circuit wires were led and the powder fired by electric current. The pressures were registered by crusher gauges, and when the powder fills the space in which it is fired it is found that the pressure is about 6400 atmospheres, or 42 tons per square inch. The temperature of explosion is found to be about 2200 degrees Cent. When gunpowder is fired in small arms, about 35 per cent. of the heat generated is communicated to the barrel, but only 3 per cent. is absorbed by an 18-ton gun. The products of explosion are about fifty-seven parts weight of solid to forty-three parts of permanent gas. The analysis of the gaseous products showed a regular change, due to variation in pressure, carbonic anhydride increasing, with a decrease in carbonic oxide, as the pressure increased. The solid products were subject to greater and less regular variation; generally speaking, the chemical action is more complicated than has been supposed, and the old fundamental equations are found to represent it very imperfectly.

SCIENTIFIC PROGRESS.

ANCIENT AQUEDUCTS.—M. Belgrand, whose services to Paris, as director of the water service of the city cannot be overrated, has made a highly interesting communication to the Academy of Sciences, in the form of an extract from a book which he is about to publish on "Ancient Aqueducts," or the distribution of water in Egypt and Greece. He showed that Egypt never could have had aqueducts, but that her system of irrigating is of the highest antiquity, and still excites the admiration of engineers. With all the engineering art at present existing, says M. Belgrand, it would be difficult to construct covered aqueducts, as the lowest practical fall, namely, 0.10 in 1,000 cannot be obtained. The ancients never made aqueducts with a fall less than 0.50 per 1,000 feet, and no trace of a covered conduit is found in Egypt or in Nubia. Greece was certainly supplied by aqueducts, as their gymnasium supplied the Romans with the type for the Thermes. But the aqueducts of the former were much less important than those of the latter. M. Belgrand intends to complete the history of the aqueducts of the ancient world, and also of those of modern times, down to that of the derivation of the Vannes, which is now approaching completion, and the waters of which will entirely supersede the less wholesome water of the Seine. These scientific histories will form a mass of valuable information, and save water engineers a vast deal of trouble.

THE FREEZING POINT.—Schultz shows that the freezing point of water is lowered by dissolving gases. That water holding solidified freezes at a lower point is well known. Thomson and Clausius have shown from the principles of the mechanical heat that the freezing point of water falls 0.007°C for every additional atmosphere of pressure. To determine the true freezing point, take a glass tube closed at one end, fill with sulphuric acid, and heat. Then pour out, and rinse repeatedly. The tube is then two-thirds filled with distilled water, which has been boiled for some time in a clean heater, and a small quantity of filtered oil of turpentine is poured upon the water. The tube is then carefully heated, without allowing to rise to boiling point, lest an explosion should ensue, to remove any bubbles which may adhere to the side. The tube is taken out of the oil-bath, cooled, and placed in a freezing mixture. In most cases a portion of it freezes at once, if a thermometer is inserted, and moved up and down. If not the tube must be returned to the freezing mixture. It is important that the thermometer should be cooled down to the freezing point before being introduced.

DEATH OF A SCIENTIST.—The death of Chas. Lyell, which took place in London, Feb. 23d, is a great loss to the scientific world. For more than a quarter of a century he had been one of the chief teachers of the age. He gained most of his fame as an author of standard geological works, in which he summed up all the knowledge of the time in a lucid style, and in this manner he did much to popularize one of the most important branches of science. His last notable book was on the antiquity of mankind. He was a man of liberal and advanced ideas, and was always ready to grapple with any question which came up within the legitimate field of scientific research. He was progressive to the last.

MEDAL AWARDS.—The Copley medal of the Royal Society has been awarded to Prof. Louis Pasteur "for his researches on Fermentation and Pebrine," and the Rumford medal to J. Norman Lockyer "for his spectroscopic researches on the Sun and on the Chemical elements."

An Interesting Solution.

Among scientific puzzles is one which has long perplexed geologists, viz., the existence of large areas of rock containing no sign of life, aside by side with formations of the same period which are full of fossils—relics of primeval life. Why should one be so barren, and the other so prolific? There is now an answer in this important question, and readers who take an interest in the exploring voyage of the "Challenger" will be glad to learn that the answer comes from that ship, in a paper written by Dr. Wyville Thomson, chief of the scientific staff on board. This paper was recently read before the English Royal Society, and contains the result of some deep sea-sounding, which have revealed the existence of vast areas of barren clay at the bottom of the bottom of the sea, in depths varying from 2,200 to 4,000 fathoms and more. In parts the bottom is composed of the so-called *globigerina* mud; that is a thick deposit of small creatures known to naturalists as *globigerina*, which live near the surface and sink to the bottom when dead. There they accumulate, building up chalk for ages to come, when land and sea shall once more change places.

But it is remarkable that at the depth of 2,200 fathoms the *globigerina* then often disappear, and the gray deposit merges into the barren clay above mentioned. The explanation is that below the 2,000 fathoms these tiny shells are dissolved by some action of the water, and that the minute quality of alumina and iron which they contain go to form the areas of barren clay. The extent of these areas is so great that it exceeds all others as yet known at the bottom of the sea, and it is also the most devoid of life. In this respect the red clay now forming, resembles the schist which at present occupies so large a part of our earth's surface. We are all more or less familiar with chalk and with rocks that show no sign of fossils; and to be thus, so to speak, made eye-witnesses of the process by which chalk and rock were formed is unusually interesting. Dr. Thomson's paper is published at length in the *Proceedings of the Royal Society*. Its importance may be judged of by the fact that one of our most eminent naturalists declares that it alone is worth all the cost of the "Challenger" expedition.—*Chambers' Journal*.

A NEW LIGHT.—A new artificial light of great intensity, particularly rich in photographic rays has been recently invented in France. A quart bottle with a somewhat large mouth, has a cork with two openings. Through one of these a tube passes to near the bottom of the bottle; through the second a large tube packed with iron scale issues. Fragments of pumice fill the bottle, and on these carbon disulphide is poured. A current of nitric oxide gas, prepared by Deville's method—by the action of nitric and sulphuric acids on metallic iron contained in a self-regulating reservoir—is passed through the bottle, where it takes up the vapor of the disulphide. It is then led through the safety-tube packed with iron scale to the burner. Excellent photographs were taken in five seconds with this light, the object being six feet distant. In photographic power the light is asserted to be superior to the magnesium or calcium light, and even to surpass the electric light itself. The products of combustion are noxious and must be gotten rid of.

ENCKE'S COMET.—The return of Encke's comet to our heavens has been for some time expected, but its immense distance (182,000,000 miles) rendered all search with ordinary instruments needless. The large equatorial at the naval observatory, Washington, D. C., was recently put into service, and the comet was seen through this superb instrument by Professor Holden and Paymaster Tuttle of the U. S. N. Its distance rendered the use of the micrometer impossible, and it will scarcely be observable under ordinary circumstances for several weeks.

It is known to our readers that the equatorial telescope above mentioned is one of the finest in the world. It is Alvan Clark's masterpiece, and has an objective 26 inches in diameter. Its power is now demonstrated in a remarkable manner.

A MATCH UNDER THE MICROSCOPE.—Those who are fond of investigations with the microscope will find a beautiful object in the head of a parlor match. Strike the match, and blow it out as soon as the head has fused sufficiently to cause protruberances to form on it; on the part of the head which took fire first, will be found a white, spongy formation, which, under the microscope and with a bright sunlight upon it, has the appearance of diamonds, crystals, snow, frost, ice, silver and jet, no two matches giving the same combination or arrangement.

PYROMETER.—Pyrometers are rapidly approaching a very satisfactory degree of perfection. It appears from a report of a committee of the British Association of Science charged with examination of the above instrument, that, by means of the Siemens electric pyrometer, changes of resistance amounting to about 1-10,000 of the quantity of heat to be measured can be detected without much difficulty.

OBTAINING OXYGEN.—In the establishment of Krebs, Kron & Co., Berlin, oxygen is prepared by heating together in a glass flask, in a water bath, 10 quarts of water, 10 lb chloride of lime, and 1 lb nitrate of copper. It produces 15 cubic feet of oxygen.

Work Done with Burleigh Drills.

Since the introduction of Burleigh drills and air compressing machinery on this coast, about two years ago, it has accomplished feats which were deemed impossible. In tunneling work especially it has been of immense advantage, and has enabled mining companies using it to double the work at a great reduction of expense. Of late it is being used extensively in the gravel mines, where a great amount of tunnel work is often necessary. This Burleigh drill is in use at the Golden Star mine, and has given great satisfaction. We append a letter from the Secretary of this company to the agents of the drill in this city, which, as it gives details of cost and work accomplished, is of interest to the mining community:

OFFICE OF GOLDEN STAR M. Co. }
Sacramento, March 8, 1875.

MESSE, PARKS & LACY—Agents Burleigh Drill Machinery—GENTLEMEN: For the information of those engaged in mining, and who may be contemplating the purchase of your machinery, the directors of our company have instructed me to state that the drill, with necessary propelling power and connections was placed in our mine and commenced work about the 1st of December last. The material is hard cement with cobble intermingled, and working with the ordinary hand drill three shifts would make about two feet per day, costing us from \$12 to \$15 per foot to run the tunnel, which is 7x7. With this machinery we make from five to six feet per day—at a cost of from \$6 to \$7 per foot.

During the three months or more use of the machinery there have been no breakages or repairs worth mentioning.

Annexed is a report of the actual working of the drill for the 22 days comprising the month of February. It is deemed proper to add that the cost of the machinery complete, set up and at work at our mine has been \$4,500, and this includes column, drills, extra parts, 2,000 feet of ten inch iron pipe, asphaltum coated, air tanks, air compressor and 15 horse-power boiler—original purchase money and placing and housing the machinery.

Report of working Burleigh drill machinery for 22 working days of February, 1875, at Golden Star tunnel, Sierra county Cal.

Size of Tunnel.....7x7
No. of one and three-fourth inch holes drilled.....688
Aggregate length of holes.....2,433 feet
Average depth of hole.....3 feet 6 inches
Consumption of wood per day.....75 pounds
Steam and air pressure.....75 pounds
Lubricants—43 gallons oil 10 pounds tallow; one pound black lead. No repairs.

The entire expenses for the month cannot vary much from \$700 or about \$6 per foot for the tunnel actually made.

Given under the seal of said company, by order of the Trustees.

L. UREN E. CRANE, Sec'y.

Determinative Mineralogy.

We have received from A. Roman & Co. a copy of the "Manual of Determinative Mineralogy," with an introduction in blow pipe analysis by George T. Brush, Professor of Mineralogy in the Sheffield Scientific School. The material in the compilation was, for the greater part, prepared almost twenty years since, by Prof. S. W. Johnson and Prof. Brush as a text book for students in the laboratory. It was not then published but has since served as the basis of a course of lectures and practical exercises annually given in the Sheffield laboratory. The tables presented are based on the tenth German edition of Von Kobell's book. Additions of new species have been made, and in many cases fuller details are given in regard to the old species, and the whole material has been thrown into an entirely new shape. Berzelius and Plattner are the main authorities quoted in the chapters on blow pipe analysis. In determinative mineralogy, heideka the works of Von Kobell, free use has been made of the treatises of Naumann and Dana.

The author states that it is proposed at some future time to add to the volume methods for the determination of minerals by their physical characteristics. The whole work is an invaluable one to the student of mineralogy, and the tables render it useful for regular laboratory work. It is the most complete work on the subject we have seen, the tables particularly being voluminous and well arranged. The first chapter is taken up with a description of the blow pipe and its uses, with list of articles used, reagents, etc. Then a systematic course of qualitative blow pipe analysis is set forth. Then a table showing the behavior of the earth's and metallic oxides before the blow pipe. There is given a very excellent and complete alphabetical list of elements and characteristic blow pipe with other reactions. Chapter 4, gives tables for the determination of mineral species by means of simple chemical experiments in the wet and dry way, translated from Kobell's *Tafeln zur Bestimmung der Mineralien*. An entirely different mode of arrangement, however, is given with much additional matter. The book is really a valuable one for reference or for the student.

The work of repairing the break in the little tunnel through White's Hill, on the line of the Marin narrow gauge railroad was completed last week.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

Company.	Location.	No. Amt.	Levied.	Delinq't.	List.	Secretary.	Place of Business.
Andes S M Co	Washoe	4	1 50	Feb 25	Mar 29	April 14	M Lenders 507 Montgomery et
California Hill Cone M Co	Eureka Nev	15	Feb 16	Mar 21	Mar 21	W V Taylor	48 California et
Alps S M Co	Ely District	8	2 50	Feb 10	Mar 12	April 12	O D Squy Cor California et Mont
American Flat M Co	Washoe	5	2 00	Feb 8	Mar 15	Apr 5	C A Sankey 331 Montgomery et
Atlantic & Pacific Cone M Co	Cal	10	5	Mar 9	April 14	May 3	A Noel 419 California et
Sicon M & M Co	Washoe	3	50	Mar 9	Mar 23	Apr 14	Edward May 419 California et
Bellvue M Co	Cal	11	50	Feb 17	Mar 23	Apr 14	D E Verdenal 409 California et
Buckeye G & S M Co	Washoe	13	50	Mar 4	April 10	Apr 29	C H Sankey 331 Montgomery et
Caladonia S M Co	Washoe	11	3 00	Mar 9	April 13	May 1	K Weener 414 California et
Chert Hill & M Co	San Diego Cal	2	50	Feb 17	Mar 23	Apr 14	F Swift 419 California et
Cherry Creek M & M Co	Nevada	2	33	Feb 17	Mar 23	Apr 15	D E Verdenal 409 California et
Confidence M Co	Cal	30	30	Jan 16	Feb 23	Mar 17	W S Anderson 210 Battery st
Coos Bay Oregon Coal Co	Oregon	1	1 00	Feb 5	Mar 10	Mar 31	T P Beach 424 Montgomery et
Dardanelles M Co	Washoe	2	1 00	Feb 5	Mar 10	Mar 31	W S Anderson 419 California et
Dayton G & S M Co	Washoe	2	1 00	Feb 16	Mar 23	Apr 13	W P Dean 419 California et
El Dorado Water & D G M Co	Cal	5	10 00	Feb 15	Mar 19	Apr 3	H Elias 416 Montgomery et
Empire M Co	Idaho	9	1 00	Jan 30	Mar 5	Mar 26	W Willis 419 California et
Gold Run M Co	Cal	10	25	Feb 9	Mar 15	Apr 5	O Palmer 419 California et
Ida Elmore M Co	Idaho	16	1 00	Feb 1	Mar 8	Mar 29	W Willis 419 California et
Imperial S M Co	Washoe	21	1 00	Feb 10	Mar 17	Apr 7	W P Dean 419 California et
Julia G & S M Co	Washoe	21	2 00	Feb 12	Mar 18	Apr 6	A Noel 419 California et
Kossuth M Co	Washoe	3	50	Feb 25	Mar 19	Apr 15	D E Verdenal 409 California et
Mammoth Silver M Co	Nevada	18	10	Feb 25	Apr 3	Apr 23	D A Jennings 401 California et
Meadow Valley M Co	Ely District	8	1 00	Feb 11	Mar 23	Apr 20	J W Colburn 418 California et
Raymond & E S M Co	Washoe	20	20	Jan 19	Feb 24	Mar 13	D A Jennings 419 California et
Newark S M Co	Ely District	18	1 00	Feb 10	Mar 23	Apr 12	H C Kibbe 419 California et
New York M Co	Washoe	3	50	Feb 16	Mar 23	Apr 12	T Derby 320 California et
North Bloomfield G M Co	Cal	36	1 00	Feb 3	Mar 12	Mar 30	W P Townsend 408 California et
Palmer & S M Co	Washoe	2	25	Jan 21	Mar 2	Mar 30	W P Townsend 408 California et
Pine West Extension M Co	Washoe	7	1 00	Mar 10	Apr 17	May 7	T L Kimball 409 California et
Portman G & S M Co	Idaho	2	1 00	Jan 19	Feb 24	Mar 13	W Willis 419 California et
Raymond & E S M Co	Pine Co	3	3 00	Jan 15	Feb 26	Mar 26	T W Colburn 418 California et
Red Jacket M Co	Idaho	5	50	Feb 16	Mar 23	Apr 15	W P Dean 419 California et
Savage M Co	Washoe	17	5 00	Feb 19	Mar 24	Apr 12	E B Holmes 419 California et
Senator Silver M Co	Washoe	11	5 00	Feb 25	Apr 3	Apr 23	J H Sayre 10 Stevenson Bldg
Shoshone M Co	Idaho	8	1 00	Mar 27	Apr 1	Apr 12	Frank Swift 419 California et
Silver Hill M Co	Washoe	6	1 00	Mar 27	Apr 1	Apr 12	D E Verdenal 409 California et
St Patrick G M Co	Cal	10	50	Feb 2	Mar 8	Mar 31	Lonie Kaplan Merchants' Ex
Star King M Co	Washoe	10	25	Feb 17	Mar 22	Apr 19	G H Colburn 419 California et
Union M Co	Washoe	8	20	Jan 24	Mar 16	Apr 12	W P Dean 419 California et
Utah S M Co	Utah	4	1 50	Feb 26	Apr 2	Apr 27	Wm H Watson 302 Montgomery et
Victoria & Imperial T & M Co	Idaho	9	1 00	Jan 25	Mar 3	Mar 23	L Kaplan Merchants' Ex
War Eagle M Co	Idaho	9	1 00	Feb 27	Apr 3	Apr 12	J M Huntington Merchants' Ex
Ward & Sons M Co	Robinson District	3	50	Feb 10	Mar 18	Apr 12	D E Verdenal 409 California et
Washington & Creole M Co	Ely District	14	1 00	Feb 18	Mar 23	Apr 12	D E Verdenal 409 California et

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS.

Alpine G M & M Co	Cal	8	1 25	Feb 11	Mar 23	Apr 14	J F Lightner 433 California et
California & Arizona M Co	Ariz	3	10	Jan 6	Feb 22	Mar 12	T E Jewell 567 Montgomery et
Carrie Hill Hydraulic M & W Co	Cal	3	10	Jan 15	Feb 24	Mar 12	H Knapp Merchants' Ex
Casado Blue Gravel M Co	Cal	2	10	Mar 8	Apr 13	May 3	J M Huntington Merchants' Ex
Centena P M Co	Mexico	2	50	Mar 5	Apr 5	Apr 22	W P Townsend 113 Liedesdorff et
Edith M Co	Cal	3	20	Mar 10	Apr 22	May 2	Wm Winder 318 California et
Electric M Co	Cal	4	8	Feb 16	Mar 22	Apr 12	G Cole 302 Montgomery et
Emma Hill Cons M Co	Utah	2	40	Jan 25	Mar 8	Apr 5	R Wegener 302 Montgomery et
Freno Q S M Co	Nevada	1	25	Mar 2	Apr 10	May 3	J P O'valier 313 California et
Gold Mountain G M Co	Bear Valley Cal	4	1 00	Jan 25	Mar 8	Apr 5	Dani Buck 14 Stevenson Bldg
Golden Crown M Co	Cal	1	10	Feb 25	Apr 1	May 1	W A Van Bokkelen 419 California et
Home G M Co	Mariposa Co Cal	3	1 25	Jan 13	Feb 16	Mar 16	E J Hermann 419 California et
Imperial S M Co	Nevada Co	21	1 00	Feb 10	Mar 13	Apr 7	W P Dean 419 California et
Independence Cone M Co	Cal	2	2 50	Feb 4	Mar 13	Apr 12	F J Hermann 419 California et
International Gold M Co	Cal	1	15	Mar 2	Apr 6	Apr 26	J M Huntington Merchants' Ex
Kincaid Flat M Co	Cal	1	20	Feb 1	Mar 4	Mar 25	G B Spinnay 320 California et
Little Pancho Quicksilver M Co	Cal	1	20	Feb 1	Mar 4	Mar 25	S H Smith 302 Montgomery et
Loa Prieta M Co	Cal	2	50	Mar 6	Apr 12	May 3	L Leavitt 520 Washington et
North Fork M Co	Cal	1	1 00	Mar 10	Apr 14	May 3	H K Kibbe 419 California et
North Fork M Co	Cal	8	25	Jan 15	Mar 12	Mar 23	A K Deuhrow Merchants' Ex
New York Cone M Co	Washoe	12	50	Feb 14	Mar 23	Apr 12	J P O'valier 313 California et
Occidental M Co	Nev	3	50	Feb 2	Mar 9	Mar 25	A K Deuhrow Merchants' Ex
Patton M Co	Bear Valley Cal	1	10	Jan 22	Mar 2	Mar 27	J P O'valier 313 California et
Panther M Co	Idaho	4	25	Mar 4	Apr 10	May 3	W F Bryant 402 Montgomery et
Phoenix Tunnel & M Co	Utah	7	25	Feb 15	Mar 23	Apr 12	O Healy Merchants' Ex
Rocky Bar M Co	Nye Co Nevada	3	1 00	Jan 12	Feb 16	Mar 12	R H Brown 513 California et
San Jose M Co	Canon	6	5 00	Jan 27	Mar 8	Apr 13	A Carigan 71 New Monte y at
Silver Cloud G & S M Co	Cal	25	25	Feb 8	Mar 15	Apr 12	A Enquet 606 Montgomery et
Silver Spring M Co	Enreka Nev	3	5	Feb 17	Apr 7	June 7	T B Winder 433 California et
Silver West Cons M Co	Cal	6	1 10	Feb 5	Mar 15	Apr 5	T F Cronise 302 Montgomery et
Table Mt Alpha M Co	Cal	20	20	Feb 23	Mar 25	Apr 17	T M Miliken Merchants' Ex
Tuolumne Hydraulic M Co	Washoe	7	40	Feb 6	Mar 10	Mar 25	J M Huntington Merchants' Ex
Union Cons M Co	Cal	5	50	Feb 25	Mar 29	Apr 12	P H Rowe 330 Pine et
Weaverville D & H M Co	Cal	1	25	Jan 23	Mar 3	Mar 30	D A Jennings 401 California et
Webfoot M Co	Elko Co Nev	1	50	Jan 13	Feb 27	Mar 18	J M Huntington Merchants' Ex
Wyoming G M Co	Cal	5	50	Jan 13	Feb 27	Mar 18	J M Huntington Merchants' Ex

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Andes S M Co		Called by Trustees	507 Montgomery et	Special	April 5
Baltimore Cons M Co		Called by Trustees	320 Montgomery et	Special	April 3
Bunker Hill Q M Co		Walter L Palmer	310 Kearny et	Special	Mar 30
Chicago Quicksilver S M Co	Cal	George A Lethrop	318 California et	Annual	Mar 24
Electric M Co		T B Winder	318 California et	Annual	Mar 24
Enterprise Cons M Co	Cal	T J Hermann	419 Kearny et	Annual	Mar 15
Franklin M Co		Wm H Watson	302 Montgomery et	Annual	Mar 29
Globe Cons M Co	Wa-hoe	Called by Trustees	419 California et	Special	April 8
Justice M Co	Wa-hoe	Called by Trustees	Merchants' Ex	Annual	Mar 16
Justice M & O Co	Wa-hoe	H C Miller	411 California et	Annual	Mar 15
Virginia Cons M Co	Wa-hoe	T B Winder	318 California et	Annual	Mar 16
West Crown Point S M Co		J O Bollinger	302 Montgomery et	Annual	Mar 13
Wonder G M Co	Cal	J L Armstrong	513 Sacramento et	Special	Mar 13

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co.	Washoe.	H. C. Kibbe.	419 California et	\$ 300	Jan 11
Black Bear Quartz	Cal	L. O. Oliver		25	Feb 19
Chariot M & M Co	Cal	Frank Swift	419 California et	40	Nov 16
Consolidated Virginia M Co	Washoe	D T Bailey	401 California et	3 00	Feb 11
Crown Point M Co	Washoe	Charles C Fish	414 California et	2 00	Jan 12
Diana M Co.	Washoe	C E Elliott	414 California et	1 00	Jan 25
Eureka Consolidated M Co	Nev	N. C. Fasset.	220 Clay st	1 00	Mar 5
Rye Patch M Co	Nevada	W V Taylor	419 California et	50	Mar 5
		D E Verdenal	409 California et		

THE White Pine News of the 6th inst. contains the following Mineral City items: We learn from Fred Hill, Esq., that the mill of the Watson company is running finely, and that the new concentrator are working beyond the expectations of the company. The mill is running on old tailings with complete success. Judge Walsh, Superintendent of the Canton company's property, will start up the furnaces about the 6th of the present month. Owing to the satisfactory manner that the Superintendent has handled the property of this company, they propose to back him in all his undertakings, and make times lively in Mineral City the coming summer.

THE Eureka Sentinel states that the Eureka Consolidated company has a splendid body of high grade ore near the northwesterly end of the Champion mine. Four years ago it was supposed that this part of Ruby hill had been worked out; but it appears now that effective work was all that was required to bring new bodies of ore into sight.

OVER 100,000 cords of wood, awaiting shipment to Virginia City and Gold Hill, are piled up in the vicinity of Empire city. Nut-pine wood is being shipped from the same locality at the rate of about 400 cords per month. It can be laid down in Virginia city by the car load for about \$15 per cord.

THE Blue Gravel mining company at Sucker Flat, in a late clean-up, realized from \$130,000 to \$140,000.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office at San Francisco:

E. DORADO QUICKSILVER M. Co. March 8.—Location: Agre Mining District, El Dorado county. Directors—S. B. Martin, Julius Bandman, D. R. McKillican, S. A. Lane and Jacob Greenbaum. Capital stock, \$10,000,000, in 100,000 shares.

CAROLINA MINING Co. March 9. Location: Washoe. Capital stock, \$7,800,000. Directors—A. C. Taylor, O. R. Johnson, H. S. Wheeler, C. A. Larkey and P. F. McWhorter.

FORT MILLER GRAVEL M. Co. March 9. Location: Fresno county, Cal. Capital stock, \$2,500,000. Directors—Warren Bryant, P. J. Galpin, W. K. Doherty, T. O. Carter and J. T. Earnest.

RED MOUNTAIN QUICKSILVER M. Co. March 9. Location: Stanislaus and Santa Clara Counties, Cal. Capital stock, \$5,000,000. Directors, W. G. Hughes, Win. Muir, J. W. Bond and S. P. Sampson.

SAN JOAQUIN AND FRESNO WATER Co. Mar. 10.—Object: The construction and maintenance of a canal and other works, to divert 30,000 inches, more or less, of the running waters flowing into the San Joaquin river, at and near a point in said river designated by a claim of said waters made by Warren Bryant, T. O. Carter and others, on or about the 10th day of February, 1875, as by the notice of such claim, duly made and recorded, will fully appear; and also to make use of said waters for the purposes of agriculture, transportation and mining, and all other purposes incident to or connected with any of said purposes, and to carry and convey the waters in and through the counties of Fresno, Merced, Stanislaus, San Joaquin and Contra Costa, from said point of diversion in, upon and along the lands where the main conduit of said waters claimed and diverted may be made to reach, by means of branch or side conduits of any kind hereafter constructed or laid down, and connected with said main conduit; also to lease, sell and convey rights to use said waters so diverted, for any of the purposes named. Trustees—Warren Bryant, P. J. Galpin, W. H. Doherty, T. O. Carter and J. T. Earnest. Capital stock, \$10,000,000, divided into 100,000 shares.

Mining Stocks.

After a depression of several weeks the stock market has again commenced to show some signs of activity. On Monday, on receiving news of a strike in Ophir, the whole line of the Comstocks went up. It has been expected for some time that as soon as a strike was made it would enliven the whole market. Outsiders were looking with some degree of certainty to a "deal" in Idaho and Ely stocks. In certain measure their expectations have been realized, as Raymond & Ely and some other of the Pioche stocks have experienced a considerable rise. The Idaho stocks, however, remain as of yore. Golden Chariot has had an assessment levied on it, and if the usual tactics of the ring having this line of stocks in tow are carried out, the whole list will shortly have an assessment on them. The idea is now that some of these mines are looking better than they should for the interests of the manipulators, and they want to assess them down out of sight and then buy them up. If these tactics are carried out, in about two months people will have a chance to invest in Idaho stocks at high prices, for the ring will run them up if they buy them in cheap. However, forewarned is forearmed. What is to be done in the Ely stocks is as yet uncertain, but most people predict a rise.

Of the Ophir strike the *Enterprise* says: "In the Ophir the drift from the bottom of the north winze had last evening been extended twelve feet, all the way in a mass of chloride and sulphureous ores of the richest description. This development is of great importance in many respects, and is therefore attracting much attention. Although they are as yet into the new body but twelve feet, there are certain indications which make it the best strike yet made in the mine. First, the dip is to the east; and, second, there is water in the ore. The trouble was in the bodies of ore found above that they were all too dry. Rich as they were there was a lack of moisture about them that made old miners distrust their permanency. The new body fulfills all of the conditions. It is as rich as could be desired; dips in the right direction and is wet. The fact of there being water in the ore on the 1600-ft level shows that no drift, crosscut, or other opening yet made on the 1700-ft level has passed into or through the same streak of rock. It is quite certain that this body of ore will be found on the 1700-ft level, and at no distant day. The finding of this body in no way interferes with or lessens the prospects in other parts of the mine.

A thing to be noted, too, is the "making to the north" of all the ore-bodies found in the Ophir. In all we have ever had to say of the mine, this peculiarity of the ore-bodies has always been prominent. From the first striking of ore in the mine up to the present day, this making to the north has been the main feature. What it portends we know not; but every body of ore found in the mine has been richer and stronger on the north side. The same is the case with the body just being opened on the 1600-foot level. It appears to be in the opinion of Superintendent Curtis, but the tail end of a very heavy body of ore lying off to the north, the head of which he thinks is somewhere in the Mexican. This is comfort to the holders of Mexican. There is more comfort for them in the fact of all bodies of ore yet found in the Ophir being decidedly stronger on the north side."

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, MARCH 4.	THURSDAY, MARCH 11.
MORNING SESSION.	MORNING SESSION.
25 Andes.....15@16	415 Alpha.....18@19
35 Alpha.....15@16	475 Belcher.....15@16
75 California.....15@16	475 Belcher.....15@16
365 Baltimore.....15@16	425 Chollar.....15@16
100 Bacon.....15@16	185 O. G. Hill.....15@16
425 Bullion.....15@16	140 Lady Egan.....15@16
25 Justice.....15@16	2700 California.....15@16
625 Belcher.....15@16	825 Crown Point.....15@16
20 Confidence.....15@16	

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

CALAVERAS COUNTY.

CHAMPION MINE.—**WEST POINT.**—*Calaveras Citizen*, March 6: During the past week sinking has been vigorously prosecuted, developing a third vein running parallel to the north and south lode, and a quality of ore equally good as either of the other two. Practical miners claim that this, so far, is one of the richest mines in the State. The rock has never paid less than \$100 to the ton, and as high as \$500, the rock now not being placed at the latter figure. If the mine holds good along this north and south vein, as indicated by surface prospecting, properly opened, it could be made to yield from fifty to sixty tons per day, and, taking an average of the rock already crushed, it can readily be seen what a valuable piece of property Mossers, Haskins and Hadley have come into possession of. With proper machinery, and this mine thoroughly opened, it could be made the most productive ledge in California.

COLUSA COUNTY.

A SINGULAR LEDGE.—*Colusa Sun*, March 6: There has been a company at work on the ledge near Founts' Springs, heretofore noticed by us as containing a kind of white metal supposed to be tin, and which assays both gold and silver, and they have in running the tunnel found almost everything. They have good prospects of cinnabar, have found several small veins of coal; and the other day they came on a large deposit of shale, so rich in oil that they were enabled to get twenty gallons of oil from a ton of it, and the shale burns as well as coal. The ledge is well defined for miles, and is about one hundred and fifty feet wide, and a very large percentage of the entire mass is metal of some kind. Gold, silver, copper, tin, iron, lead, quicksilver, coal and coal oil have been found in it so far, and the company are now hunting for something else! The tunnel being run will strike the ledge about one hundred and fifty feet below the surface, and the last we heard from it, they were within about twenty feet of the ledge.

CONTRA COSTA.

MINING ITEMS.—*Contra Costa Gazette*, Mar. 6: The work of the quicksilver mining company near Clayton, is being prosecuted with much energy and method. The furnace was put to test for smelting, and was found to require some alteration; but the yield from the ore is quite satisfactory, though only that of the lowest grade was smelted. The prospects are so fair that the company will erect another furnace, and make further preparation for extending their operations.

The company, composed of Charles P. Marsh, Sheriff Morse, and other Oaklanders, who lately purchased the old Lyman Hastings ranch, have done some service prospecting, and propose shortly to engage in testing their ground systematically. Many mining experts and capitalists have visited the district recently, and there is likely to be considerable exploration there for quicksilver this season.

Messrs. Hatch & Co., the present owners of the Heston ranch, north of the Telegraph road, are running a tunnel which at 1,000 feet is expected to strike the coal vein, which has heretofore been somewhat extensively prospected at or near the outcrop. The tunnel is now in 400 feet. Messrs. Lux & Miller, who have purchased the Grover ranch, further down the creek, and adjoining the property of Hatch & Co., are also intending to run a tunnel for the coal vein.

INYO.

PANAMINT DISTRICT.—*Panamint News*, Mar. 6: Prospectors who have come in within the last few days bring with them exceedingly rich rock from all sections—east, west, north and south. They are highly elated, and say that the country hasn't been prospected at all yet. Most all that have been out heretofore seemed to be looking for the high-stained ore, and have passed entirely over the best kinds of free-milling ore. They are just beginning to find out where the best ores are, so they say. The ores we have now are certainly high grade enough to satisfy almost anybody, and if this thing keeps on we advise our dealers in that line to send for more lumber, and our merchants to hurry along more grub.

CONCENTRATORS.—The Herdy concentrators for the Jacob's mill, Panamint, have arrived. They have been placed in position, the pans set, and the mill is ready to start up. Six of these concentrators have also arrived for the upper or twenty-stamp mill of this company, and will be set in operation as soon as the mill is ready to crush the ore.

LAKE COUNTY.

QUICKSILVER SHIPMENTS.—*The Free Press* says that the Great Western and Sulphur Banks mines, both in Lake county, shipped, via Calistoga, on the 25th February, 302 flasks of quicksilver, valued at \$40,000, the product of one week's run.

ANOTHER FURNACE.—*The Bee* of March 4th says: The California Borax Company intend putting up immediately another furnace at the Sulphur Banks Quicksilver mine. The new furnaces will be of the Knox & Osborne pattern, of thirty-ton capacity, with sixteen condensers of the largest size.

NEVADA COUNTY.

NEW YORK HILL.—*Foothill Tidings*, March 7: New York Hill is fast gaining position among our paying mines. Since September last, 315 loads of rock therefrom have been worked at the Larimer mill, which produces something over \$28,000, or an average of \$90 per load. Each month's run has exceeded this previous one in the average value of the rock and when the mine is opened so as to work a reasonable force thereon something weighty in the way of gold bars may be expected.

SIERRA COUNTY.

NEW HILL.—*Mt. Messenger*, March 6: The Oro Q. M. Company have made all arrangements for erecting a ten-stamp mill to work their ore. The surveys for water have been made and plans for the mill about completed. The water will be taken out of the South Fork, and conveyed by flume through a tunnel to mill sight at the lower end of Durgan Flat. It will have a fall of twenty-five feet, which will be ample for the center-discharge wheel they propose to put in. Work will be commenced in a short time.

SONOMA.

RICH STRIKE.—*Sonoma Democrat*, Mar. 6: A rich deposit of cinnabar has been found next to the Sulphur Banks, similar in character to that being worked at the above-mentioned mine. The ground has been located by Jake Gear, the discoverer, Robert Oliver, J. H. Jameson and Geo. Marshall. Mr. A. Miller has located the first extension west, on north side of the road leading from Lower Lake. The prospect in this claim is unusually flattering, and there is considerable excitement in the neighborhood. Two miles west of this, in McIntyre's cañon, T. F. Hayter, Jake Gear and others have made locations. The prospect is same as next to Sulphur Banks.

PINE MINING DISTRICT.—*Sonoma Democrat*, Feb. 27: The recent mineral discoveries between Forrestville and Russian river have led to the formation of a new mining district, bounded as follows: Commencing at John Bone's place, thence running west to Dutch Bill creek, thence down Dutch Bill creek to Russian river, up Russian river to the mouth of Green Valley creek, up said creek to the township line, thence south to the place of beginning. Mr. James Stone, a resident of Redwood township, is running a tunnel on a claim located by him at the head of Duval creek. Some of the rock was sent to San Francisco for assay, and the returns showed \$50 gold and \$6 silver. Some rock from the same claim made a handsome return in quicksilver. Mr. Stone calls his mine the Mountain View. The outcrop was discovered near the top of the mountain, and the tunnel now being run is on the side of the hill below, and will strike the ledge at a considerable depth. Mr. H. Lindolph, residing in this district, is also working a claim which promises a handsome return. There will be great activity in prospecting throughout the county the present season, and we look for the development of rich mines in both gold and silver. Quicksilver is already among our most valuable exports.

TUOLUMNE.

GEM G. & S. M. Co.—*Stockton Independent*, Mar. 4: The mine of this company is located in Tuolumne county, and the principal place of business is in this city. The mine is situated two and a half miles northwest of Columbia, on the Pandole road, leading from Gold Springs to Vallecito. The shaft is 118 feet deep; the north drift 32 feet; and the south drift 20 feet. There are 275 tons of ore on the dump, from which two assays have been made—one of \$132.43, and the other \$136.36. Forty feet below the shaft is a stream of water sufficient to run a twenty-stamp mill. A wheel has been erected, with a pump attached, which will pump the mine dry in one and one-half hours. A drum has also been placed in position at the main shaft which is calculated to raise seven hundred pounds of rock at a time. In developing the mine this sum of five thousand dollars has been expended.

Nevada.

WASHOE DISTRICT.

CALCEDONIA.—*Gold Hill News*, March 4: The repairs to the shaft and machinery are about completed, preparatory to commencing the sinking of the main incline in good earnest. A road has been surveyed from the railroad to the site of the intended new shaft of the company. This shaft will be located on the west side of Gold canyon, nearly on a north and south line with the new Overman shaft, about 1,500 feet south of it and nearly 2,000 feet east of this present hoisting works. The grading for the site has already been commenced, and the most of the machinery is already manufactured at the foundries in San Francisco, ready for shipment. These works will be furnished with hoisting and pumping machinery of the most powerful and approved description, capable of sinking the shaft to the depth of 4,000 feet or more. The shaft will be complete in all its appointments, and is calculated to cut the ledge at a depth of 3,500 feet from the surface.

ORPH.—Daily yield, 150 tons of ore. The ore stops and breasts on both the 1300 and 1465 ft levels, are looking well and yielding the usual amount of good ore. The north winze is down to the 1600-ft level the entire distance in splendid ore. At that point the sinking has been discontinued pending the putting in of station sets at both the 1500 and 1600-ft levels, preparatory to starting drifts west at those points to connect with corresponding drifts from the 1500 and 1600-ft stations in the shaft. These drifts are very im-

portant workings, as they will in a great measure determine the width and character of the ore body at those points, and perhaps set at rest all doubts or cavil in regard to the extent of the paying body of ore in a downward direction. The ore developments already made at the 1600-ft level are acknowledged to be the deepest yet made on the Comstock, being 123 feet deeper than the winze sunk below the 1550-ft level of the Consolidated Virginia.

CONSOLIDATED VIRGINIA.—Daily yield 450 tons of ore, keeping the mills steadily running. The ore breasts are all looking splendidly, as usual. But little ore has been taken from the 1550-ft level during the past week, owing to inability to hoist through the Gould & Curry shaft. On the 1500-ft level the ore stops are being gradually extended north of cross-cut No. 1, along the east wall of the ledge, the ore still continuing of the same rich character. The 1300, 1400 and 1500-ft levels are all being rapidly connected at available points by air winzes, which greatly facilitate the extraction of the ores on these levels. The yield of bullion for the present month up to last evening, was \$763,980.77. The mines never looked more prosperous or promised richer future results than it does at present.

LADY BRYAN.—The body of ore struck in the southeast cross-cut and the south drift on the 80-ft level, still continues to the southward, and is of a very fine and promising character. This ore body has been penetrated by the cross-cut east a distance of 34 feet; and by the south drift a distance of 22 feet, and is of a very even and encouraging character. An average of the thirty-five assays gave \$168.29 per ton. The assays show an average value of about one-third gold to two-thirds silver. On the 250-ft level the west cross-cut has penetrated the ore vein a distance of 40 feet, but has not yet reached the point at which it is expected to find the ore body struck on the level above.

CALIFORNIA.—The north drift of the 1550-ft level is being steadily extended northward at the rate of 25 feet per week, the face of the drift still in ore of the richest possible character. On the 1500-ft level the north drift from cross-cut No. 1 has reached the line of cross-cut No. 2, and a drift has been started back west to meet and connect with cross-cut No. 2. The ore in the west drift and also of cross-cut No. 2 is of a very rich character. The face of cross-cut No. 3 on this level continues in ore of a good quality. The face of cross-cut No. 4 on the 1500-ft level is in 70 feet from the starting point, and is in ore assaying from \$20 to \$30 per ton. The south drift from the east winze, now being sunk from the 1400 to the 1500-ft levels, is still in fine ore. Sinking this winze is also making fair headway, the bottom still in good ore.

SIERRA NEVADA.—The rock in the bottom of the new shaft is much firmer than heretofore, and admits of better headway in sinking than for some time past. The flow of water does not in the least impede progress. The prospecting drifts south from the old Sierra Nevada tunnel are also being driven ahead with all the vigor possible, to reach and determine the character of the ore vein further to the southward than it has yet been prospected on that level.

KNICKERBOCKER.—The west cross-cuts, on both the 600 and 700-ft levels, have struck the east clay wall of the ledge, so that it cannot now be long before the ore vein will be reached on those levels. The new pumping machinery has arrived at the mine, and is being placed in position.

BELCHER.—The ore breasts are yielding the usual amount of milling ore. There is little or no change in any of the ore producing sections during the past week. Sinking the three prospecting winzes below the 1400-ft level still goes vigorously on, the bottom of each still in ore.

NACARA.—The main incline is down 150 feet in depth, and is well timbered throughout. It is being sunk directly on the ore body, which is looking finely, and promises a good development for the future.

SENATOR.—Both main drifts, north and south, are making excellent progress. The south drift, which gives the most favorable assays, is now in 55 feet, and, being in the most favorable looking formation of the eastern Comstock, bids fair from the present showing to soon run into good paying ore.

BEST AND BELCHER.—The south drift, from the double incline winze on the 1700-ft level, is still pushed ahead, following the east clay wall of the ledges. Wherever the east clay wall has been out, it looks very favorable for future ore developments.

BULLION.—Driving the south drift on the 800-ft level is making fine progress. Cross-cutting this portion may yet develop some good ore deposits.

BALTIMORE CONSOLIDATED.—Erecting the new pumping machinery is making steady headway. Prospecting the 750 and 850-ft levels still continues without abatement, and with some very favorable indications of future ore developments.

MEXICAN.—The north drift on the 1465-ft level of the Ophir is showing a steady improvement as the work advances.

ORIGINAL GOLD HILL.—The face of the raise above the 340-ft level, 350 feet south of the shaft, was run six or seven feet into the red ore described in last week's report, and, finding that it was evidently a large and permanent body, assaying high figures, the unsprinkled thought best to get after it in a more practical and efficient manner, as this prospecting raise was in wet ground liable to cave, and noways advantageous to work through. A drift is now being run from the track floor level of the main

south drift, to run under where this ore body is found, and no doubt directly into it. It will be reached very shortly, when a valuable development may be looked for.

THOX CONSOLIDATED.—The new steam hoisting machinery, including an engine (125-horse power), is on the way from San Francisco, and will arrive here on Saturday next.

KOSSTUN.—Sinking the main shaft is making steady progress, the bottom in hard blasting rock. It is now down 450 ft. It is the intention to open another station at the 500-ft level.

JUSTICE.—The prospecting operations on the lower levels are still being pushed ahead with all the vigor possible, the evidences of finding a paying mine becoming more favorable every day.

PHIL. SHERIDAN.—Main west drift going ahead lively, running at present in soft ledge matter, with occasional seams of red quartz from three to six inches wide. These seams or "feeders" assay lightly in gold and are very liable to lead into something good before long.

CROWN POINT.—Daily yield, 400 tons of ore. The ore breasts show but little change during the week. The main east drift on the 1600-ft level to cut and prospect the ore vein at that point, is making steady progress without change of interest to report.

EUROPA.—The face of the east drift or cross-cut from the bottom of the winze, 115 feet below the adit level, shows stringers of very favorable looking quartz carrying metal, and from present indications, as well as what is already known by developments above, the ledge is only a few feet distant.

WELLS-FAROO.—The new steam hoisting machinery which started up ten days since, is now being run day and night, three shifts of miners being employed in sinking the shaft.

GOULD & CURRY.—Rapid progress is being made with the enlarging of the main shaft below the seventh station level.

IMPERIAL EMPIRE.—Sinking the main incline below the 2000-ft level is making good headway. Driving the main south drift on the 2000-ft level is also making good progress.

JULIA.—The face of the main south drift on the 1000-ft level is still in vein matter of a very encouraging character.

OVERMAN.—Steady headway is being made draining the water from the shaft. Arrangements are being rapidly completed for the erection of a more powerful pump for draining the water.

AMERICAN FLAT.—Prospecting the 750 and 800-ft levels is progressing well, with some very favorable indications of ore developments ahead.

SOUTH COMSTOCK.—The new steam hoisting works went into full working operation day before yesterday, and sinking the shaft is resumed under the most favorable auspices.

SILVER HILL.—The face of the south drift at the third station level is still in red quartz of a promising character.

LEVIATHAN.—The new hoisting works machinery has been started up and is getting into full operation to-day.

Colorado.

CLEAR CREEK COUNTY.

SACO.—About 300 feet of the second pocket have been uncovered in this mine.

POLAR STAR.—This mine has been sold at satisfactory prices.

BROOKLYN.—The Georgetown *Miner* says that this mine is rapidly looming into notice, not only as an ore producer, but as a producer of rich ore. It is now being worked by a tunnel or adit on the vein, just above timber line, which has been driven a distance of two hundred feet, reaching a depth of one hundred feet from the surface. The mineral streak varies from one inch to twelve inches, and the ore runs uniformly rich, mill runs giving five hundred and eighty ounces silver per ton for first-class, and two hundred and forty-two ounces for second-class, or a coin value respectively of \$754 and \$314.60.

THE FREN ROSSERS.—This popular mine is, we learn from the *Miner*, being successfully worked. The ore is divided into three classes—first, second and third. The third-class usually runs from 150 to 200 ounces silver per ton, the second-class from 200 to 300 and 400 ounces, while the first-class includes all above that, up to and into several mill runs, above 1,500 ounces.

COLORADO CENTRAL.—A highly interesting fact has been developed in the workings on the ground of the Colorado central, west of the discovery shaft. Here may be seen the phenomenon of a vein of obsidian, volcanic glass, three feet wide, crossing this great ore channel. The obsidian cuts off the vein matter at its crossing with mathematical precision. The ground on that portion of the mine, No. 5, owned by the Marshall silver mining company is now in royal pay. Six different companies who are leasing ground on No. 5, are taking out high grade milling ore in paying quantities and we learn that portions of the ground on the Colorado central is in good pay also.

THE O K—O K is one of the remarkable ore channels of Leavenworth mountain. The ore mined out of this lode has frequently yielded by mill run from 500 to 800 ounces in silver per ton, or a coin value of \$600 to \$1,040 per ton. The total production of this mine has been estimated from \$33,000 to \$40,000. So says a correspondent of the *Miner*.

SACO.—The records of this mine show that the total products since its discovery, two years and six months since, has been \$134,175. The highest mill run of ore taken from this mine, was \$2,900, coin value per ton.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Sixth Lecture Delivered before the University of California College of Agriculture, on Tuesday, January 26th, by PROF. C. E. BESSEY.

[From Pacific Rural Press.]

The Cone Bearing Plants and the Oak Family.

The cone bearing plants, *Coniferae* form a small order of about 350 species. All are woody, varying in size from trailing shrubs to the largest trees on the globe. A balsamic fragrance pervades the family and this is often associated with valuable medicinal properties. In their distribution, they extend throughout all parts of the temperate and colder climates; occurring also to some extent in the tropics, upon mountain sides. They are of great economic importance, furnishing not only the most important woods for lumber, but also fuel, medicines, materials used in the arts and for the people in certain limited districts a considerable amount of food. In the northern hemisphere, the genus *Pinus* seems to be the predominant one in this order and in every country of this half of the globe, one or more species seem to be particularly adapted to meet the wants of civilized man. Of these, we can notice but a few.

The Scotch Fir, *Pinus sylvestris*, is found in Europe and northern Asia, forming large forests. It is very largely used for building purposes. The one referred to in English books takes the place of, or corresponds to the Redwood of California.

White Pine, *Pinus strobus*, is a tall, large tree found growing throughout the northern United States. Its wood is white and it readily works into valuable lumber. It is very largely used, almost to the exclusion of other woods.

Sugar Pine, *P. Lambertiana*, is an enormous tree of the Pacific slope, attaining sometimes the height of 300 feet, with a diameter of 20 feet. It is very similar to the White Pine of the East, but has a smaller cone. The wood is extensively introduced into our markets.

Yellow Pine, *P. ponderosa*, of the southwestern United States, has a dense, heavy wood that almost sinks in water and is full of resin. From the wood of this tree, by burning it with a close, smothering heat, tar is obtained. Pitch is the evaporated tar. Turpentine is a fluid obtained by making rude incisions in the bark of the tree, from which it flows. It is composed of a volatile oil and a resin. When heat is applied, the oil is driven off into a receptacle and is known as this oil of turpentine, while the residue is the well known resin, or rosin, of commerce. Another variety of Yellow Pine, *P. ponderosa*, as also the Western Balsam Fir, *Abies grandis*; Menzies Spruce, *A. Menziesii*; *Thuja gigantea* and Californian White Cedar, *Libocedrus decurrens*, are all of more or less value.

Douglas Spruce, *Abies Douglasii*, of the Rocky mountains and Sierra Nevada region; in some localities is incorrectly called White Pine. It is a large tree, of great height but slender stem, and its wood is largely used for planing, also for railroad ties, for which purpose its great durability admirably fits it. From it very good lumber is obtained, but not the very best. It lasts well, especially that taken from high regions. The tree has a peculiar cone.

The Redwood of the Pacific slope, *Sequoia sempervirens*. A large tree, sometimes attaining a height of 300 feet with a diameter of 15 feet. It has small cones; from one to two inches long, and short leaves which have somewhat the appearance of those of *Abies*. This wood, (Redwood) is the one used more largely in housebuilding. The receipts of this lumber in San Francisco, in 1874, amounting to about 87,000,000 feet, were fully two-thirds of the whole. Spruce fir, *Abies excelsa*, a fine tree, growing to the height of 100 to 150 feet in its European home. From its white deal lumber is made; from its resinous juice, Burgundy pitch is made and its branches are holed to aid in the manufacture of spruce beer.

Balsam Fir, *Abies balsamea*, a native of North America, is a fine tree of small size. It produces a turpentine known as Canada balsam, used in mounting microscopic objects.

The European Larch, *Larix Europaea*; is, in England and Europe generally, a valuable timber tree. From its juice is obtained Venice turpentine. This tree is also grown for ornamental purposes. *Cupressus*; valuable trees, known as Cedars. Their wood is very durable and is largely used in the manufacture of various domestic utensils, as well as for posts, piles, etc. Some of this species are used for ornamental purposes among which may be mentioned the Monterey cypress.

The Junipers and Red Cedars, *Juniperus*, are valuable for their durable wood. From *J. Virginiana* and *J. Bermudiana*, lead pencil sheaths are made. Their berries are of some medicinal value.

The Yew, *Taxus baccata*, a large tree of Europe, is noted for the great durability of its wood, specimens having been found in the ruins of Nineveh. *Pinus Pinaster*, *P. Laricio* and *P. Maritima*, all of Europe, are used on the coast of Ireland and Normandy for fixing the sands. All are more or less ornamental. This is the case with *Pinus*, *Abies*, *Cedrus*, *Cupressus*, *Thuja*, *Taxus* and *Salsburia*. Of remarkable trees, there are the *Sequoia gigantea*, the giant Redwood; the Norfolk Island Pine, *Araucaria excelsa*, a specimen of which can be seen in the yard of the San Francisco postoffice, but which is not hardy here; and the Maiden Hair tree, *Salsburia adiantifolia*, the leaves of which are especially peculiar.

The Oak Family,

Cupuliferæ; numbers 330 species, of which 280 are members of the genus *Quercus*; is mostly confined to the northern hemisphere. For timber this order ranks next to the *Coniferae*,

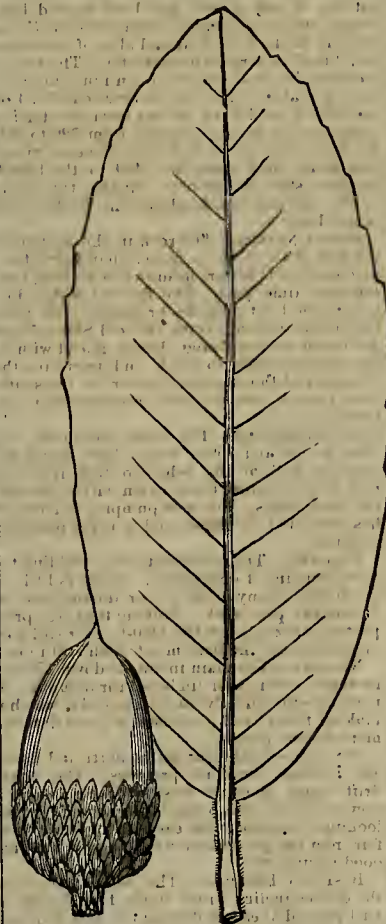
Fig. I.

Live Oak—*Quercus virens*—reduced one-half.

the Oaks occupying a place second only to that filled by the Pines and Firs.

British oak *Quercus sessiliflora* and *Q. pedunculata*. These are extensively used for ship building in England; especially the first, whose wood is very tough, heavy and durable. The bark is much used in tanning and somewhat in

Fig. III.

Tan Bark Oak—*Quercus densiflora*—natural size.

the manufacture of dyes. It would be an experiment worthy of trial to import from England a quantity of acorns of the first species, as in all probability the tree might be

Very Profitably Grown Here.

Quercus virens, the Live Oak of the southeastern Atlantic States, (See Fig. 1), is very valuable also as ship timber. It should be introduced.

The White Oak, *Quercus alba*, is in the United States east of the Mountains, one of the most valuable of hardwood trees. Its timber when protected from the changes in moisture is very durable and that grown on particular soil exceedingly tough. (See Fig. 2).

Quercus Hindsii, a relative of the last is one of the most common of the deciduous oaks in central California. Its wood is not of great value being too brittle.

Quercus agrifolia is the common evergreen species and abounds in Oakland and vicinity. The wood is said to be rather brittle and not well adapted to use where toughness and strength are required. A form of this or pos-

sibly of another species is used somewhat for ship-building and it is said to give good satisfaction.

The Evergreen species in California are very variable, and much confusion still exists as to their specific limits.

The American Beech, *Fagus ferruginea*, is common east of the Mississippi valley. Its wood is heavy and dense and is much used for planes and other carpenters' tools. It is not found on this coast.

Castanea vesca, the Chestnut, furnishes a valuable lumber for cabinet work, it being light and nearly white. It is also used for inside finishing in houses. Its fruits are well known. The fruit of the European Chestnut is larger and better than that of the American variety. A species of this variety grows in California.

The Filbert, *Corylus avellana* grows in Europe. It is a shrub much like the Hazel of America to which it is very nearly related. Its fruits are the filberts of commerce. The Oak galls so largely used in inks and dyes, are produced on an oak (*Q. infectoria*) growing in Western Asia. These galls are produced by the punctures of a species of Cynips or gell-fly which makes these wounds in preparing a receptacle for its eggs.

Fig. II.

White Oak—*Quercus alba*—reduced one-half.

Tanbark Oak, *Quercus densiflora*, (See Fig. 3), is coming considerably into use and is found when properly prepared to be very tough and durable, and to be admirably adapted to use in the manufacture of agricultural implements.

Fig. IV.

Canyon Oak—*Quercus chrysolepis*—natural size.

The Cañon Oak, *Quercus chrysolepis*, is said by those who are familiar with the tree to be almost equal to the Live Oak of the East for ship-building, (Fig. 4). This species is found growing in the deep cañons of our mountains.

CAPTAIN RICHARDS shipped on the 30th inst., from Battle Mountain, five car loads of copper ore from the English company mine in Copper cañon, near Glendale. The ore from the mine is shipped direct from San Francisco to Liverpool.

WATER for mining purposes is getting very scarce, says the Nevada Transcript, and unless we get a "heap" more rain, times will be exceedingly dull. The miners are making the most of what water they have, but it will not last a great while longer.

THE yield of gold from placers and quartz in Montana, in 1874, is placed at \$2,360,170, divided as follows: Placers, \$1,864,170; quartz, \$496,170.

Two large new boilers have been received at the hoisting works of the Consolidated Virginia mining company, and will at once be set up.

Shall the Productions of the Soil be Patented?

The press—especially the agricultural portion of it—have given some space of late to the discussion of the merits of a bill now before Congress, which, in its design and provisions make the productions of the soil patentable. The bill provides that every resident of any State or Territory of the United States, who has been or shall be the originator of or discoverer of any new and valuable fruit or plant, being a new variety of any grain, vegetable, vine, herb, root, tree, wood, plant, shrub or flower, or the seeds, roots, scions, bulbs, burs, eyes or cuttings thereof, and which shall not have been sold or publicly offered for sale, shall have the sole right and liberty of growing, propagating and selling such plant for the term of seventeen years.

Those who are, or profess to be, especially concerned for the rights of the agriculturist and horticulturist, declare that they cannot see why a man who produces an improvement in these departments should not possess the same right in them that is granted to mechanics and others. But, putting in this claim, is, to say the least, hardly opportune at the present time, when farmers are making a special effort to restrict patents, if not to ignore them altogether. But we do not really believe that the classes for whose interests this bill is supposed to provide desire its passage. In the first place, they would not derive any direct benefit from such patents, for such improvements do not originate with these classes. It is to the enthusiasts in these matters, isolated individuals, retired but ardent worshippers at the shrines of agriculture and horticulture, that we trace the improvements in fruits, grains, flowers, etc. The amateurs who were dependent upon commerce and the trades and professions, or who were independent of all these callings, have produced most of our improved varieties of grain, fruits, flowers, etc.

The originator of the celebrated Goodrich potato, was Dr. Goodrich, physician to the N. Y. State Lunatic Asylum. The grounds of the asylum afforded a good field for his experimental operations, and he found recreation from his arduous professional labors in the efforts which resulted in this celebrated seedling, which has been as widely known as any potato that has ever been produced.

We could mention many cases of a similar character, but will merely refer the reader to the brief sketches of new varieties of grain, vegetables, fruits and flowers, which, in a large proportion of cases that inform us they were originated by some physician, clergyman, or retired merchant or capitalist.

So if there is any royalty to be paid for these improvements it will come out of the pockets of the farmers instead of going into them; and there is a probability that a monopoly will thus be built up, more onerous to the agriculturist classes than any now existing. The producer and the consumer will alike be taxed to sustain a new and powerful order of middlemen. It is safe to predict that it will be new in every respect; for if money is to be the incentive to experiments in this field of invention, we may expect to see the enthusiastic, unselfish men to whom we have hitherto been indebted, slacken their labors, and their places supplied by an entirely different class of men. They have not, as a general thing, sought pecuniary reward; as a class they have been remarkable for their modesty and disinterestedness. Still they have not, by any means, lived lives of self sacrifice. The man who is, through a long course of years, employing his leisure hours in perfecting some seedling, grain, fruit or flower, is no more an object of commiseration or reward than is the trout fisher on the bank of some favorite stream. In mechanical inventions and scientific research great sacrifices of time and money are generally made before anything substantial is gained; but nothing of the kind is required in securing such improvements as this bill would make patentable.

Even though justice and the interests of agriculture and horticulture required the proposed protection by patents, is it practicable? If a farmer buys at a high figure a potato or an ear of corn of some new and expensive variety, will he not dispose of the increase from these as he thinks proper? Can he dictate to the purchaser thereof whether he shall eat all the potatoes, or plant a portion of them, and the same with the corn? And the surplus scions and runners which we remove from off our trees and vines; shall we be allowed to give them to friends and neighbors? It will be rather hard if we are denied this privilege; but without this restriction a patent on fruit would be of little avail; for a very large portion of the increase of choice fruit is brought about in this way; and the same rule applies largely to plain agricultural products. These patents are, it seems, to be good for seventeen years; but we apprehend it would require a larger increase of office holders to manage this thing seventeen months, even, than the country would submit to.

We have as yet heard nothing said in connection with live stock; but the sacrifices are greater in producing a clearly defined, valuable breed of cattle and horses, sheep or fowls, than any of the products referred to above; while the benefits which the country receive from the former are quite as tangible and permanent, and common justice would grant the stock breeder a patent as readily as it would to the originator of a variety of grain or fruit. But in tracing out the proprietary rights of the cattle or poultry breeder, what a fearfully bewildering series of cases of mistaken identity present themselves to the imagination!

GOOD HEALTH.

Dangers of Pork Eating—Now the Trichina Kill.

We condense the following from the *Health Reformer*:

When taken into the stomach the trichina is invested by a capsule. The fibrous capsule is very soon dissolved away by the gastric juices, thus setting at liberty the partly matured worm, which grows very rapidly, attaining its full size in about two days, being then many times larger than when first taken into the stomach, when its length is only about one-twenty-fifth of an inch. In about a week each worm gives birth to about 1,000 young, according to Leuckart, which immediately begin to penetrate the mucous lining of the stomach and intestines. This gives rise to violent purging and vomiting, but to little effect for the relief of the patient, for the worms are already secure in the walls of the intestines. In a very short time they find their way into all the muscles of the body, when the most painful symptoms occur. The patient lingers along for a few days, perhaps weeks, in the most distressing suffering, finally dying from exhaustion, or from suffocation caused by the great number of parasites infesting the muscles of respiration and thus preventing their action.

In less than two weeks after eating an ounce of infected meat a person might have in his intestines hundreds of millions of these rapacious animals, whose ravages no remedy can stay. Imagine the agony which a person must suffer, while this numberless horde of microscopic serpents are boring through the wall of his alimentary canal. The rapidity with which the body becomes filled with these loathsome creatures is most astonishing. Professor Dalton found 208,000 to the cubic inch in the muscles of a boy who died on the twentieth day after being attacked with the disease. When a person has been once poisoned he can never become free from the parasite. Death is his most probable end; but some survive after many months of suffering worse than death. In these cases the worm becomes incased in a calcareous sheath, which process takes place in from one to two years. Here they may live for an indefinite period, probably as long as the patient. Virchow mentions a case in which they were found alive in a cancer removed from a woman twenty-four years after they were received into her system.

Its Prevalence in Swine.

The trichina is found in cats, rats, mice, and various other animals, as well as in the hog, and it is probable that they are introduced into the latter by eating the dead bodies of the first mentioned animal. It seems to be the general belief that the disease is of rare occurrence in hogs, and need excite no apprehension. Various facts disprove this supposition, however. It should be remembered that the flesh of an infected animal may be apparently healthy to an unassisted eye for the trichina are microscopic objects, often being no more than one-seventh-third of an inch in length and one nine hundred and sixtieth of an inch in diameter. Careful observations have been conducted by scientific men to ascertain the frequency of the disease by examination of the dead carcasses sent to market. A committee of the Chicago Academy of Sciences reported in the *Medical News and Library* of June, 1866, that in 1394 hogs examined in different packing houses and butcher shops of the city they found an average of one in fifty affected with trichina. A gentleman in Louisville reported, as the result of extensive observations, that he found an average of one trichinous hog in every ten examined.

Frequency of the Disease in Man.

Until recently there has been no conception of the frequency of this disease. It is now positively known that many cases of supposed typhoid fever are really the results of trichina poisoning. Professor Janeway, Demonstrator of Anatomy at Bellevue Hospital, asserts that observations in the dissecting room had convinced him that the disease was of great frequency, not being discovered until revealed by post-mortem examination, the patient being treated for some other supposed affection. He found three cases thus affected in the short space of one month; and it is probable that the majority go undetected.

Trichinosis may simulate numerous diseases. In the first stages it would readily be mistaken for diarrhea, dysentery, or peritonitis. The later stages as closely resemble rheumatism and typhoid fever. The patient often dies in coma, the cause of which would be likely to be attributed to almost any cause but the real one.

Many unmistakable cases of the disease have occurred within the last ten years since public attention has been called to it. A physician last winter attended eight cases of the disease in a single family in Malcolm, Iowa. Several members of the family died in a few weeks. The remainder of the family survived but only to continue suffering. None of them have regained their health.

In Helstadt, Prussia, one hundred and three persons were poisoned by eating sausage at a public dinner. A large number of them died in a short time, twenty within a month.

In Germany 360 persons were attacked with the disease at one time. Large numbers of them perished miserably. Those who survived were doomed to carry about in their flesh, dur-

ing the remainder of their miserable life, myriads of loathsome worms encased in calcareous envelopes which sometimes forms around them, preventing their irritating action on the human system, and thus rendering the life of the patient possible, sometimes for many years after the first attack.

WHOOPIING COUGH.—No known means will arrest the disease unless it be the means recommended and practiced by the celebrated Brown-Séquard, which consists in keeping the patient insensible with poisonous doses of belladonna for several days in succession. If the patient does not die it is barely possible that he may escape the disease upon recovery from the effects of the poison. The cause of the disease is a poison which pervades the system. Recovery takes place when it is all eliminated and not before. Nurse the patient well, avoid exposure to sudden changes of temperature, but keep the air of the sick room pure as possible by ventilation. Give nourishing food, and administer a warm bath every other day.

USEFUL INFORMATION.

A Few Hints to Foremen.

To manage a gang of men properly is a matter that requires a more thorough knowledge of human nature than falls to the lot of thousands of foremen. There are hundreds of foremen who imagine that a great deal of noise, bluster and profanity is necessary to secure the performance of the greatest amount of honest labor. This is a grievous error.

If any one will take notice of a gang of men whose foremen is sour, cross and surly, and whose mouth is always full of oaths on the slightest provocation, either fancied or real, it will be seen that the men care little for what they are doing. They always keep at least one eye on the "boss," and as soon as his "back it turned" they commence to "soldier" at once. If he leaves them for a while, they are not anxious to make a good showing on his return, for they are sure of a season of abuse, however faithful they may have been in his absence. There is nothing to encourage them to extra exertions, and all they care about is to get along as easily as possible until pay-day.

Honest, skillful workmen are not likely to stay with such a man any longer than they are obliged to, and such foremen can seldom keep other than a gang of reckless, third-rate workmen together. They are continually in trouble; but little work is done, and that in a slovenly manner. Usually this kind of men manage their work without any system or regularity. The men get in each other's way; they get each other's tools; they take hold of things at the wrong end; everything is hurry and confusion, and the foreman imagines that because he has made a great deal of noise and the men have exerted themselves tremendously he has accomplished wonders, while in reality he has done but little.

At times a dozen men are set to perform what might easily be done by half that number, at other times a half dozen men are expected to do what would require the united efforts of twice that number. These foremen do not know how much a man can or ought to do. They go to work on a job headlong, without exercising any forethought or judgment, and the latter is seldom possessed by the class of men in question. These men have a very high opinion of their ability, when the fact is they are a positive injury to any person who may be so unfortunate as to employ them.

If a foreman is of a kind disposition, possessed of a cool head and good judgment, with a friendly feeling existing between himself and the men under his charge, they need no urging in cases of emergency. A cool-headed man is usually possessed of good judgment, and knows how to place men so that they can work to good advantage. Every move counts, and work is rapidly performed without any seeming hurry, whereas the snarly, quick-tempered man will worry and fret both himself and every one around him and accomplish but little. Good nature is indispensable to the successful management of workmen, but it should be accompanied with sufficient firmness and decision to prevent any undue liberties on the part of the workmen.

In the machine shop, the foremen who has the last-mentioned qualifications will have everything shipshape. Every workman knows what would displease the "boss," and takes especial pains to have everything in good order. He does his work in the best manner, both for the praise he expects to receive from his foreman and the interest he feels in the welfare of his employers.

When a workman knows that faithful, honest labor is appreciated, he is not slow to take a lively interest in the work in hand, and it is of great importance that individuals or corporations employ no foremen who are continually at war with the men under their charge.—*R. R. Gazette*.

A FRENCH chemist claims to have discovered a means of extracting moisture directly from the air for the irrigation of land in dry seasons, thus rendering the agriculturist independent of rain or irrigation by canal. By the application of chloride of calcium to fields, meadows, roads, and sandhills, the land is made to absorb abundant moisture for three days.

Forging Tools.

A correspondent of the *Scientific American*, who has evidently had much experience in forging tools, writes to that paper as follows:

"My experience has been that no amount of skill and care in hardening and tempering can make a right down good tool of one not judiciously forged. In forging bring the steel to a mellow heat, and keep it so until you have your tool forged to shape. As the heat declines to black hot, compact your steel by light hammering on the face of the tool, but do not hammer the tool edgewise. Now if the tool is ready to harden, when it is heated it will swell so as to loosen up the compacting that was done by light hammering as it was cooling off. So it follows that whatever will harden the steel at the least heat will do it the best.

I use strong cold brine, and want it near the fire, so as to utilize all the heat in the tool. As soon as the tool is cool I dip it in oil (sperm or whale oil preferred). Now hold the tool over a well burnt-down fire, without the wind on. Hold the tool so as to retain as much of the oil on it as possible. Now tip it up slightly so as to make the oil flow from over the hottest part to the edge. The oil becomes a carrier of heat, and will help to let down the temper (exactly alike every time) from any thick part to a delicate cutting edge. I think the color that comes on the steel under hot oil can be depended upon much more with than without oil, although it (the color) will be a little tardy. In letting down the temper I want to do it slow enough at last, so that I can lay down the tool to cool off, and not have to dip again. But if it is going too low, I invert it, and dip the body part and leave the edge out. There are very few tools in which I like to leave heat enough in the body to let down the temper with, for this reason: as I grind back on the tool, the cutting edge is apt to get a little farther from the outside film of refined steel. This film is harder than the steel under it, so I would leave the tool slightly harder a little way back from the end; whereas, if you run out heat enough from the body of the tool you will very soon be at work with a tool altogether too soft.

Treatment of Tin Scraps.

In the manufacture of tinware it is said six per cent of the whole of the plates employed disappear in the form of scraps. This enormous waste in sardine boxes produced in Nantes, in 1869, nearly 400 tons of scraps; Birmingham produces some 20 tons per week, and Paris 50 to 60 tons per month. A small quantity of these scraps has always been used in various ways, such as the addition of small quantity to the pig iron intended for steam cylinders; another small portion was treated by concentrated sulphuric acid, or a solution of caustic potash, but no one treated tin scrap on a large scale until a short time since. The subject has been treated by M. Kneusel, in the *Bergund Uttamannische Zeitung*, and an abstract of his paper is given in *Iron*. The mode employed comprises four chief operations: 1.—Treatment of the scraps by means of boiling in water acidulated with hydrochloric and nitric acid, until all the tin is dissolved. 2.—Precipitation by means of zinc of the tin contained in the above solution and washing of the precipitate. 3.—Solution of the precipitated solution in hydrochloric acid and crystallization of the chloride of tin. 4.—Utilization of the iron scraps when despoiled of the tin.

STUPID NEWSPAPER REPORTS.—Ignorance about the most common operations of different trades does not appear to be confined only to many of our own newspaper editors and contributors, but Germany, and France lately gave a striking illustration of it in an absurd report which was going the rounds of the papers there, and finally found its way into a French paper published in New York. It stated that some mischievous Frenchman had painted the four large cast-iron lions, supporting the Waterloo monument in Brunswick, Germany, orange by means of red lead, and that they could not get the paint off, but had to paint them over again with black. We supposed that almost every one knew that it is very common to paint iron, especially when rusting is feared, first with red lead ground in oil, this being a protection almost as good as galvanizing, while at the same time it causes the subsequent black paint to adhere better and dry quicker. There was evidently no mischief in the operation, it being the regular method employed by the painter who had undertaken the job, and who understood his business perfectly well.

NEW WAY OF CUTTING VENEER.—S. C. Carpenter and Dr. M. E. Williams, of Green Bay, Wis., have constructed a novel and successful machine for cutting veneer. There is a machine for cutting veneering from round blocks, but it is quite different from this. In that, machine the knife is parallel with the log, and in some kinds of wood the beauty of the grain is lost, while with the knife set at an angle it is preserved, and this is the merit of the new machine, which has a conical-shaped cutter like a pencil sharpener, and commences cutting at the end of the log, the log feeding into the knife or the knife to the log on a lathe, the veneering coming off in the shape of a scroll. The machine cuts the veneering one twenty-fourth of an inch thick, and the log would therefore cut about 24,000 feet.

DOMESTIC ECONOMY.

Humbbug Food.

A careful observer will not accuse us of exaggeration when we say that thousands, yes, millions of people are daily attempting to supply the alimentary wants of their bodies with compounds which are the veriest humbugs extant. Very earnest and just protests are raised against the many lottery swindles and numerous other deceptive operations constantly being brought to light; but the majority of us daily allow ourselves to be "taken in" by the savory but innutritious and unwholesome mixtures which modern cooks furnish us. A multitude of shrewd farmers, merchants, lawyers, and even doctors, who pride themselves upon their tact and cleverness, are unwittingly cheated several times a day by their dear wives, although we should in justice say that the latter are in total ignorance of the perpetration of any offense. And yet, although a matter which is so intimately related to life and health as is food and drink is of vastly greater moment than mere material or pecuniary affairs a protest against these wholesale dietetic swindles is seldom heard.

The common terms, "rich" and "poor," as applied to food, are excellent illustrations of the ignorance of the popular mind respecting the real dietetic value of articles of food. Thus we hear, and sometimes ourselves speak, of rich pies, rich cakes, etc.; and we talk of poor food and low diet, including in the latter classes articles which are deficient in those elements which would give them rank in the class of "rich food" if present. In our estimation the terms rich and poor should be applied to articles of diet in exactly the reverse of their present application. If the word "rich" has any proper significance as relating to food, it should certainly be applied to such articles as contain the materials requisite for the maintenance of the body in the largest proportion, and in the most available condition. This would require us to denominate as "rich," such articles as Graham bread, oatmeal pudding, and similar delicacies, while the appellation of "poor" should be applied to pies polluted with lard and spices, cake made indigestible with soda, butter, and a profusion of sweets, and all articles of like character. So, too, would we be obliged to term "poor" the numerous "fried" dishes which figure so largely in the popular bills of fare. But poorest of all is the diet of the man who allows himself to believe that in taking a glass of "bouillon" he is taking a "long drink and a square meal at the same time," as the flaming placards in the saloons assert.—*Health Reformer*.

BROWN BREAD.—The sweetest bread ever made.—Take three pints of coarse yellow corn meal, scald it with three pints and a half of boiling water, add two pints of coarse rye meal after the corn has cooled. Knead thoroughly with the hands. Take it out into a stoneware crock which is a little larger at the top. The quantity here given will make a vessel which holds five or six quarts. Place it immediately in the oven, after smoothing over the top with a spoon frequently dipped in cold water. Cover with a stone or iron plate, and have but little heat in the oven. It should take three hours to begin to bake, then bake slowly four hours. Leave the loaf in until the oven cools off, if it is several hours longer. It should be dark-colored, light and firm, with a good soft crust. A round-bottomed iron kettle will do to bake in. Try it.

SPLIT PEA SOUP.—Put one pint of split peas, which have been previously soaked in cold water four hours, into two quarts of pure soft water. Let them boil for one hour, then add one carrot, one persnip, one turnip, two onions, a small head of celery and a little mint, all cut small, and boil another hour. Strain the soup from the vegetables, and thicken it with a little Indian meal, previously mixed in cold water; boil the whole for ten minutes more, and serve in a tureen with toasted or plain wheat meal bread. Mix the vegetables well, and put them into a mould or basin, and then into a vegetable dish, and serve with steamed or baked potatoes. Salt moderately.

APPLE BREAD.—Weigh one pound of fresh, juicy apples, peel, core, and stew them to a pulp, being careful to use a porcelain kettle or a stone jar, placed inside an ordinary saucepan of boiling water; otherwise the fruit will become discolored; mix the pulp with two pounds of the best flour; put in the same quantity of yeast you would use for common bread, and as much water as will make it a fine, smooth dough; put into an iron pan and place in a warm place to rise, and let it remain for twelve hours at least. Form it into long-shaped loaves, and bake in a quick oven.

BAKED CUSTARDS.—One pint of cream, four eggs; cinnamon; almond-flavor, and three ounces of sugar. Boil the cream with a piece of cinnamon; pour it into a basin, and when cold add the eggs, well beaten and strained, the sugar powdered, and a few drops of almond-flavor. Bake in small cups, in a cool oven.

STRING BEANS should be string, broken in pieces, and boiled an hour or two, and seasoned the same as shelled beans.

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San Francisco:

Saturday Morning, March 13, 1875

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Straw Burning Engines.

Messrs. Treadwell & Co. have recently re-
ceived a Hoadley threshing engine, with a
number of new improvements, suggested by
the necessities of field work in this State.
Among the improvements are the cut-off gov-
ernor, which consists of an arrangement of
mechanism so attached to the shaft as to move
the eccentric to a different angle with the crank
by a change of speed, the centrifugal motion
overcoming the tension of a pair of springs,
and these springs in turn acting to give the
centrifugal force. The fire grate consists of
hollow tubes, which are coupled with another
set of vertical tubes, standing in front of the
flues, and these tubes are connected with the
water space, so that the fire is bounded on two
sides by this "grillage," as it is called, and
enough more steam is made to supply all the
waste of the steam boiler.

This engine has been adapted to burn straw,
and a partial test of the invention was made in
front of Messrs. Treadwell & Co's on Saturday
last.

The most satisfactory tests were, however,
made before the engine was sent from Hoad-
ley's works, and consisted of two trials of four
or five hours each, with an ascertained load.
During these tests the engine, which is rated at
15-horse power, showed a maximum of 24-
horse power and a total average of 18-horse
power. Indicator cards were taken from time
to time which were more than usually fine.
Steam was got up by simply igniting the
straw with a match, and no difficulty was ex-
perienced in keeping steam up to a high pres-
sure during the entire run. These already
popular engines will be rendered more effective
than ever for the coming season's work.

LECTURES ON GEOLOGY.—J. W. Taylor, of
Utica, N. Y. (formerly Curator of the State
Cabinet of Natural History and Geology at
Albany), is to give a course of four lectures at
the hall of the Academy of Sciences, in this
city. We are not able at present to state the
time of the delivery of these lectures, further
than that they take place within a few days.
Mr. Taylor has a good reputation as a geologist
and lecturer.

The St. John quicksilver mine, Solano
county, yielded 225 flasks of quicksilver dur-
ing the month of February. The force of
workmen has lately been increased, and the
product will soon be doubled.

New mineral discoveries are reported in Bear
valley, San Bernardino county, and prospe-
ctors are flocking to that locality.

Among the Foundries and Machine
Shops.

Business at the machine shops of our city
continues unusually brisk. Contracts for new
work are constantly being made, and most of
the foundries are taxed to their utmost capacity
to fill their orders.

Risdon Iron and Locomotive Works.

At this establishment is in process of con-
struction a piece of mechanical skill which is
unusually interesting. We refer to the eleva-
tors, five in number, to be used in the Palace
Hotel. The elevators are strongly constructed
and capable of lifting one hundred persons
from the ground floor to the upper seventh
story in thirty seconds. These elevators are
worked by hydraulic pressure.

The power is obtained by two sets of en-
gines, 9½-inch cylinders, acting on two sets of
pumps, three to a set—which are arranged to
work either together or separately. These
pumps are four inches in diameter and two feet
stroke. They pump from a tank into an accum-
ulator, 22 inches in diameter and 20 feet long,
the rem of which is loaded with a weight-box
containing about 100 tons of sand. This ram
is connected with the throttle-valve of the en-
gines, so that when the box or ram is at its
greatest height the steam will be shut off and
the engines stopped. The power is distributed
from the accumulator through 4-inch pipes
to each hoist, and immediately upon the use
of the water by the hoist or other machinery,
the ram descends and gives off its stored power.
The engines then commence to pump and re-
place the water taken out. All the water used
is again sent back to the pump-tank and thus
the leakage and evaporation represent all the
water wasted. This wastage is so slight that a
very few gallons per day will be sufficient to
supply the loss. The whole machinery is so
arranged that an accumulated power of 175
horse-power is constantly stored up and may
be put in operation in a few seconds.

One peculiarity of this power is that it can
be distributed by means of pipes to almost any
reasonable distance. It is comparatively new
in this country but in England, where it was
first inaugurated, six and eight miles of main
pipes, with numerous connections, have been
laid. There are three steel ropes attached to
each elevator either one of which is capable of
sustaining it alone if necessary. The plunger
of the accumulator is a rolled shaft of iron
weighing some twenty tons. The amount of
water in use will be about 1,000 gallons, but as
this is used over and over again there really is
not more than a few gallons expended in a day.
When we state that this system of power is ca-
pable of being used in mining operations some
idea may be had of the great value its applica-
tion may be to our State.

The application of this power in the Palace
Hotel is being carried on under the direction of
Mr. Joseph Moore and Mr. George W. Dickie,
of the Risdon Iron Works.

Miner's Foundry.

This establishment is crowded with work.
Among other things a locomotive is being con-
structed for the Walla Walla mill to be used in
hauling logs and timber. A narrow-gauge
railroad has been built into the redwood forest
seven miles from the mill, and this engine will
be placed on it. A great deal of timber has
been lost in the Columbia river in times of
freshet by the breaking of booms and the con-
sequent escape of the logs to the sea. It is be-
lieved that the construction of railroads for the
transportation of logs will in many cases prove
economical and certainly much more conveni-
ent.

Golden State Foundry.

A number of new contracts have lately been
made by the proprietors of this foundry.
They are about completing a lot of grading
cars for the Los Angeles and Independence
railroad. Saw mill work for a mill in Sonora,
Mexico, is being constructed. Battery work,
shafting and other mining machinery is in dif-
ferent stages of finish for the following mines:
Bunker Hill Quartz mine, Reddington Quick-
silver Co., Benton mine, Indian Queen mine,
Socrates Quicksilver mine and the Justice
mine.

Occidental.

At this foundry a large amount of miscella-
neous work is being done. The whole force is
employed and new work coming in every day.

From the Wheatland Free Press we learn
that a party of miners backed by San Francisco
capitalists, are actively engaged in prospecting
for iron in the neighborhood of the Suspension
bridge. They have discovered detached bould-
ers bearing eighty-seven per cent of iron, and
are sanguine of success in finding the lead to
which they belong.

THERE is between thirty and forty inches of
water running out of the Suto tunnel at pres-
ent. The Superintendent anticipates striking
a ledge within a short time.

The Gila mining company have purchased
the Reveille mill and mine in that district, and
will have the former at work on the 10th in-
stant.

A CLEAN UP of 97 tons of rock from the Crater
mine, Placer county, last week, yielded 250
ounces of gold.

Hydraulic Mining at Gold Run—The Blue
Lead Ancient River Channels.

Mr. W. A. Skidmers, of this city, has recently
made a visit to the hydraulic mines, at Gold
Run, Placer county, where some extensive
operations are being carried on. From him
we have obtained some interesting information
concerning the hydraulic mines on the Blue
Lead, which is embodied in the following:

The Mining districts of Gold Run and Dutch
Flat comprise nearly 2,000 acres of auriferous
gravel, situated on the line of the ancient river
popularly known as the Blue Lead. The
Central Pacific railroad crosses this channel
diagonally and forms the dividing line between
the two districts. From the window of the
cars the passing traveler looks with surprise
and wonder on the immense excavations on
either side, produced by the hydraulic opera-
tions of sixteen years; but fails to realize the
fact that the ground embraced within the
scops of his vision—about eight hundred acres
in extent—has contributed no less than ten
millions of dollars to the gold product of our
State, and that the most reasonable estimates
of the contents of the ground still in place,
based on the actual yield of the lower strata
now being mined, would not place the aurifer-
ous contents of these districts at less than one
hundred millions of dollars, requiring from
thirty to forty years for their exhaustion.
Neither can he conceive the vast enterprises
now in progress to open the bottom of these
districts by means of bed-rock tunnels run
with all the appliances of modern mechanical
skill and engineering.

Many theories have been advanced, with a
greater or less degree of plausibility to account
for the origin of these vast

Deposits of Gold Bearing Delritus.

Only on one point is there a general agree-
ment—that they were deposited by the action
of water. Each of the various theories ad-
vanced are reasonable when applied to the par-
ticular locality which the writer describes, but
they do not admit of universal application. In
some cases there are undoubted evidences of
channel action, indicating the existence at
some remote geological era of a system of water
courses whose line of drainage was nearly two
thousand feet higher than that of the present
time. What, then, must have been the average
surface level? Certainly much higher than at
the present time. The grade of the ancient
river system was much greater than that of our
day. Carefully prepared data founded on sur-
veys shows it to have been from six to eight
feet to the mile. This is greater than that of
the swiftest rivers of Europe, as their grade is
rarely more than four or five feet to the
mile. It is also evident that a much larger
volume of water than that of the modern
watershed flowed in these ancient rivers. Huge
masses of rock were carried for great distances
and deposited finally at a point remote from
their first resting places. Ledges of quartz
were broken and disintegrated, thereby releas-
ing their gold and concentrating it in the beds
of the ancient streams, where it was destined
to remain for centuries, until again released—
this time by the artificial appliances of hydrau-
lic mining. Trees of great size and not differ-
ing greatly from the present species were torn
up by their roots and carried along the fierce
torrent, until meeting with some obstacle, they
lodged, and in the course of time became car-
bonized, or in some instances petrified.

Everything points to the supposition that
these events occurred after some great climatic
change, and it is not unreasonable to suppose
that it was after the glacial period. The line
of drainage was not materially different in
direction to that of the present time, namely—
from north to south—but the ancient channels
have been in most instances cut and broken
by the feeders of the modern streams, which
rising high in the Sierra pursue a direction
from east to west until they reach the principal
watercourses—in our time the Sacramento and
the San Joaquin rivers. But the

Ancient Channel System.

Which is closely and unmistakably marked on
the line of the Blue Lead from the volcanic
ranges of Plumas and Sierra counties to the
low hills on the borders of the great valleys.
was not the only line of drainage. In the
counties of Trinity and Klamath we find a sys-
tem of drifts extending for miles, which had
its ancient debouchure on the Pacific ocean.
This drift, which may be traced for over forty
miles, was of great depth, and seemed to have
filled pre-existing valleys, which are now occu-
pied by high ridges of auriferous gravel. This
system may possibly be traced to Oregon and
connected with the gravel beds on the high
mountains mentioned in a late number of the
Press by a correspondent, who erroneously
supposed he was at the head of the Blue Lead
system. The Blue Lead system of drainage
had its source of supply in Lassen and Plumas
counties, where its sources are covered with
mountains of superincumbent lava, whose flow
caused the change or modification of the drain-
age system of the plicene era. These streams,

like all modern rivers had numerous affluents,
and the points of convergence are plainly indi-
cated, as at Dutch Flat, Placer county, and
Forest City, Sierra county.

An impression is common, particularly
among Eastern and English travelers who visit
our mines, that the sections of the

Ancient River Beds

Situated in detached masses and patches, so high
above the present water courses, are the results
of volcanic upheaval. This is clearly errone-
ous, as it is manifest there has been no change
of the plans of level of the old streams—as
they may be followed continuously on the same
grade for miles, except where interrupted and
broken off by the modern water courses, and
even here their continuation can be easily
traced across the streams. There seems to have
been no great eruptive disturbance since this
period which filled the ancient rivers. The
difficulty is in connecting the various chan-
nels consistent with a system of drainages,
and this would exist with respect to our
modern streams if they were submerged by
masses of lava. Thus, if we look at a map
of the State, and imagine this state of things,
we can see that the Sacramento and San
Joaquin rivers would appear as one and the
same stream.

The so-called

Blue Lead

Is an ancient river bed filled with gold-bearing
gravel in alternate strata varying in color,
thickness and hardness. The material is
principally composed of pebbles and boulders
of quartz, slate and greenstone, reduced by the
action of attrition to rounded or oval shapes,
and frequently strongly cemented by iron and
silica held in solution in the waters of the an-
cient streams, alternated with strata of pipe
clay and sand which are generally non-pro-
ductive. The gold occurs in minute particles
throughout the superincumbent dirt and gravel,
and in coarse particles in the lower or blue lead
stratum, while on the slate bed-rock it is some-
times found in nuggets, weighing from a few
grains to an ounce or more—the latter being of
rare occurrence. Where the bed-rock was
soft the gold has penetrated it to the depth of a
few inches, and this matter is taken out and
reduced in the stamp mills. The finer gold,
or that portion of it which is visible to the
naked eye, is usually in flat or "scale" form;
the coarser pieces are always water washed and
rounded, presenting an angular surface. These
latter are occasionally found in "nests" or ag-
gregations, lying behind some boulder which
formed an obstruction in the channel, at the
termination of an eddy, or in a crevice of bed-
rock. This mode of occurrence is not un-
common in Gold Run and Dutch Flat districts
where the bed-rock has been exposed. The
surface dirt is always the least productive and
the bottom stratum the richest. The various
layers between these constitute the averages
"hydraulic dirt" of the district, as the lower
stratum being strongly cemented is run
through stamp mills, and the gold saved by
amalgamation in battery and the use of sluice
boxes. The system of hydraulic mining is so
fully described in the able articles of Mr.
Waldever, now being published in your col-
umns, that it will not be necessary to allude to it
here.

The Infinite Divisibility of the Gold

Existing in these accumulations of detritus can
only be appreciated by comparison with some
familiar standard of size, weight and value. If
we take our smallest gold coin—the gold dollar
—weighing 25.8 grains, and cut it into two
hundred parts of equal size, we should have
two hundred specks or "colores," each weigh-
ing thirteen one hundredths of a grain, of
the value of one-half a cent each. Now let us
imagine thirty of these colors diffused through
a cubic yard of gravel or dirt—that is to say
through 120 miner's pans, for a pan contains
about 400 cubic inches, and 120 pans may be
estimated as a cubic yard for purposes of com-
parison. It will be seen that if we obtain one
color to four pans (assuming that we obtained
all the colors), this would amount to but fifteen
cents to the cubic yard—a ratio much higher
than the known product of hydraulic mining in
these districts for the past sixteen years of their
history and development. And yet so little is
known on this subject by interested parties,
that at a meeting of the London stockholders
of a prominent claim in Gold Run District,
when the statement was made that a prospect
had been obtained of the lower or Blue Lead
stratum of the company's ground, which showed
two dollars a pan, (a statement which the writer
has verified), one of the directors gravely in-
formed the stockholders that even two dollars
per cubic yard was considered good hydraulic
dirt.

In Gold Run District

The depth of auriferous gravel from grass roots
to bed rock was originally from 240 to 300 feet,
and of this scarcely more than 100 feet has
been removed. The width of the pay between
rim and rim is about 1,000 feet. This dead
river, as it may be appropriately called, is at
this point 1,350 feet higher than the North
Fork of the American, which has broken
through it, leaving a section of the ancient
channel exposed on the lower end of Gold Run
District, where it is opened by the tunnel of
the Indiana Hill Cement Company. The river
at this point had a gradual north by east
course, and may be traced northward for many
miles, being cut by the eroding influence of the
modern streams. The grade was about six
feet to the mile.

During the first five years of hydraulic mining

In Gold Run District (1865 to 1870), the average yield per cubic yard was not more than five cents. This average would probably be increased to ten cents if it should take the product for ten years (1865 to 1875), as the ratio of gold increases with each successive bench removed. What it will be five years from now it would be hazardous to conjecture, in view of the recent determination of the rich character of the bottom of this channel as developed by the workings of the Indiana Hill Cement mining company and the prospect shaft of the Gold Run Hydraulic mining company of London.

In the neighboring district of Dutch Flat, the average yield of the upper strata has been somewhat greater. An estimate of the cubical contents of the upper stratum of a tract of twenty acres washed to a depth of seventy feet, showed a yield of six and three-quarter cents per cubic yard. In this case accurate accounts were kept of the gold product. The average yield is increased from year to year as the lower and richer strata are run off. And yet, with the seemingly slight yield noted above, hydraulic mining has been a remunerative business in these two districts.

At the extreme south end of Gold Run district is situated the ground of the

Indiana Hill

Cement Mill and Mining Co. Standing on the bed-rock at the mouth of their tunnel and looking southward across the great canon of the North Fork of the American river which has here eroded a gorge two miles in width and half a mile in depth, we can discern the continuation of the Blue Lead, on the same level, on the mountains forming the north slope of the North Fork, where it is extensively worked at Iowa Hill. The breakage of the channel at this point enabled the Cement company to attack their ground parallel to the drainage line, instead of by means of a rim rock tunnel run at right angles. A tunnel has been run "up stream," and breasts of 150 feet in width are being opened toward the west rim. This system here pursued is known as

Drift Mining.

The cement constituting the bottom stratum is taken out to a height of four feet from bed rock and run through an eight-stamp battery. From 50 to 80 car loads of the dimensions of twenty cubic feet are run through every twenty-four hours, the amount depending on the character of the dirt, which varies in hardness from month to month. The record of this company for the past three years, dating from the purchase of their ground has been unprecedented in the annals of this class of mining, and has demonstrated the immense richness of the bottom of this portion of the Blue Lead. The records of the company show an average yield of \$5.76 per cubic yard. This is exclusive of an occasional rich prospect which does not enter on the mill returns. During a recent visit of Mr. Skidmore to the this ground, a washing of one bucket of dirt yielded \$126 worth of gold. Last November about \$1,000 was taken from three car loads, and "pans" containing from \$20 to \$50 are occasionally washed. The owners are not capitalists but hard working practical miners.

Immediately north of and adjacent to this mill company's property we find the extensive operations of the

Gold Run Ditch and Mining.

Locally known as the Miner's ditch company (of Gold Run), and of the Gold Run Hydraulic company (limited) of London. This first named company, under the superintendence of Mr. Jas. Gould, are running an immense bed-rock tunnel through the east rim of the channel, for the purpose of reaching their claims, and eventually of serving as an outlet to the whole district. The starting point selected was on Cañon creek, a deep ravine emptying into the North Fork. The objective point is an old prospecting shaft, situated near the center of the district, known as the "49-50" shaft. The main tunnel is 8x8 feet in dimensions, and will be 2,000 feet in length. Eight hundred feet of this had been completed on February 15th, and two branches had been run to open ground in the vicinity, pending the completion of the main adit. One of these branches, nearly as large as the main tunnel in dimension, had been run 1,300 feet, and the "raise" commenced. The company expect to be ready to wash in June, 1875. This successful introduction of the Burleigh drill in California render these long tunnels no longer the formidable obstacles they were once considered.

Another Tunnel.

The Gold Run Hydraulic mining company (limited) tunnel will, when completed, be 840 feet long, eight feet wide, and eight feet high. 450 feet of this tunnel has been completed and the Miner's ditch company is driving it ahead at the rate of 130 to 140 feet per month. The tunnel at this shaft will be at least 60 feet in the bed-rock, being ample grade to work out the whole property. There has been a shaft sunk to bed-rock, 181 feet, through rich gravel the entire distance, and at the bottom of the shaft they struck soft, shelly bed-rock, which was actually yellow with coarse "lead" gold. This tunnel, when completed, will enable them to successfully work this vast deposit of auriferous gravel to bed-rock. They expect to have the tunnel completed by the middle of June next, and the incline raised and ready for washing at the commencement of next water season. They will put a five-foot flume in the tunnel, and several undercurrents. This "rig" will be first-class in every respect, and cannot fail, when properly opened to bed-rock, to yield

large profits to the fortunate owners in England.

The last named tunnel is also a branch of the main adit of the Miner's ditch company, work is proceeding rapidly—142 feet having been made in February. The Gold Run hydraulic company of London is in charge of Mr. J. A. Stone as manager or superintendent. In the selection of mining superintendents for their hydraulic operations in California, our English consuls have exercised remarkable judgment, and in no instance have had occasion to regret their choice. All their local managers, like Mr. Stone, are practical miners, familiar with this branch of mining and generally old residents of the district in which their property is situated. Some of our Eastern quartz companies might profit by this example, instead of sending dry goods clerks to take charge of quartz mines.

To the traveler there are no points of greater

Orchard Oriole.

The orchard oriole enters the Southern States from South America early in March, and continues there until October. In the more northern regions, it of course arrives later and departs earlier; but it does not often go further north than Connecticut. The migration from south to north is performed by day, and singly, the males preceding the females by a week or ten days, frequently alighting on the top of trees, to rest or feed. They exhibit a great repetition of motions of the wings, although gliding through the air for a few yards only at a time, and, while about to alight, as well as afterwards, perform strong and well marked jettings of the tail.

As soon as they reach the portion of the country in which they intend to remain during the time of rearing their young, and where



THE ORCHARD ORIOLE.

interest than Gold Run and Dutch Flat Districts. Here may be seen hydraulic mining on a scale of magnitude not attained elsewhere in the States and here may be studied under peculiarly favorable circumstances the channel system of the phocene age as illustrated by the great Blue Lead.

There are many other features of interest in this and adjoining districts of Dutch Flat, such as the Moody & Kinder tailing claim and the Cedar creek claims (of London), this latter near Dutch Flat, which will amply repay a visit to the traveler who wishes to study our hydraulic mining system.

QUARTZ SPECIMENS.—If any of our mining friends have any good specimens of gold quartz suitable for cutting, to make jewelry, etc., by addressing us we can inform them where they can get from \$18 to \$20 per ounce for the gold. Miners owning mines from which quartz of this class is procured can sell the good specimens to more advantage than they can crush them. There is a demand here for good quartz specimens of a character to be cut for jewelry, so our mining friends can save that they have and easily dispose of them at good prices. The more of them the better.

THE mines in Little Cottonwood, Utah, are jammed with ore awaiting transportation to the smelters.

they are always welcomed with pleasure, these birds exhibit all the liveliness and vivacity belonging to their nature. A little time is consumed before the female is won by her frisky wooer, the singing and gyrations of which are then very ardent; and, as soon as they have paired off, the most active industry is evinced. They resort to the meadows or search along the fences for the finest, longest and toughest grasses they can find; and, having previously fixed upon a spot, either on an apple-tree or amid the drooping branches of a weeping-willow, but which is very apt to be near the habitation of man, they begin by attaching the grass firmly and neatly to the twigs immediately around the chosen place. The filaments are twisted, passed over and under, and interwoven in such a manner as almost to defy the eye of man to follow their windings. All this is done by the bill of the bird. The nest is hemispherical, and supported by the margin only, finished outside and in with long slender grass, some of which goes around the nest several times, as if closely woven. But softer and warmer materials are used in the more northern ranges of these birds.

Figs, mulberries, strawberries, and various kinds of fruits are eaten by these birds, but not to a very injurious extent, their chief reliance being upon the pernicious insects of the garden and field.

Important Mining Suit Decision.

A decision has just been rendered in the great quicksilver mining case of Stone vs. the Geyser Quicksilver Mining Co., which has been on trial since February 26th at Santa Rosa. This case has created a great deal of interest, not only here but throughout the entire State, involving property valued at millions. The question at issue was, whether the original locators should get possession of the mines or the late holders, who claim that the original owners had abandoned their claim to the property.

A statement of the case may be briefly summarized as follows: In the early part of 1860, 20 claims were located in the vicinity of Geyser Springs. The first recorded was the Pennsylvania company, which included twenty claims as they were called, of 150 feet each, and the others in the following order: Healdsburg, 17 claims; Empire, 30 claims; Russian river, 14 claims; Gibraltar, 10 claims; Chaparral, 15 claims; Petaluma, 11 claims; Buckeye, 12 claims; Boston, 2 1/2 claims; Alta California, 15 claims. These claims, 127 in number, were consolidated and incorporated under the title of the Geyser Quicksilver mining company. Some prospecting was done. In July, 1871, the Last Chance, New York and other claims, were consolidated with the prior consolidation, and the company took the name of the American Quicksilver mining company. Some further prospecting was done. Finally, on the 28th day of April, 1873, the ground was sold, with the assets of the company, on attachment for \$496.50 and costs of suit, for goods, wares, etc., sold to the company by Ellis Brothers, and was purchased by F. G. Hahman at Sheriff's sale. After this, the affairs of the Geyser American quicksilver mining company faded from sight and memory.

On the 25th of November, 1871, W. H. Hopkins located the old Kentuck mine, part of which is claimed as the old American ground. The old Pennsylvania had, prior to that, been located as the Geyser, and shortly afterward the old Petaluma was located as the Missouri mine, which lies just west of the old Foss tract on the Hog's Back. A law was passed by Congress taking effect May 10th, 1872, extending the time for work to be done on old claims.

S. A. Stone, the plaintiff in this suit, purchased the title which Hahman had acquired under the Sheriff's sale in 1873, and commenced suit for the ground. The defendants had, prior to that sale, relocated the mines, and claim to have expended a large amount of money in developing them, said to amount in the aggregate to over \$50,000. They claim that they were in possession of this ground before the passage of the Act extending time to work on old locations, that the claim of the American company had been abandoned, and that they are the beneficiaries under the Act, the plaintiff having done nothing to keep possession after the Sheriff's sale of 1873. Plaintiffs aver that they had not abandoned their claim, and the law of 1872 extended the time for them to work upon it.

This suit has been decided in favor of the defendants—a decision which has been received with rejoicing in Santa Rosa, Calistoga and elsewhere in that vicinity. The jury was only out about ten minutes. This suit is considered a test case of the rights of locators under the mining law of 1872, as against those who years ago abandoned their claims and now endeavor to set up claims to them.

The finest coal yet discovered on the Pacific coast, without any exception, is declared by some experts to be that lately discovered in Pierce county, Oregon, in the foothills of the Cascade mountains, near the headwaters of the Tacoma River, and from 25 to 28 miles from the town of Tacoma. The deposit there is known to extend over a region at least two miles wide and three miles long, and the seams are from four to eight inches in thickness.

In Alameda county, some twenty-four miles south of Oakland, there are 400 acres of land devoted to salt making. In winter the sea water is let in, and in June it is gone into the clouds, leaving the salt behind. The annual yield is 7,500 tons, and the table salt there made brings \$10 per ton, while the cost of making it is \$6 a ton. Forty men are employed in the business on these 400 acres.

J. T. ANDERSON, who has the old Felter place on Oregon Gulch, Trinity, recently sluiced into an old Indian burying ground and examined a number of relics which had been buried therein. Among others was a stone pestle of neat workmanship, and twenty inches in length. The Chinamen quit work immediately when the bones were found.

NOTWITHSTANDING the effort made to stop the flow of water in the Sutro tunnel, a small stream is still running. In order to allow the men to continue the work, the track has been raised and a ditch cut below it. Men are now engaged at the header, and hopes are entertained that the water will soon cease to flow.

The Phoenix mine, in Pops valley, Napa county, with only twenty-five men employed, is turning out ninety flasks of quicksilver per month.

Miscellaneous Notices.

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For Sale by all Grocers.

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It is unequalled for cleansing Woolen Fabrics, Outlets, Carpets or Crockery; for Scrubbing Floors, Washing Paint, Removing Grease Spots, Shampooing or Hatting.

It renders water soft, and imparts a delightful sense of coolness after washing.

DIRECTIONS.—For Laundry, use two to four table-spoonfuls to a wash tub of water. For bathing, use one table-spoonful in the bath tub. For removing grease spots, apply with a brush, undiluted, and wash with water afterward. For stimulating the growth of plants, use a few drops in every pint of water used in watering.

PRICE.—Per Pint Bottle, 25 cents; per quart Quart Bottle, 40 cents; per Half Gallon, 75 cents.

Also, SULPHATE OF AMMONIA for chemical purposes, fertilizing and the preparation of artificial manures. AMMONIACAL PREPARATION for the prevention and removal of boiler scale. CRUDE AMMONIA, for general manufacturing, and PURE LIQUOR and AQUA AMMONIA for chemical and pharmaceutical purposes.

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Goshawks, 30 to 40

pounds. Hens

15 to 20

pounds.

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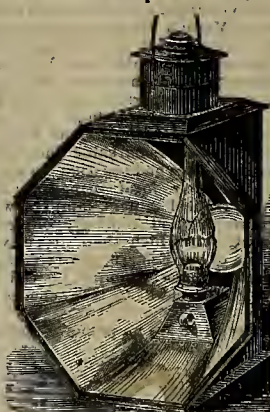
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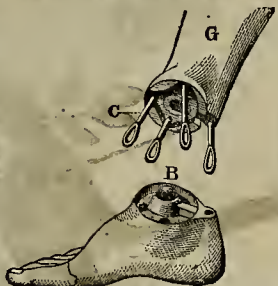
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THE "ANATOMICAL LEG" WITH A UNIVERSAL ankle motion; the shoe cut is its illustration. This artificial leg approaches so much nearer an imitation of the functions of nature than any other, that it stands without a rival among all the inventions in artificial legs, old or new. (The very latest announced new inventions duly considered.)

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WANTED—By a graduate of the Massachusetts Institute of Technology, who has had practical experience, the situation of Chemist or Assayer, or a position as Assistant in a Mine or Smelting Works. References given if required. Address, Q. E. STAFFORD, Toledo, Ohio.

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The pan being filled, the motion of the muller for the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. It is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and sets for themselves, at this office, 229 Fremont Street, San Francisco.

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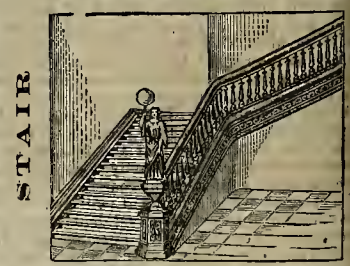
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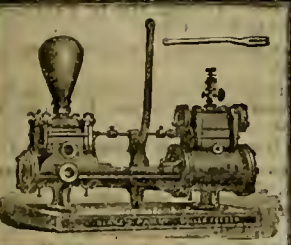
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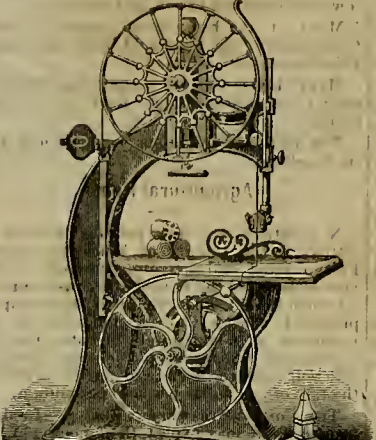
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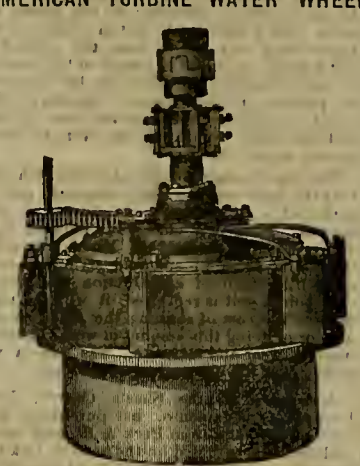
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For Roasting, Desulphurizing, Chloridizing, and Oxidizing Ores, etc. For the reduction of Gold, Silver, Lead and other ores, saving a larger percentage, at less cost, than any other invention now in use. Chloridizing Silver ore more thoroughly, in less time, with less fuel, salt and labor; also roasting Lead ore preparatory to smelting, better and cheaper than any other invention. The Furnace is so constructed that one man, of ordinary ability, tends five or more furnaces; controls them with ease; adding heat or air, stopping or starting at will; charging and discharging with ease. Also, Patent "Conveying Cooler," for conveying and cooling roasted ores, heating the water for amalgamation and the rollers at the same time. Saving the large space in mill (covered with brick or iron), and the labor of two men per day, exposed to the poisonous chlorine gases. Also, Patent Air Blast "Dry Kiln," for drying ores direct from the mine or breaker, saving fuel and labor heretofore necessary in drying ores for dry pulverizing. For description refer to MINING AND SCIENTIFIC PRESS, No. 16, October 31, 1874. For particulars address

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TRIP HAMMER QUARTZ BATTERY.



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Home Industries.

The California Chemical Paint Company.

The stranger visiting San Francisco is attracted by the light and fresh appearance of its private residences. Instead of the heavy, sombre buildings of the Eastern States, the mildness and equable character of our climate allows the construction of much less substantial and, at the same time, more graceful edifices. What adds largely to the beauty of our private houses is the free use of the paint brush. Of course where paint is such an important article as it is in San Francisco, or for that matter, throughout the State, it is well for our people to become acquainted with the best and most durable manufactures. Prominent among our industries is the

California Chemical Paint Company, having their manufactory at the corner of Fourth and Townsend streets. This company are the sole agents on the Pacific coast for the Averill Chemical Paint, which has acquired such an excellent reputation in the East. The inventor of this paint, Mr. D. R. Averill, of Cleveland, Ohio, spent some twenty years in experimenting before he achieved success in producing a paint which has the characteristics most desirable—durability, elasticity, ease of application and beauty of finish.

These Points of Excellence

Mr. Averill claimed to have achieved it when he applied for his patent eight years since. From that time to this nothing has been neglected which science or capital could furnish to improve upon Mr. Averill's original invention.

The California Chemical Paint Company are manufacturing under the Averill patent but are constantly endeavoring to improve upon the patent article. The company was organized in this city in 1869, but has only been under the present able management since last spring.

The Officers Are:

President, Tyler Beach; Secretary, M. C. Jewell. At the manufactory on Townsend St., the process of grinding, mixing and packing is carried on. Here may be seen samples of the different shades of paint on hand, and if not just what is wanted, the chemist in charge of the compounding will mix the very tint required.

It is prepared at the manufactory and put up in quantities of a gallon and upwards ready for use. When wanted a quantity can be drawn off—no mixing is required—and if not all used returned to the package. One merit of the Chemical Paint is, any one can use it. The farmer if he wishes to paint his house or his barn has only to buy a brush and a package of this paint and apply it. He

Becomes a Painter.

For the time being. The value of this paint, aside from its permanency of liquid, consists in affording a means of protection to wood against the action of the elements, and also, as has been proved by experience, forming a coating comparatively

Fire Proof.

The company is also manufacturing a copper paint, which is nearly equal to copper itself for preserving the bottom of vessels from the action of the water and parasites of the sea. An iron paint for coating iron vessels is likewise in great demand. A visit to the manufactory of the California Chemical Paint Co. will well repay any one, and prove that what we have said is not, to use, perhaps, an appropriate expression, too "highly colored."

LAND PLASTER.—We are pleased to state that Messrs. Lucas, Gesner & Co. have established a mill at 215 and 217 Main street, in this city, for the purpose of manufacturing plaster of Paris for fertilizing and other purposes. The fertilizing influences of this material have long been known and appreciated in the Atlantic and Mississippi Valley States; but it has never been utilized in California, chiefly on account of the exorbitant price charged for it here—\$20. per ton. The above named firm is now enabled to supply a very superior article for \$10. per ton, and we understand that some farmers are already beginning to supply themselves, either with large quantities for general use, or with smaller ones for experimental purposes. There is no doubt that this fertilizer, if generally introduced, would prove much more efficient in the dry climate of California than it ever has done in the more moist regions east of the Rocky mountains. We shall soon refer to this matter more at length, and in the meantime would urge upon our farmers the propriety of at least experimenting with the material on a small scale this season, and thus so assure themselves of its value that they may apply it more largely another season, should the success of this year's experiment warrant them in so doing.

MANY of the miners holding claims on Prospect mountain, near Enreka, are hard at work on their mines, and good ore has been found in several instances. The mountain is dotted with groups of miners searching for the hidden treasures. The greatest activity prevails among them, and when the snow will have disappeared Prospect mountain will be heard from.

THE total yield of the Consolidated Virginia mine for the month of February was \$1,205,390. This and the payment by the company of a dividend of \$10 per share, speaks well for the bonanza mines.

Industrial Items.

THE Portland iron works of Messrs. Moynihan & Aitken are just finishing the largest steam boiler ever built on this coast, and as large as has ever been built in the United States. It is 14 feet 8 inches in diameter, 16 feet across the front, with a chimney 10 feet in diameter and 12 feet high, and stands from the ground 25 feet 8 inches high. The length of the boiler is 19 feet 4 inches and it will weigh 100 tons when in position in the steamer "Senator." The iron is 3/4-inch and the rivets are also 3/4-inch, and the tensile strain on the iron is 60,000 pounds to the inch.

THE Kern county Courier of March 6th, says that the Hyde steam wagon, although not yet perfected in all its details, is proving a great success. It is now engaged in plowing and is doing splendid work. On Monday it plowed thirty-one acres in splendid style, and when every little fault of construction that experience points out is remedied, it will do much more. The cost of running the machine that day, or of doing this amount of work, including interest, wear and tear, etc., was \$25—a vast saving over the old method of plowing.

ACCORDING to the Shasta Courier, Judge Beatty, of Sacramento, has purchased 1,200 acres of coal land from Peck & Kincaid, whose coal lands are situated on the head of Oak run, Shasta county. The work of developing these mines will be immediately commenced, and a large force of men will be employed. The coal extracted will be shipped to Sacramento, as soon as shipping facilities can be arranged.

IN Alameda county, some 24 miles south of Oakland, there are 400 acres of land devoted to salt making. In winter the sea water is let in, and in June it is gone into the clouds, leaving the salt behind. The annual yield is 7,500 tons, and the table salt there made brings \$10 per ton, while the cost of making it is \$6 a ton. Forty men are employed in the business on these 400 acres.

A NEW irrigating district is soon to be formed under the Bush irrigation law, which will include Anaheim and the surrounding country to the extent of 12,000 acres. The water will be brought from Santa Ana river. This will be the second district formed under the new law, and will bring in all about 26,000 acres under irrigation.

THE Vallejo broom factory is now turning out fifty dozen brooms a day. To accommodate their interior customers they have combined with their business a full line of wood and willow ware imported by them from the East.

A BURNING gas well in Butler county makes summer weather in the neighborhood. The trees are budding and the grass growing in the charmed circle of its influence.

MR. AYRES, lately from St. Johns, N. B., has purchased the mill and water privilege of C. P. Traber, of Ukiah, and expects to erect a woolen factory there during the coming summer.

THE new machinery for the Capital woolen mills, Sacramento, is daily expected from the East. There will be about three car loads of it, of the most approved pattern.

MR. F. C. CHASE, while boring a well at the Findley ranch, near Wheatland, recently, discovered what are considered infallible signs of coal.

THE narrow gauge company of Salinas and Monterey has just received another locomotive from Philadelphia, at a cost of \$8,000.

General News Items.

OFFICIAL reports from all the railroads in Minnesota show only 2,340,000 against over 5,000,000 bushels last year. Well posted grain dealers estimate the entire wheat crop of last year at 21,000,000 bushels, and as over 16,000,000 bushels has already been shipped, there remains but little over 3,000,000 bushels in the hands of farmers.

WASHBURN & Co.'s new grade into the Yosemite Valley, from Clark & Moore's, a distance of twenty-four miles, will be completed about the 15th of next month. When finished this grade will be the finest one leading into the valley, as tourists can travel with as much ease and comfort as if on our valley roads.

THE THIEVES are getting smart in Vallejo—they have taken to stealing gardens. A resident of that place arose the other morning to find the shrubs, flowers, roots and hulloes which had adorned his premises the day before, vanished, and what was a garden, transformed into a desert.

THERE is no prospect of a speedy settlement of the difficulty between the Pennsylvania and Baltimore & Ohio rail road companies. In the meantime the public are being benefitted by the reduction of freight and passenger rates.

AMONG the important Pacific coast bills which passed Congress at the end of the session and have become laws was the bill providing for the coinage of twenty-cent silver pieces, to be a legal tender to the amount of \$5.

THE forty-third Congress adjourned on the 4th inst. The extra session of the Senate called by the President will probably continue until the last of the present month.

SECRETARY Bristol has directed the retirement of \$1,385,000 of legal tenders, being 80 per cent of the National Bank circulation issued under the new Currency bill.

OVER forty persons who have died in St. John, N. B., this winter, have been temporarily interred in the snow which lies in such quantities as to prevent the opening of graves.

SISSON, WALLACE & Co. have orders for 1,400 or 1,500 workmen on the Grass Valley and Colfax road, and the southern railroads of the State. Here is a chance for men wanting employment.

A RUMOR comes from Paris to the effect that there is great difficulty in preventing young King Alfonso of Spain from abdicating in favor of Duke De Montpensier.

RAILROAD travel has been very much impeded in the Eastern States by the snows of the past week. In Michigan most of the roads have suspended operations entirely.

THE Reporter has an article on "apathetic Napa," in which the apineness of that county is complained of. Railroad communication is needed to gain access to the outside world.

A colony of Tennesseans, among them Gen. Forrest, will soon arrive in Los Angeles county, where they intend settling.

THE President has nominated Godlove S. Orth as Minister to Austria and Horace Maynard as Minister to Turkey.

AT Pacheco a company has been organized and is now engaged in preparing the ground for planting sixty acres of tobacco during the present season.

THE trees around the Vallejo City park which died during the present year have been removed, and good live trees planted in their places.

Large quantities of grape-vine cuttings are now being shipped from San Jose to San Buenaventura and other points in Ventura county.

THERE are several grain and hay merchants at South Vallejo who are just wild because the cows are permitted to run at large.

MANY of the heavy grain dealers in Santa Clara county, who have held their grain since 1873, are now disposing of it.

MANY of the Oregon farmers are changing their large pastures into fields of growing grain.

THE Yolo Mail threatens to start a new daily in Woodland.

Agricultural Items.

NEGOTIATIONS are now pending between the settlers in the vicinity of Whetstone and the Fresno canal and irrigation company, with a view to securing the immediate construction of a branch canal to that vicinity. The company propose to construct a canal immediately, conveying an abundant supply of water, provided a sufficient number of persons can be found who will bind themselves to purchase water at the rate of one dollar per acre per annum.

THE COMING STRAWBERRY SEASON.—In about two weeks we may expect the opening of the strawberry season. Present indications warrant sanguine expectations on the part of the vast army of strawberry eaters. Some have predicted a surplus, and that the growers would not receive pay for labor and investment. It is to be hoped that this will not be the case; and we have faith that the expected increase of supply, will create a corresponding increase of consumption.

ABOUT GREEN PEAS.—We have just received a note from a gentleman of Harrisburg, Alameda county, asking: "Whether there are any green peas in market, and if so what is the price?" Of course there are. Green peas have been in the S. F. market nearly four weeks, and are now selling at 5 to 5 1/2 cents per pound by the sack.

THE Contra Costa county people are, it seems from the Gazette of the 27th ult., bound to wage an unremitting warfare against the squirrel until their extermination is assured. The Gazette says: "We know that we must destroy the squirrels or ultimately abandon the land to them, and the sooner we determine to do one or the other the better and more profitable it will be for us."

ON the Cosumnes bottom, says the Sacramento Agriculturist, heavy crops of corn are raised; after the water has passed off, a heavy sediment is left of richness, which, when powdered, is valuable for corn, pumpkins, potatoes; large numbers of hogs are raised and fattened every year.

A CORRESPONDENT of the Tulare Times writes from Linn's valley that the farmers in that neighborhood have about finished sowing all the land they intend to cultivate in grain or hay, and are now busily engaged in preparing their land for a more extensive potato crop than ever grown in that valley.

THE Southern Californian advises farmers to plant more grain this season and stop importing from San Francisco. It will require 100,000 sacks of grain this year to supply the Cerro Gordo freight company alone.

THOUSANDS of fruit and shade trees have been planted in Hollister and environs within the past few weeks.

FARMERS in Tehama report the crop prospects along the southern border of the county as most cheering.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

GEORGE WILSON, formerly contributor of the MINING AND SCIENTIFIC PRESS, will please address this office.

PATENTS & INVENTIONS

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch, Dated Washington, D. C., March 9, 1875.

FOR WEEK ENDING FEB. 23, 1875.

ABSORBING AMMONIA GAS IN WATER.—John A. Beath, S. F., Cal.

GRAIN SEPARATOR.—Josiah H. Looke, San Jose, Cal.

COMPOUND FOR THE PREVENTION OF SOALERS IN STEAM BOILERS.—John H. Pitts, Oakland, Cal.

GAS METER.—Jacob Radston, S. F., Cal.

RAILWAY CAR AXLE.—Samuel L. Harrison, S. F., Cal.

FERTILIZING COMPOUND.—Chas. H. Hoffman, S. F., Cal.

SADDLE TREE.—Pemberton B. Horton, S. F., Cal.

WAGON BAARE.—Robert J. Knapp, Half Moo Bay, Cal.

SOREW PROPELLER.—James H. Loftis, Oakland, Cal.

RE-ISSUE.

FOR TEAS.—Williams, Blanchard & Co., S. F., Cal.

"The patents are not ready for delivery by Patent Office until some 14 days after the date of issue. Copies of U. S. and Foreign Patents furnished by Dewey & Co. in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest time possible."

THE San Juan Times says: "The people and around French Corral complain of the great scarcity of water for mining purposes. The Milton company have to distribute the supply of water among so many mines that they only retain enough to keep their own mines at work about half the time. This has been, thus far, a poor season for the miners, and unless we have very heavy rains higher in the mountains during the months of March and April, fears are entertained that even miner in this township will be compelled to the first of August to cease from work."

THE Yreka Union learns that the miners on the Klamath river are busy making preparations for a vigorous prosecution of their claims the coming season, which, owing to the small quantity of water that has fallen this winter promises to be a longer one than usual with them.

"I'LL RISK IT."—"That cough will kill you, if you neglect it," said a New York merchant to one of his partners about nine weeks ago. "Try Hale's Honey, Horchond and Tar," he added. "It has cured my wife of just such a cough as you have, and I believe would cure you." "Nonsense, my dear fellow," was the reply, "mine's not a cemetery cough. It will stay of itself. I'll risk it!" He did "risk it," and is present apparently in the last stage of Chronic Bronchitis. He is now taking the remedy he scoffed at, and it relieves him; but it remains to be seen whether it is not too late to effect a cure. Pike's Tooth-Ache Drops—Cure in one minute.

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High and Low Pressure Boilers of all Descriptions.

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SPIRAL BOILER.

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Iron and Locomotive Works,

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CAPITAL.....\$1,000,000.

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Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Cams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

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LEWIS R. MEAD.....Secretary
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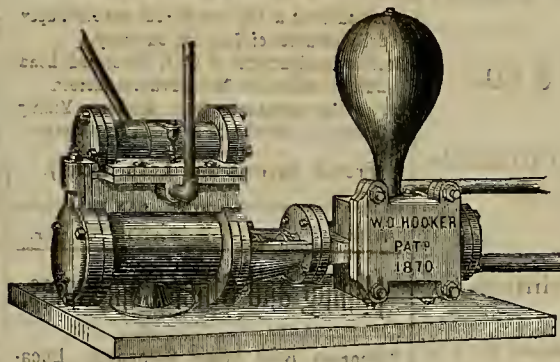
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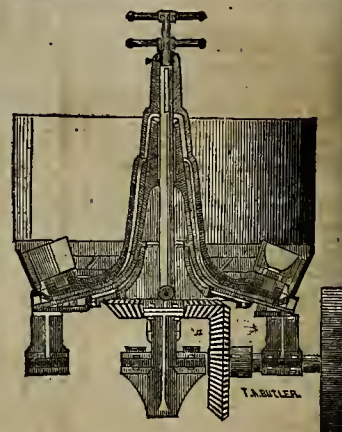
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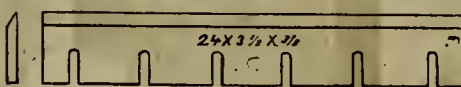
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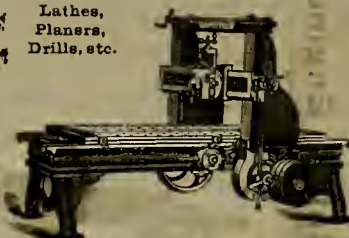
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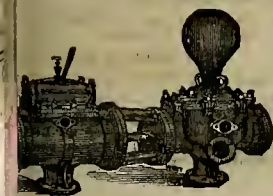
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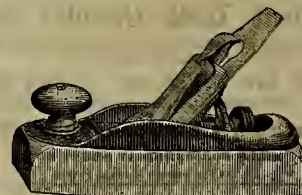
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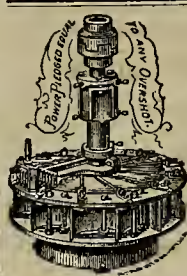
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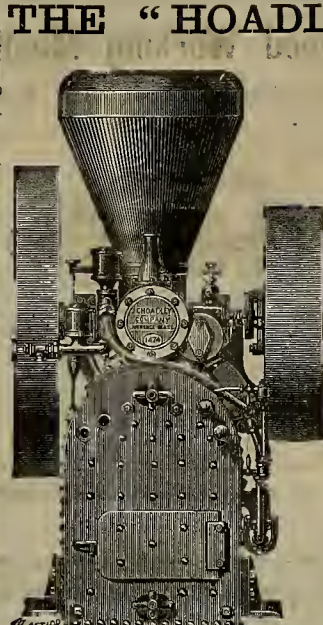
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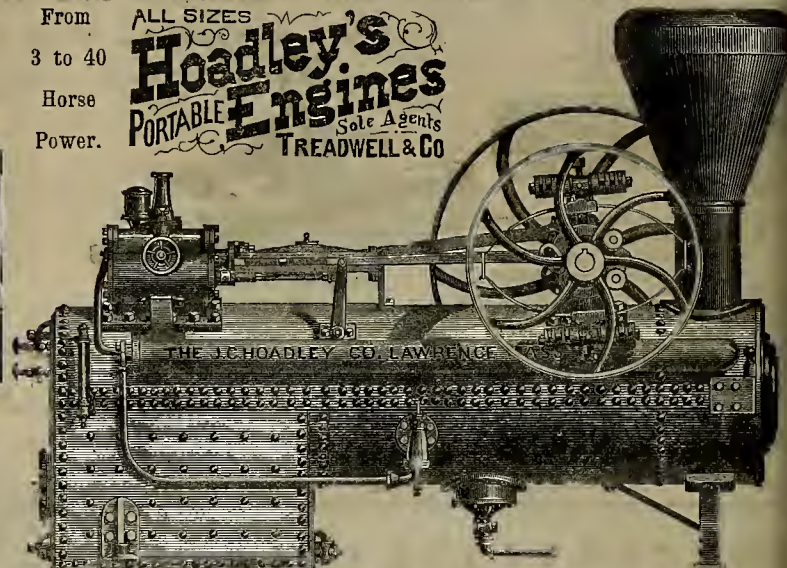
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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

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OAKES'S PATENT



Quicksilver Strainer.

Patented January 26, 1875.

For description see MINING AND SCIENTIFIC PRESS
March 6, 1875.

For Cleaning Quicksilver Before Using
for Amalgamation.

Millmen are invited to examine the Patent Quicksilver Strainer at the office of the Agents,

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Messrs. Dewey & Co.—I have received my Little Patent through your agency. And, for your promptness, except my thanks. Yours,
S. N. KNIGHT.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MARCH 20, 1875.

VOLUME XXV
Number 12.

Hydraulic Mining in California.

No. 17.

The Grizzly.

This word in the strange nomenclature of the California miner means a grate or framework of parallel iron bars, with interstices, which is used here and there in the line of sluice boxes to throw large pebbles or stones out, and to permit such particles only as can pass easily through the interstices between the bars to be carried farther along in the sluice boxes. Wherever a grizzly is applied, a drop of a few feet is necessary; since the material which can pass through must be collected in a box below and thence carried away by a power section of sluice boxes. The construction of grizzlies is of use only where the stones to be discharged over the grizzly can be thrown down a steep embankment. When this is the case, the sluice boxes can be relieved of a great quantity of useless material.

To illustrate, we will suppose that a precipice of 40 or 50 feet exists close to a drop box, so that any material thrown outside of this box would tumble down the precipice. This would give a favorable chance to apply a grizzly, which would have to be done by attaching a frame work of strong iron bars, connected iron rails are excellent, to the bottom of the sluice box, which discharges its contents into the drop box, and to lead this grate with fall of about 30 degrees across the drop box and toward the precipice.

The iron bars or rails would have to run the full width of the sluice box, six inches apart and parallel with each other, towards the precipice, and all boulders larger than six inches in diameter would be discharged. On both sides of this grating planks must be fixed to prevent any of the stones from escaping sideways.

Hydraulic Nozzles.

The observant miner early perceived that if a certain amount of gravel could be washed with a certain quantity of water, double the quantity of water would wash from three to four times as much gravel without increasing the expense for labor in proportion. Greater quantities of water and enlarged hydraulic nozzles were therefore introduced, and he latter became very soon the object of imitative speculation, which resulted in the successful production of the very ingenious hydraulic machines.

The first improvement was a flexible iron joint, Fig. 1, formed of two elbows, working one over the other, with a coupling joint between them. These elbows were called goose-necks.

This invention was a decided improvement, though it showed some serious defects. The abrupt turn of the elbow broke the force of the water to a great extent; the upward pressure made the joint c, hard to move, and when the pipe was turned horizontally the hose part could often bend a little too far and the reaction would cause the pipe to "buck" or fly round in a contrary direction. The same reaction would also often occur in elevating or depressing the pipe.

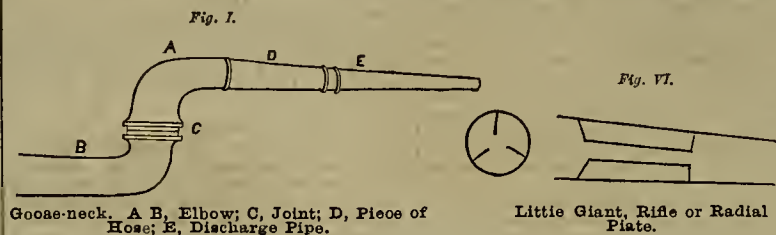
The next improvement was Craig's Globe Monitor, Fig. 2. This invention consists of a globe or globe, with an opening on one side, into which enters the main supply pipe, and one on top, out of which an elbow joint protrudes. One end of this elbow is attached to a socket which revolves on the interior of the globe, and at the same time creates a water tight joint. This joint enables the operator to change the direction of the stream from point to point at pleasure. To the other end of the elbow is attached the discharge pipe, which may be of any size desired. The ball revolves entirely round horizontally, and up or down at an angle of about 40 degrees.

The next machine introduced was Hoskin's Dictator, in which the parts constituting the joint work with an external instead of an internal connection; that is, the pressure of the water, instead of forcing the parts of the joints together, tends to force them apart, and the

joint, to keep it from leaking, is provided with an elastic packing. Both rotary and vertical motions are facilitated by the peculiar construction, wheels reducing the friction on the former, and the later turning on pivots. This joint is still much used; the only objections to it is the unnecessary loss of power on account of the elbows being too abrupt.

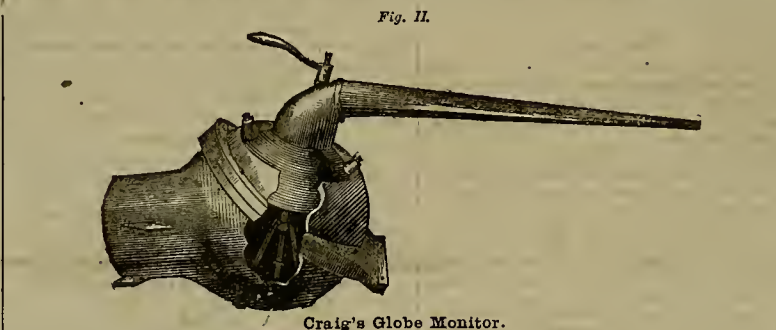
Another machine under the name of Watson's Champion, similar in design to the last

the rolls themselves. A piece of rubber pecking placed between the flanges of top and bottom elbows, makes the joint tight by the pressure of the water against the ring. In the outlet or top elbow is a knuckle joint, which permits the up-and-down motion of the discharge pipe. It is a concave surface fitted to a convex one; the concave has an opening for the pipe to pass through. The pipe is screwed into the convex surface and will move up and down, while the



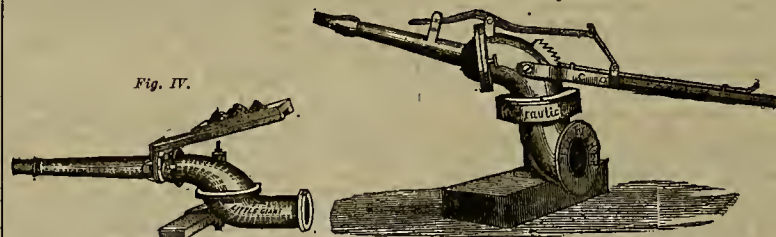
Goose-neck. A B, Elbow; C, Joint; D, Piece of Hose; E, Discharge Pipe.

Little Giant, Rifle or Radial Plate.



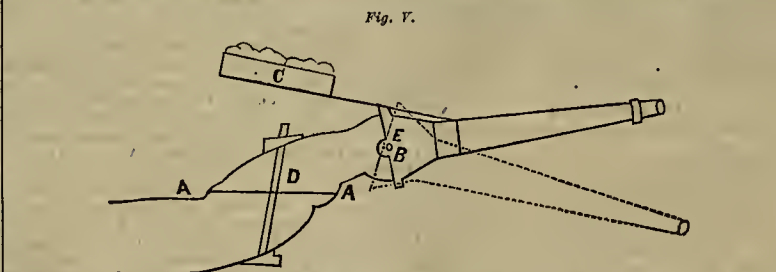
Craig's Globe Monitor.

Fig. III.



Hoskin's Little Giant.

Fisher's Knuckle-joint and Nozzle.



Little Giant, Section. A, Joint for Horizontal Motion; B, ditto for Depression or Elevation; C, Balance-box to keep Pipe in Place; D, B, Bolts.

mentioned, was introduced, but denounced as an infringement on the Dictator, and put under injunction.

Another new machine entered the field under the name of Knuckle-Joint and Nozzle, Fig. 3, invented by Mr. F. Fisher, of Nevada county, California, consisting of two elbows, placed in reverse position when standing in right line, but made to revolve by a ring in which there is a series of anti-friction rolls, the ring being slipped down over the top of the lower elbow, and then held in its place by a flange bolted to the top of the lower elbow. The ring is then bolted to a flange on the top elbow, thereby connecting the two, and at the same time leaving the top elbow free to move around in a complete circle. When the water is let into the elbow the pressure biases the rolls in the ring up against the flange on top of the bottom elbow, allowing the top elbow to move around easily and without any friction, except that of

the rolls themselves.

The elbow end knuckle joint are made of cast iron from five-eighths to three-fourths of an inch thick. The discharge pipe is made of No. 16 iron, eight feet long, with cast iron nozzle. The machine is operated by a lever 10 or 12 feet long, with two arms, and attached to the top elbow by trunnions. A lever is pivoted to the top of the upper elbow and attached on one end to the discharge pipe by a strap inclosing the pipe, and provided with two rolls on the top for the lever to slip on. At the other end it is connected with the operating lever by a short upright lever, made to work loose on its joints. Thus the up-and-down motion is imparted to the discharge pipe by the rise and fall of the operating lever. By moving it to the right or left the whole machine, except the bottom elbow, is moved. A little device is attached to the lever to hold the discharge pipe

in position when the water is off. It is a catch working in a ratchet on the top elbow, attached by a rod running out on the lever, so that the operator can put it in or out as the case may be.

The pipe stands firmly in place when the water is on; the operator, standing at the end of the lever, can easily direct the stream to any point—good execution being done at a distance of 200 feet from the bank, thus securing safety of life from caves, which are so frequent and so often fatal, where small streams are used against high banks. These machines are made to throw streams of from four to seven inches in diameter.

The Little Giant, Figs. 4 and 5, invented by Mr. R. Hoskin, of Dutch Flat, Placer county, is claimed to combine all the requisites of the hydraulic nozzle.

Simple in its arrangement, it is easily managed, and an additional pressure of water does not interfere with its motion, as the connections, or joints, instead of being forced together, are forced apart by such a pressure. The avoidance of abrupt angles in its construction makes the Little Giant approach nearer to the straight line than any other hydraulic machine so far introduced. Upon the strength of this fact, it is claimed, and apparently with good reason, that less resistance is offered to the flow of water by the Little Giant than by any other hydraulic apparatus, and that by it, therefore, not only a greater quantity of water, but also a far more powerful stream can be discharged.

The joints, being packed with leather, are dependent on the packing for tightness, and are thus preserved from wearing or grinding out. To prevent this rotary motion of the water, produced whenever the elbows are turned different ways, the "rifle," Fig. 6, composed of radial plates, is inserted in the discharge pipe. These plates force the water to issue in a straight line from the discharge pipe, and thus prevent the scattering or breaking up of the stream, on the solid and columnar shape of which so much of its effectiveness depends.

The Little Giant has been worked with six-inch nozzle under a pressure of 435 feet.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

The Botany of California.

When the work of the State Geological Survey was suspended by the Legislature, no provision was made for the publication of what had been gathered in the department of botany. A good deal of labor had been done in this direction, and there was great disappointment when it was learned that the matter would not be published, for want of means. Since the survey was suspended, several efforts have been made to publish the material, and the last one was successful. Prof. Gilman, late President of the State University, with the co-operation of other citizens, has received subscriptions to the amount of \$5,000 for this purpose.

This is cause of great congratulation, as the California flora develops some characteristic species novel and interesting, exciting the attention of all students of botanical science. The publication is now secured through the exertions of Prof. Gilman, at whose request the following named gentlemen have contributed the necessary funds to stereotype the work: Leland Stanford, Henry Pierce, R. B. Woodward, Lloyd Tevis, D. O. Mills, J. C. Flood, John O. Earl, Wm. Norris and Charles McLaughlin. These gentlemen are not known to be scientists and do not appear to be actuated by any special or personal motive. Honorable mention should also be made of Professors J. D. Whitney, Asa Gray, and Watson of Harvard University, and especially of Prof. W. H. Brewer, of Yale College, for their personal devotion to this work, without any pecuniary compensation.

At last pay-day, the miners of the Crown Point mine contributed \$921.50, the Belcher, \$239.50, and other sources \$119—total, \$1,280—for the widow and family of Mr. McLaughlin, formerly a miner in the Crown Point, who died some two weeks ago.

CORRESPONDENCE.

Mexican Mines.

The Native Silver District of Morelos, State of Chihuahua, Mexico.

(Written for the Press by A. E. Koels.)

Everybody has read in books or knows by hearsay of the wonderful riches which lie hidden underneath the famed soil of the land of the Aztecs; yet the number of those who by personal and practical experience are enabled to form a correct idea of the truly vast extent and astounding variety of Mexico's mineral resources, is certainly very limited.

A long residence in that country having made me intimately acquainted with it, more particularly with the State of Chihuahua, I propose to give in the following lines a description of one of its most interesting mining districts, which in my opinion offers a very fair field for profitable investment of capital.

Morelos

Is, besides the adjoining district of Batopilas, whose many great bonanzas in former times, and again in our own days, shed such brilliant lustre over its name, the only one within the confines of Mexico; end, so far as known—except the famous mines of Los Caracoles, in Peru—in the world—where the native silver is found to form the most important part of the ores, hereby distinguishing itself from all other silver regions.

While the mines of Batopilas have been worked for fully two centuries already, those of Morelos only became known in the year 1826, but at once attracted considerable attention.

Its Situation

In the south-western part of the State, is in 27° 30' north longitude, and 107° 26' west latitude from Greenwich, about ninety leagues southwest from the city of Chihuahua, and the same from the nearest port on the Gulf of Cortez (Aguila) in a direct eastern line, in the very heart of the Sierra Madre mountains, which attain here an average height of from six to eight thousand feet above the sea.

The Mountains

Which enclose the extremely narrow gorge, hidden in which lies the town of Morelos, rise on all sides, in steep inclinations of from 35 to 45 degrees, up to three and four thousand feet above the bed of the creek flowing at their base, and emptying into the Rio de San Miguel, the valley of which forms a tremendous break in the chain, highly interesting as to its geological features. In fact, this whole section, having hitherto been but very little traveled over by intelligent observers, remains as yet almost entirely unknown, although abounding in points of terrific grandeur and nature's wonders. Deep ravines furrow them on all sides, and dark colored rocky cliffs, in the most fantastic shapes, crown everywhere their summits; while the most luxuriant grasses, green all the year round, carpet them wherever the soil allows it under the shadow of gigantic pine trees, followed lower down by manifold oak and madroña trees, these again to the gorges beneath by a thick growth of high, thorny bushes, and giant species of cacti.

The Climate,

Warm and pleasant during the winter months, gets, however, due to the shut in location, extremely hot from March to October; consequently many cases of fever occur (*calentura*), but seldom of a very aggravating form.

The Population,

Like that of all mining towns the world over, changes with the temporary state of the mines; increasing rapidly as soon as the report of a bonanza goes abroad, and as quickly dispersing again whenever this ceases to give employ or chance to gain. At present it may not pass a few hundred, who, for the most part, live in that miserable state so indicative of poverty and idleness; yet seeming to be an unchangeable institution of the country.

The Principle Articles of Consumption

Are all brought from over the mountains on mule pack trains, either from the towns of Alamos, El Fuerte, Sinaloa, Parral, etc., or the small Indian ranchos which lie scattered in the gorges, or over the mountain sides of the Sierra, and are partly cultivated by the numerous half civilized tribe of the *Tarahumaris*. The freight paid for a mule load of 300 pounds (*carga*) from any of the above named towns amounts to from \$6 to \$9; consequently everything is dear. Corn (*maiz*) for instance, always ranges from \$5 to \$8 per fanega (12 almudes); brown beans (*frijoles*) from \$8 to \$12; flour, from \$18 to \$26 the carga of 300 pounds; salt, from \$7 to \$10 per fanega; lard (*mantequilla*) from \$6 to \$9 per arroba of 25 pounds; tallow (*sebo*) from \$5 to \$7 per arroba; brown sugar (*panocha*) \$24 to \$30 per carga of 600 pieces, etc.

The Geological Formation

Which comprises the greater part of the district resembles more or less that of Batopilas. Speaking in general terms, granite, often complicated with granite (*bucohuatl*), or syenite (compact felspar with hornblende), with transition to porphyry, constitute the principal

mass of the mountains immediately to the south and east of the town. Granite may be said to dominate to the west and north; in many parts conglomerate either underlies or overtops the same. Stratified rock I have noticed in but very isolated and little extended locations. Limestone and slate formations are more prominent to the south and east, more distant from the center of the district. A very noteworthy and important circumstance presents itself in this, that the lodes carrying the native silver are almost exclusively confined to those ridges of mountains which lie northwest of the town, or the dividing creek, while the opposite ranges are filled with veins carrying argentiferous lead, fahl ores, and such in combination with copper. Certain hills abound equally with splendid indications of gold; in fact, a number of such veins are known; none of them, however, have as yet been worked, for want of capital and enterprise. I have seen some of the latter ores which were very rich indeed.

The whole mountain ranges belonging to the district seem in fact to form an inexhaustible deposit of precious metals.

The Mineral Lodes

Are for the greater part very formal and true fissure ones. Those of the native silver in the neighborhood around Morelos, generally with a strike from north to south, deviating more or less, and a medium dip of eighteen to twenty degrees to the west. Their matrix, differing somewhat from that of the Batopilas veins, carries far less calc spar (*espato calizo*), seldom quartz or flint, but consists more of slate.

Like their celebrated neighbors, however, they do not, as a rule, crop out very wide on the surface, nor do they attain below the dimensions of other classes of ore veins, but in few instances widening out over two yards. Their great redeeming and distinctive feature lies in the peculiar richness of the ores, a comparatively small stretch of which often gives a very large result. Their average width is from three quarters to one yard. When they enter into ores they will often expand to beyond that, sometimes carrying them disseminated all through their body; or others more concentrated on the lower or the upper wall, (*respaldo alto o bajo*). As in all other metal-bearing veins, the ores are found in stretches of more or less horizontal or perpendicular extent, with barren spaces between them. These have to be thoroughly prospected in order to find the rich spots.

The Ores

Are, as already stated, formed of various combinations—sulphurets, often intermixed to a great extent with, and merging wholly into native or malleable silver—their great distinctive character.

Like Batopilas, nature seems to have indeed particularly favored Morelos with a remarkable show of this latter metal, in an entirely or almost pure state, greeting the eye often with a most brilliant white color (although of this more in B) and of very curious and interesting shape, so that many pieces might be readily taken for works of art rather than of nature, and are eagerly sought for as precious specimens for embellishment of mineral collections.

These ores are classified as first, second, third and fourth class; the latter showing but little if any silver at sight, and is known as *aqueous*.

The key of them ranges from \$56 to \$100 per ton of 2,000 pounds for fourth class; from \$100 to \$300 for third class, and from \$600 to \$1500; and from this to perfectly solid silver of \$32,000 per ton in value.

The Virgin, or Native Silver,

Occurs mostly in the shape of massive silver, which does not break, but must be hammered or chiseled out of the matrix, (*plata maciza*.) Wires—of more or less thickness, (*plata alamburada*.) Nails—more or less thick, separating by pounding, called *broza*, when very fine and near together, gives from one-third to two-thirds of the weight of the stone in silver, (*clavos de plata*.) Leaves—like thin sheets, (*plata de hoja*.) Lumps—generally enveloped in a soft clayish crust; often of one-half or two-thirds of its weight in silver, (*bola de plata*.) Pieces or grains, like the metallic gold.

The Beneficiating

Of this metal, or its ores, is done in a twofold way; by means of regular smelting furnaces, (*horno de fundicion*) of not very improved pattern, or by the application of quicksilver, by the old Mexican or Patio process, (*amalgamacion*.) The bullion resulting from either is refined in more or less crudely constructed cupel ovens, (*vaso de finacion*.) The actual loss produced by any of these manipulations is however much less than might be readily supposed from the often very primitive arrangements.

The ores of the fourth and third class, often being crushed by hand and means of heavy stones, or in the few existing regular mills, (*hacienda de beneficio*) by water-power machinery, are ground to a fine pulp in common stone built mills, (*tahona* or *arastro*) which generally grind from nine to 1,800 pounds (three to six cargas) during 24 hours, then taken out, carried to the Patio or open flag laid space, and here piled up in heaps (*montón*) of from four to eight tons each (30 to 60 cargas of 300 pound.) After being spread out, salt, iron or copper pyrites, (or sulphate) quicksilver not get mixed with them in their due proportions, ascertained before by assay or trial, and repeatedly trodden over by men or beasts, but very thoroughly each time, and the amalgamating process left entirely to the influence of the sun or atmosphere. Frequent tests with the horn-spoon show how this mysterious

process progresses and when it terminates. As soon as no more silver is taken up by the quicksilver, the entire mess gets washed out (*lavar*) in a reservoir (*pila*) prepared for the purpose, the amalgam carefully separated by kneading it, and after letting the earthy matter run off, the metallic particles or tailings (*polvillos*) are concentrated (by frequently throwing water on them), for future separate treatment. The amalgam is then burnt to separate the quicksilver from the silver and this latter refined (*apinar*.) The loss of the former during this entire process depends in a great measure on the care taken.

The first and second class ores are simply pounded with a hammer or a heavy stone, until the metal (native silver) concentrated in it gets as much as possible separated and clean of adhering matrix. It is then taken to the furnace (*horno*) in quantities of generally 25 pounds, to be smelted down. These give from \$250 to \$350 and more in silver. The resulting from the crushing is ground in the mill (*tahona*) to a flour-like state, washed out and its metallic parts treated in the same way as the foregoing, when they will produce a similar ley. What after this remains of parts is again ground together with the lower class ores and beneficiated along with them in the Patio. The tailings are subjected to a careful roasting in a reverberatory furnace before they are taken to the Patio, there to be treated with quicksilver, or are sometimes taken at once to the furnace.

The average expense for beneficiating one ton of third and fourth class ore (not included the cost of quarrying and delivering at the mill) may, while the price of quicksilver keeps at \$1.50 to \$2 per pound, be set down at from \$14 to \$20.

The Cost

of the working in the mines differs of course with the class of rock enclosing the lodes. The average price per yard of ordinary dimensions, when drifting with black powder, ranges from \$30 to \$35. Powder sells at \$7 to \$8 per 25 pounds (*arroba*.)

The Wages

Peid in the district to the workmen in the mines are comparatively low. A foreman (*minero*) earns from \$9 to \$12 per week, a miner (*barratero*) five to six reales (bits) per day's work of two blast holes 18 inches deep each and to charge and fire them off; a man who carries the rubbish, and the metal out of the mine (*tenatero*) four reales; a boy for all work (*zorro*) two to three reales; a watchman (*guarda-mina*) \$4 to \$5 per week; a man to attend to the mules (*muelero*) \$3.50 to \$4 per week; other workmen outside the mine, at the ore mill cost from four to six reales per day.

The Extent of the Claims

Or *pertenencias*, corresponds to that prescribed by the old Spanish mining laws (*Ordenanzas de mineria*) still in force in Mexico, which allows 200 varas (600 feet) measured off along the lode on the surface, by 100 varas (300 feet) in width, laid off at option on either side of the lode, running down perpendicular to the center of the earth (if needed) and enclosing an indisputable property everything contained in this parallelogram. A so-called company's claim (*perlenencia de compania*), however, is allowed to comprise four single *pertenencias*, therefore equal to 800 varas (2,400 feet) in length, by 100 varas in width. But the discoverer of a new lode is entitled to two single claims for himself. In regard to the

Number of Veins

Morelos may be said to compare very favorably with any of its surrounding districts; yet it seems that by far the greater number of these lodes which carry native silver, are concentrated in a mountain northwest of the town, and known as *El cerro de San Anastasio*, which in all its parts seems to be traversed by them, and in some spots running out from towards San Joaquin or independent hills divided by the deep gorge known as *La Corcovada*.

Few of them have, however, been actually worked, and but two over 100 yards in depth, most of the others from 10 yards only to hardly over 50 or 60. They may therefore justly be called "virgin" ones. The reason why must be looked for in the general lack of capital and the unstable state of the country, formerly nipping at all enterprises in the bud. Almost all the lesser work had to be done by *gambuzinos*, who discovered the lodes, or by men of small means, both of whom confined themselves merely to picking out what metal they were fortunate enough to encounter on or near the very surface, but had no means nor courage to follow up as soon as barren parts of the vein cut their "bonanza" temporarily off.

Many of the lodes may indeed not prove remunerative, although their surface indications are promising; still, this question can in the end only be solved by the employment of at least a certain amount of capital and work on the mines, which would justify the opinion. As a rule, verified by actual experience, the larger body of ore may not be looked for until a depth of from 30 to 40 yards has been attained, with corresponding exploring drifts. The deeper, the more constant and of richer ley they will show, while near the surface, although often extremely rich and running into solid silver, they will hardly ever be extensive.

The General Opinion

Among the mining population is, and this corresponds with my own observations, that, "if money be invested in any of the better class veins, selected with circumspection, and lying in good mineral ground (*panino*), nothing will be lost." The main condition for success is,

of course, besides the good lode, a proper and economical management of the business, doing away with any and all unnecessary or fancy expenses which have ruined the most of the American mining enterprises in Mexico in former years, but few of them having been conducted by men of experience, or who were willing to forego conveniences of life which they had been used to. Above all, leave all costly machinery alone, until the state of the mine imperatively calls for it.

In my opinion, a working capital paid in or otherwise secured, of from \$15,000 to \$20,000 is sufficient, if expended with care, to open one of these above mentioned mines, or bring it into a satisfactory state.

A number of them are held by private parties, either by actual possessory papers, or by denouncement or re-denouncement, a majority of whom would be willing to part with them for a corresponding remuneration, they lacking the means to prosecute the work in them. Other mines, however, have at present no owners and are open to denouncement. One like the other needs exploring to prove their value.

The first of all these native silver mines ranks the great

San Gil Mine,

Discovered in 1826 by Gambuzinos, among them a most remarkably gifted prospector, Don Juan N. Avila, who at first took up four independent claims upon it. Beginning with rich chlorides (*bodagones*) and native silver, this latter soon became predominant, for considerable stretches running into massive metal and for a long time continuing to give forth great treasures, so that often \$40,000 and \$50,000 were taken out in a single week. In fact, the virgin silver was actually found cropping out in more than one place along the lode, which crosses the southeast slope of the San Anastasio hill, in a southeast to northwest direction, and a west dip of 20 degrees.

The ores of it are very peculiar, containing iron pyrites, among them very conspicuous the so-called "ruby-silver" ore, which, especially in a certain part of the mine, therefrom surmised "Sangre de Christo," was found in such quantity and of such blood-red color, that the entire vein seemed to be painted. The most beautiful and perfect crystals of it have frequently been sold for very high prices.

The great deposits of metal seem to have extended more in a south direction and about 60 yards downward. No regular accounts of their product was kept by the first owners, still it is known that it must have been many millions. Being but illiterate men they, with the improvidence peculiar to their class, spent their fortune as fast as it came out of the bowels of the earth, until, when the ore body finally gave out, they were obliged to sell out to a gentleman named Don M. Ochoa, who united the four claims into the present one. His heirs still own and work the same under the present management of Sr. Don Francisco Ochoa.

The perpendicular depth of the workings comprises in no part 120 yards, although in the places connected, galleries extend over 300 yards in a longitudinal direction. The metallic silver of this lode is very pure, hardly losing two per cent., and often met with very brightly polished end white.

The mine may be said to be virgin yet, and every sign is highly favorable for again striking a bonanza after passing the intervening barren layers of the lode. A tunnel being started to cut it below the old bonanza parts gives already very promising hopes; equally so a gallery being driven to the south in virgin ground. The present owners having become weakened by other enterprises, have for several years only been able to work the mine with a mere handful of men. The days of new prosperity seem, however, to be near, if I may judge so from ores which I saw myself coming out of the mine on the very day before I left Morelos in December last.

A number of more or less parallel running formal lodes enter the claim, laying west of the San Gil; none of them here, however, been worked to any extent, all giving, wherever picked at, on or near the surface, very rich silver and chlorides. The mineral country is everywhere excellent, the country rock partly granite, partly diorite and syenite.

[Concluded next week.]

OPEN ORE MARKET.—A new enterprise, in which all miners will take a lively interest, is the crushing and sampling work now in course of erection on the corner of Third and Argentine streets, by Melliss & Morris, a new firm, but well acquainted with the wants of the miner, and having abundant means and knowledge to carry their project to a successful issue, and, at the same time, to supply a want long demanded in our community by parties having ore to sell of all grades and qualities. In other words, an open market, in which the ore is sold to the highest bidder for cash, after having been crushed to the required fineness and carefully sampled and assayed; bottled and sealed samples having been previously distributed among the buyers, somewhat after the plan so successfully adopted in Salt Lake and other large ore markets. By this method the miner can be in no doubt as to whether he has received the full value of his ore; and Messrs. M. & M. propose to go still further and, in the event of a "slow" market, to themselves take all ore sent to the mill, at full prices, for shipment to Europe. In addition, they will be at all times ready to make cash advances on well known ore as soon as delivered at their mill which, it is expected, will be ready for business by the end of the coming month.—*Colorado Miner*.

MECHANICAL PROGRESS.

New Uses for Copper.

Dr. Knuzel, whose name will be recalled as a joint discoverer with M. Montefiore-Levy, the well known phosphor-bronze, now announces the additional discovery that when phosphor-bronze is combined with a certain proportion of lead, the phosphorized alloy, when cast into a bar or bearing, segregates into two distinct alloys, one of which is hard and tough phosphor-bronze, containing but little lead, and the other a much softer alloy, consisting chiefly of lead, with a small proportion of tin and traces of copper. The latter alloy is almost white, and, when the casting is fractured, it will be found nearly uniformly diffused through it; the phosphorized alloy forming as it were a species of malleable sponge, all of whose cavities are occupied by the soft metal alloy segregated from it. This phenomenon of the segregation into two or more alloys, of combinations of copper with tin and zinc, has long been known, and the fact that such separation is generally passive, and not equal throughout the mass, it has been a source of annoyance to the founder. Dr. Knuzel, however, seems to have succeeded in causing the segregation to take place in a uniform distribution throughout the casting. It has taken advantage of the properties of the product which he obtains in this manner, to construct therefrom bearings of railway and other machinery.

In heavy bearings, such as those for marine engines, the valuable properties of Babbitt metal, and similar anti friction alloys, are well recognized; but these being generally soft, are subjected to the grave objection that where they are subjected to considerable pressure, or even moderate pressure accompanied by continued vibration, they become distorted in form, and fail to sustain the journals in their proper position. The device is, therefore, resorted to by the machinist, of casting a hollow cage of lead metal, of proper form, for the intended bearing, the cavities of which he then fills by casting into them the soft metal alloy, which thus forms the actual rubbing surface of the bearing. The hard metal cage supports the metal within, and prevents its distortion or escape, save by surface abrasion. Dr. Knuzel claims to effect the same result by the peculiar constitution of his new phosphorized alloy for bearings. This forms its own supporting cage, for the soft bearing metal, which, according to the out-set, separates from it in the process of cooling. He claims that these bearings combine the very small friction and abrasion of the journals, with the firm resistance to pressure and stability of form of rings of hard metal. The test of practice can decide the value of these claims, though they seem very plausible.

In relation to the above see article on this page—"Brass vs. Phosphor-Bronze Bearings for Rolling Mill Use."

MICA SUBSTITUTE FOR STOVES.—A correspondent writes to the *Iron Age* as follows: Sir—The illuminating principle in stoves has become so thoroughly established, and the constant demand for mica has become disproportionate to the supply, is it not possible for one of our chemists to produce some chemical substitute for the same that shall be cheaper and as durable? Illuminating stoves to the household are like pictures on the walls, refining and civilizing in their influence and tendency, and so great a boon to mankind should not be jeopardized by fear of any failure of the supply in an article that possesses the quality of much pleasure and health-giving comfort. Would this suggestion be within the possibilities of chemical combinations, a liberal reward will be paid by the stove manufacturers of the country.

The editor of the *Gas Light Journal* calls attention, in connection with the above, to a communication in reference to the same idea published in that journal, April 16th, 1874, wherein a beautiful device for this purpose was given by Dr. A. A. Hayes, of Brookline, Mass.

BRASS VS. PHOSPHOR BRONZE BEARINGS FOR ROLLING MILL USE.—A correspondent at Pittsburgh recently wrote to the *Scientific American*, asking what he thought to be an unusual test journal bearings and the result—phosphor bronze being the material employed. Some technical person who seems to know whereof he speaks and who writes over the initials "T. J." also of Pittsburgh, took the matter up, and after showing that the "tests" mentioned by the first were of the most common character, proceeds to give, in the same paper, an account of far better results from good brass bearings; giving the proportions of copper and tin composing the latter. The particulars with regard to both tests are given quite fully. "T. J." remarks that previous to reading the communication in relation to the tests with the phosphor bronze he was laboring under the impression that it was a superior composition for journal boxes and rolling mill brasses; but comparing the results of the two trials with similar work, his former opinion of phosphor bronze has been materially changed.

NEW POTTERY GLAZE.—M. Constantin, a chemist of Brest, has invented, for common pottery-ware, a glaze which is completely infusible, and which is destined to replace the glaze which, up to now, has been always

employed, and which has had the serious inconvenience of producing intoxications more or less mild. Already in 1872, M. Constantin had produced a glaze comparatively less dangerous by reason of the small quantity of lead which it contained. His mixture consisted of a silicate of soda added to powdered flint, with a very little minimum of red lead. Since that the glazes accepted at the manufactory of Lantilis, near Brest, do not contain any trace of lead. The two formulas which they use are: First, 100 parts of silicate of soda at 50 degrees; 15 parts of powdered quartz; 15 parts of Mendon chalk; or, second, 100 parts of silicate of soda at 50 degrees; 15 parts powdered quartz; 15 parts Mendon chalk; 10 parts borax. The addition of borax makes the glaze more fusible and brilliant; it requires a less vivid fire than the first formula, and it can be colored green by copper and brown by manganese.

Improvements in Telegraphic Apparatus.

A number of telegraphic instruments have been for some time in operation upon the Government lines between the Capital and the War Department, constructed and arranged on a plan invented by Mr. Merritt Galley, of Rochester, New York. An important feature of this system arises from the fact that there is comparatively little expense, and but little change of instruments. A common telegraphic instrument arranged for single transmission, as per old Morse system, may be converted into a line for transmitting messages in both directions at the same time, with the ability to draw a copy of either or both messages at any or all way stations of the line. The line has been in operation with batteries over twenty-five per cent. out of the balance, and still a margin of over twenty per cent. remained for the adjustment of instruments. Preparations are being made to place Mr. Galley's invention not only on all the Department lines, but also on the Signal Service. The Atlantic and Pacific and the Western Union Telegraph companies, as well as others, are also looking into the merits of the invention, with a view to its adoption, should it prove in every way satisfactory.

The most ingenious and perhaps the most important instruments exhibited by the inventor, are those for automatic transmission, in which the objections urged against the automatic in common use seem to be obviated. The invention is emphatically automatic—a single operator with it not only preparing accumulating matter for transmission, but it will transmit any portion of the same to its proper destination, having perfect control of the entire work even over a number of lines, while sitting at a single instrument. He exhibits an instrument which requires no perforated message stub, but by means of peculiar but simple mechanism transmits message after message with the instrument, until such time as the line can be secured, when by a stroke of single key they are sent into the line complete.

Achievements by the Sand Blast.

There has recently been exhibited in London, a plate of glass about half an inch thick, which by the sand blast has been pierced through in about ten minutes, and also a large flat file, in which a slit about four inches long and three-eighths of an inch broad, had been cut, by the same means.

The fact seems to be abundantly demonstrated, that sand, driven by an air blast of the pressure of four inches of water, will completely grind or de-polish the surface of glass in ten seconds. If the glass be covered by a stencil of paper or lace, or by a design drawn in any tough elastic substance, such as half dried oil, paint or gum, a picture will be engraved on the surface. Photographic copies in hi-chromated gelatine, from delicate engravings, have been thus faithfully produced on glass.

In photographic pictures in gelatine, taken from nature, the lights and shadows produce films of gelatine of different degrees of thickness. Now, it is found that a carefully regulated sand blast will act upon the glass beneath these films more or less powerfully, in proportion to the thickness of the films, and the half-tones or gradations of light and shade are thus produced on the glass.

Then, too, if the sand blast be applied to a cake of resin, on which a picture has been produced by photography in gelatine, or drawn by hand in oil or gum, the bare parts of the surface may be cut away to any desired depth. The lines left in relief will be well supported, their base being broader than their top, and there being no under-cutting—as is apt to occur in etching on metal with acid—an electrotype from this matrix may be made, and can be printed from an ordinary press.

STEEL VS. IRON.—The *American Manufacturer and Iron World* says: For many purposes steel, or those products generally called steel, such as Bessemer, homogeneous, etc., is rapidly superseding iron, and in the manufacture of all grades of steel, the tendency is towards the employment of processes that will permit not only of a largely increased output, but of the production of much larger masses. The Bessemer process, as is well known, accomplishes both of these results, giving a low grade of steel, that is a steel low in carbon. The Siemens-Martin and the Pernot modification of it give much better grades than the Bessemer, and the latter in masses fully equal to the Bessemer. We do not expect that steel will ever supersede iron for all purposes, but it is evident that the possibilities of steel neither in its manufacture nor in its applications are as yet reached.

SCIENTIFIC PROGRESS.

Progress of Solar Chemistry.

Several important circumstances unite to give unusual interest to the solar eclipse to occur in April next. The progress of solar chemistry has brought investigators face to face with problems of universal reach and significance, for the solution of which the four minutes of observation will be more valuable than as many years of laboratory work. A new instrument, the siderostat, destined, it is thought, to effect a great revolution in astronomical observation, will immensely increase the efficiency of spectrum photography; and the conditions under which the eclipse will be visible promise better opportunities for the observation of totality than can be enjoyed again before the close of the current century, or, more precisely, April 16, 1893. In not one of the four total eclipses of the meantime—1878, 1882, 1886, 1897—or in that of 1900, will the duration of totality be so great, or the central line of the eclipse present stations so favorable for observation.

Between the eclipse of 1860—during which photography decided the long vexed question of the origin and place of the strange red prominences seen round the dark body of the moon at the moment that the sun's disk is covered—and the eclipse of 1868, the spectroscopic had revealed the approximate composition of the sun's atmosphere, taken as a whole. The great point to be determined in 1868 was not simply the place and shape of the prominences, but their material. The result is well known, namely, that they consisted of glowing gas, or a mixture of such gases, shot to immense heights through the solar atmosphere.

Almost simultaneously with this discovery, it was found that the prominences could be studied spectroscopically independently of eclipses; and observers were not long in finding out that, outside the bright round face of the sun, was an envelope of glowing hydrogen into which magnesium and sodium, and more rarely, iron and other heavy metals, were injected from below, in the form of a vapor. It was further ascertained that the gases and vapors were not all mixed up together, but that the slightest, such as hydrogen, magnesium, and sodium were generally at top; and that, as the others were shot up from time to time, the heavier were located, as a rule, lower down in the solar atmosphere. During the eclipse of 1869 it was established that an unknown gaseous element, lighter than hydrogen, existed above that gas heretofore supposed to be the lightest form of matter. Since 1871 the spectroscopic study of the sun's chromosphere has been carried out to great advantage by Professor Young, at a mountain elevation of 9,000 feet in which clear atmosphere the chromosphere appears more complicated than when examined in the denser atmosphere below. Extensive laboratory researches have been undertaken under these conditions for the elucidation of the various phenomena connected with the sun's chromosphere. The study of the sun has enabled astronomers to explain the various classes of stars by supposing that, as a star grows older and colder, the metaloids are enabled to exist lower down in the atmosphere, and thus to change the character of the spectra of stars bright and hot into that associated with those which are dim and possibly colder; until at last the metaloidal rain, so to speak, falling on the metals below, gives the material of a future crust.

Associated with these chemical questions are physical questions of the greatest interest, the solution of which will help to make clear the development of our Universe from nebulae to suns and worlds. How far the coming eclipse will further the inquiry remains to be seen. It is confidently expected that the result to be accomplished will be "the fruit and crown" of the work begun in 1860, and carried on with so much zeal by all civilized governments since that time.

The course of the central line of this eclipse is mainly a sea track, yet, in its passage from the Nicobar islands, in the Bay of Bengal, to Siam, it crosses several points that will afford good stations for observation. At Kaikul, in the island of Camorta, totality will continue four minutes, twenty-seven seconds. On Bentinck Island, the maximum duration of totality will be four minutes seventeen seconds; at Mergui, four minutes, six seconds; at Tennaserim, three minutes, fifty-seven seconds; near Bangkok, Siam, to which point astronomers have been invited by the King, the total eclipse will last three minutes, fifty-four seconds.—*Scientific American*.

RELATIVE EFFECT OF WHITE AND RED HOT IRONS ON FLESH TEXTURE.—Dr. J. S. Camden publishes in the *Medical Times and Gazette* information very important to surgeons who are not cognizant of the fact, that the application of a white-hot iron to the body is absolutely painless, while when only red-hot it is an extremely painful operation. When operating with a red-hot iron on men the screeching was fearful, while when the iron was white-hot a murmur was heard; and when he operated so upon a horse the animal seemed scarcely to be aware of what was being done. He proposes to use for actual cautery a large spirit blow-pipe.

Curious Facts About Sponges.

Recent investigations have shown this curious fact about sponges. No matter how long a sponge may have been used, no matter how long it may have been kept dry, its life is apparently restored when it is wet. The sponge being wet with warm water and being placed in a warm room, the extremities of the sponge, after a little while, appear to be alive, and reach out like so many snakes. The longer they are, the greater the motion. It was observed that wetting the sponge with salt water seemed to increase the motion. Nearly half of all the slender points seemed to come to life, but after they become dry the motion ceases.

All sorts of dust were put upon the sponge so that they should be under the same circumstances as the pores of the sponge, but nothing but the pores of the sponge appeared to be in motion. Under the instrument, the sponge has no longer the appearance of a sponge; it appears like caverns, rocks, etc. These moving parts, when caught with pliers, would pull out a portion of the sponge. When there is much water in the sponge, they seem to be satisfied, but it is as the sponge is drying gradually that they appear to have life. This fact was discovered with an instrument which magnified only 42 diameters.

WIND-DRIFT EROSION.—At the Hartford meeting of the American Association for the Advancement of Science, a paper was presented by G. K. Gilbert, upon "Erosion by Sand in the Western Territories," and an abstract of the same is already in type for the forthcoming volume of the Proceedings. One of the topics discussed was the degradation of desert plains by drifting sand—a degradation evinced by the peculiar worn surfaces of the pebbles which strew the plains. The hard pebbles exhibit a high polish; the softer parts of the heterogeneous are deeply scored; and pebbles of limestone are carved with an arabesque plexus of furrows. In a subsequent note to the *Journal of Science*, Mr. Gilbert states that these phenomena were briefly noted by Dr. J. S. Newberry in 1861, and his observation has been cited as the first on record. But it is a well known fact that the phenomena were earlier observed by Prof. W. P. Blake, who published descriptions in 1855. His description, which is more extended than Dr. Newberry's, touches the majority of the features, and to him belongs the credit of having first discovered and truly explained the facts.

INTERESTING INVESTIGATION.—M. Faivre has recently performed a series of experiments of the mulberry, hazel nut, and cherry laurel, which he considers go far to prove the fact that the substances which supply the food of plants have an ascending motion in the bark. For this purpose he made perfect or imperfect annular incisions through the bark or detached pieces of the bark, to which buds were attached, or removed entire cylinders of bark from the trunk. The result of the experiments was that the buds always continued to develop when the communication remained uninterrupted with the lower portion of the trunk; while when this communication was completely destroyed, the buds invariably withered away. If the bud was separated by a perfect annular incision, it withered the more slowly the greater its distance from the incision; and in these cases the starch disappeared entirely from the incision; and in these cases the starch disappears entirely from position so the wood above the incision between it and the bud. When entire cylinders of bark with buds on them were removed, the buds continued to develop, and even produce branches bearing leaves.

THE REPORT OF THE GEOLOGICAL SURVEY OF MISSOURI.—This volume, comprising 734 octavo pages, besides index and plates, is a worthy successor to the report of Prof. Pampelly. Like that report, it treats with special fullness of the resources of Missouri in useful minerals and cannot fail of a direct and immediate effect in advancing the development of the State. We take pleasure in presenting to our readers as full an account of its contents as our limited space will permit. The plates appended to the volume comprise about ninety lithographic illustrations, referring, almost without exception, to ore deposits and mining and metallurgical operations.

IMMENSE PHOTOGRAPHS.—There are now on exhibition in Paris says the *Revue Industrielle*, the two largest photographs which have been made since the introduction of the art. One of these photographs represents the principal bronzes—the *Départure*, by Rude—of the *Arc de Triomphe de l'Etoile*. Each of the prints facade of the new Opera, the other one of the measures four feet three inches in length and three feet four inches in height. They were obtained in one single piece, by well known processes, and with the aid of a large and specially constructed camera.

THE EVAPORATION OF METALS BY ELECTRICITY.—Mr. Hopkins describes an interesting experiment, which consists in passing a charge of electricity through a very fine thread of platinum, or other metallic foil, the thread being kept in place between slides of microscope glass. The effect of the heat from the electric discharge is to vaporize the metal, which is instantly condensed in a transparent layer upon the cold glass, which can then be studied by the microscope, and can be used in various ways to determine the character of the metal and the peculiarities of the discharge.

Mining Stocks.

The Mining Stock market continues dull, with few sales at low prices. There seems to be no animation in any particular stock, and the depression from last week's prices is quite marked. Of the Comstock situation the *Enterprise* says: "At the northern end of the Comstock, in the bonanza region, in addition to drifting, the have gone to boring ahead into the ore body with diamond drills. In this new style of mining the only trouble met with is the occasional clogging of the drills, caused, as is currently reported, by their coming in contact with nests of stephanite and pockets of pure silver in which the diamonds slip and therefore make but little headway—which is 'important, if true.' Both in the Ophir (on the 1700-foot level) and in the California (1500-foot level, cross-cut No. 3) these drifts are now traveling eastward by day and by night. The open drifts are all showing up as well as could be desired, and what with boring and what with drifting, the known dimensions of the great ore body are every day increasing. Never before has it looked so well for the Ophir, and in the California and Consolidated Virginia it is said that pure silver looks cheap, and their only present thirst is for gold. It is now considered quite probable that the big bonanza will be found to back down south into Best & Belcher, and that it may not stop then, but reach down into the Gould & Curry; while at the north end it bids fair to plow its nose into Mexican and some of the mines beyond. The present is indeed a season of great expectations, and it is hard to say what will be the metes and bounds of the great ore body when its dimensions shall have been fully developed. For miles to the northward, companies are going down in the track of the great lode in the expectation of finding bonanzas, as yet unknown and almost unsuspected. To the southward the same is being done, but in that direction shafts have already been sunk to considerable depths, and most powerful hoisting machinery is already in operation, by means of which still greater depths in every shaft will very shortly be attained.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, MARCH 11.	THURSDAY, MARCH 18.
MORNING SESSION.	MORNING SESSION.
415 Alpha.....18@18 1/2	180 Alpha.....17@17 1/2
420 Best & Belcher.....5 1/2@5 3/4	185 Best & Belcher.....4 1/2@4 3/4
425 Belcher.....5 1/2@5 3/4	190 Belcher.....4 1/2@4 3/4
430 Obolair.....6 1/2@6 3/4	195 Obolair.....5 1/2@5 3/4
195 O. G. Hill.....1 1/2@1 3/4	200 O. G. Hill.....1 1/2@1 3/4
185 Con Virginia.....4 1/2@4 3/4	205 Con Virginia.....4 1/2@4 3/4
210 California.....2 1/2@2 3/4	210 California.....2 1/2@2 3/4
825 Crown Point.....3 1/2@3 3/4	220 Crown Point.....3 1/2@3 3/4
150 Confidence.....2 1/2@2 3/4	225 Confidence.....2 1/2@2 3/4
75 Daney.....1 1/2@1 3/4	230 Daney.....1 1/2@1 3/4
110 Imperial.....1 1/2@1 3/4	235 Imperial.....1 1/2@1 3/4
115 Justice.....1 1/2@1 3/4	240 Justice.....1 1/2@1 3/4
230 Kentucky.....1 1/2@1 3/4	245 Kentucky.....1 1/2@1 3/4
140 Lady Bryan.....1 1/2@1 3/4	250 Lady Bryan.....1 1/2@1 3/4
150 Madison.....1 1/2@1 3/4	255 Madison.....1 1/2@1 3/4
1530 Ophir.....1 1/2@1 3/4	260 Ophir.....1 1/2@1 3/4
420 Overman.....1 1/2@1 3/4	265 Overman.....1 1/2@1 3/4
5 Seg Silver.....1 1/2@1 3/4	270 Seg Silver.....1 1/2@1 3/4
565 Sierra Nevada.....1 1/2@1 3/4	275 Sierra Nevada.....1 1/2@1 3/4
200 Succor.....1 1/2@1 3/4	280 Succor.....1 1/2@1 3/4
325 Yellow Jacket.....1 1/2@1 3/4	285 Yellow Jacket.....1 1/2@1 3/4
125 Union.....1 1/2@1 3/4	290 Union.....1 1/2@1 3/4
480 Yellow Jacket.....1 1/2@1 3/4	295 Yellow Jacket.....1 1/2@1 3/4

AFTERNOON SESSION.	AFTERNOON SESSION.
230 American Flag.....2 1/2@2 3/4	235 American Flag.....2 1/2@2 3/4
550 Baltimore.....1 1/2@1 3/4	240 Baltimore.....1 1/2@1 3/4
510 do.....1 1/2@1 3/4	245 do.....1 1/2@1 3/4
100 Chief of Hill.....1 1/2@1 3/4	250 Chief of Hill.....1 1/2@1 3/4
100 Chert Creek.....1 1/2@1 3/4	255 Chert Creek.....1 1/2@1 3/4
400 California.....1 1/2@1 3/4	260 California.....1 1/2@1 3/4
25 El Dorado South.....1 1/2@1 3/4	265 El Dorado South.....1 1/2@1 3/4
205 G. G. V.....1 1/2@1 3/4	270 G. G. V.....1 1/2@1 3/4
120 Empire.....1 1/2@1 3/4	275 Empire.....1 1/2@1 3/4
20 Golden Chert.....1 1/2@1 3/4	280 Golden Chert.....1 1/2@1 3/4
600 Globe.....1 1/2@1 3/4	285 Globe.....1 1/2@1 3/4
50 Ide Elmore.....1 1/2@1 3/4	290 Ide Elmore.....1 1/2@1 3/4
510 Julia.....1 1/2@1 3/4	295 Julia.....1 1/2@1 3/4
321 Knickerbocker.....1 1/2@1 3/4	300 Knickerbocker.....1 1/2@1 3/4
1800 Meadow Valley.....1 1/2@1 3/4	305 Meadow Valley.....1 1/2@1 3/4
275 Mansfield.....1 1/2@1 3/4	310 Mansfield.....1 1/2@1 3/4
75 M Belmont.....1 1/2@1 3/4	315 M Belmont.....1 1/2@1 3/4
200 Mahogany.....1 1/2@1 3/4	320 Mahogany.....1 1/2@1 3/4
9 Newark.....1 1/2@1 3/4	325 Newark.....1 1/2@1 3/4
450 Prussian.....1 1/2@1 3/4	330 Prussian.....1 1/2@1 3/4
205 Pioche.....1 1/2@1 3/4	335 Pioche.....1 1/2@1 3/4
5150 Raymond & Ely.....1 1/2@1 3/4	340 Raymond & Ely.....1 1/2@1 3/4
345 Rye Patch.....1 1/2@1 3/4	345 Rye Patch.....1 1/2@1 3/4
270 South Chert.....1 1/2@1 3/4	350 South Chert.....1 1/2@1 3/4
50 Silver Cord.....1 1/2@1 3/4	355 Silver Cord.....1 1/2@1 3/4
250 War Eagle.....1 1/2@1 3/4	360 War Eagle.....1 1/2@1 3/4

The Seattle (W. T.) *Intelligencer* of the 3d instant says: "There was a report current on the street yesterday to the effect that the Seattle Coal Company had entered into a contract with the Central Pacific Railway Company to supply them with coal for a period of three years, to the extent of 5,000 tons per month, and that Captain Blair, the owner of a large number of vessels plying on this northern route, having secured the contract for its transportation, would immediately put his vessels on the route between there and San Francisco.

The two foundries and two planing mills in Santa Cruz are busy turning out machinery and doing work for the two railroads now being constructed into town.

HEADSTAMP wants an assayer. The only question is, can it pay for such a luxury? There are plenty of assayers, but they will not work where they get only about one job a week.

An average of 120 car loads of ore is shipped daily over the Virginia and Truckee railroad to different quartz mills.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't. Sale.	Secretary.	Place of Business.
Andes S M Co	Washoe	4 150 Feb 25	Mar 29	April 14	M Lenders 507 Montgomery st
Adams Hill Cons M Co	Eureka Nev	6 15 Feb 16	Mar 21	April 16	W W Taylor 408 California st
Alps S M Co	Ely District	4 15 Feb 16	Mar 21	April 16	O D Squire Cor 331 Montgomery st
American Flat M Co	Washoe	5 200 Feb 8	Mar 15	Apr 5	C A Sankey 419 California st
Atlantic & Pacific Cons M Co	Cal	10 50 Mar 9	Apr 14	May 1	A Noel 419 California st
Bacon M & M Co	Washoe	3 50 Mar 9	Apr 12	May 1	Edward May 419 California st
Belleme M Co	Cal	11 50 Feb 17	Mar 22	Apr 14	D F Verdenal 409 California st
Buckeye G & S M Co	Washoe	13 50 Mar 4	Apr 10	Apr 29	C H Sankey 331 Montgomery st
Caledonia S M Co	Washoe	11 300 Mar 9	Apr 13	May 1	R Wescener 414 California st
Chariot Mill & M Co	San Diego Cal	2 50 Feb 17	Mar 22	Apr 14	F Swift 419 California st
Chert Creek M & M Co	Nevada	2 25 Feb 17	Mar 22	Apr 15	D F Verdenal 419 California st
Cross Bay (Iron) Coal Co	Oregon	1 100 Feb 5	Mar 10	Mar 31	T P Beach 424 Montgomery st
Crown Point R G & S M Co	Washoe	2 50 Mar 12	Apr 12	Apr 29	J M Buffington 419 California st
Dardanelles M Co	Washoe	2 100 Feb 5	Mar 10	Mar 31	W S Deval 402 Montgomery st
Davison G & S M Co	Washoe	2 100 Feb 5	Mar 10	Mar 31	W S Deval 402 Montgomery st
El Dorado Water & D G M Co	Cal	3 100 Feb 16	Mar 19	Apr 13	H Elias 416 Montgomery st
Empire M Co	Idaho	9 100 Jan 30	Mar 5	Mar 25	W Willis 419 California st
Gold Run M Co	Cal	10 15 Feb 9	Mar 5	Mar 25	O O Palmer 41 Market st
Golden Chert M Co	Idaho	13 25 Mar 3	Apr 12	May 1	L Kaplan 419 California st
Ida Elmore M Co	Idaho	16 100 Feb 1	Mar 8	Mar 25	W Willis 419 California st
Imperial S M Co	Washoe	21 100 Feb 10	Mar 10	Apr 7	W E Dean 419 California st
Independence S M Co	Cal	15 50 Feb 18	Mar 15	Apr 19	G T Grimes 240 Montgomery st
Julie G & S M Co	Washoe	2 200 Feb 12	Mar 18	Apr 6	E F Stern 419 California st
Kossuth M Co	Washoe	3 50 Feb 25	Mar 13	Apr 21	D A Jennings 401 California st
Mammoth Silver M Co	Nevada	18 100 Feb 25	Apr 3	Apr 28	D A Jennings 401 California st
Manhattan M Co	Ely District	1 100 Feb 25	Apr 3	Apr 28	D A Jennings 401 California st
Monitor Belmont M Co	Nevada	50 50 Mar 16	Apr 19	May 7	W W Hubbard 418 California st
Newark S M Co	Ely District	13 100 Feb 2	Mar 10	Mar 31	W Willis 419 California st
New York M Co	Washoe	3 50 Feb 16	Mar 22	Apr 12	H C Kibbe 419 California st
North Bloomfield G M Co	Cal	3 100 Feb 3	Mar 12	Mar 25	T S Wiggins 328 California st
Overman S M Co	Washoe	31 300 Mar 16	Apr 20	Mar 10	Geo D Edwards 414 California st
Phil Sheridan G & S M Co	Washoe	2 75 Jan 21	Mar 2	Mar 30	W R Townsend 330 Pine st
Pictou M Co	Washoe	7 25 Mar 2	Apr 3	Apr 23	S Phillips 408 California st
Pine West Extension M Co	Pioche	3 300 Jan 18	Feb 26	Mar 26	T W Colburn 419 California st
Raymond & Ely S M Co	Idaho	6 50 Feb 1	Mar 9	Mar 30	W Willis 419 California st
Red Jacket M Co	Washoe	7 100 Jan 11	Mar 15	Mar 7	J W Clark 419 California st
Rock Island G & S M Co	Washoe	1 100 Feb 18	Mar 15	Apr 12	F B Hildes 419 California st
Sage M Co	Washoe	11 50 Feb 25	Mar 13	Apr 21	J H Sayre 10 Stevenson's Bldg
Sentinel Silver M Co	Idaho	8 100 Mar 27	Apr 1	Apr 22	Frank Swift 419 California st
Silver Cord M Co	Washoe	5 200 Feb 16	Mar 19	Apr 9	W E Dean 419 California st
Silver Hill M Co	Cal	10 15 Feb 2	Mar 12	Mar 25	F J Small 409 California st
Star Patrick G & S M Co	Washoe	10 25 Feb 25	Mar 31	Apr 19	Louis Kaplan 418 California st
Star King M Co	Washoe	10 50 Feb 17	Mar 22	Apr 8	G W R King 434 California st
Sutro M Co	Utah	4 15 Feb 28	Mar 22	Apr 27	W H Watson 302 Montgomery st
Victoria & Imperial T & M Co	Utah	9 100 Jan 25	Mar 12	Mar 25	D A Jennings 401 California st
Ward Beecher Cons M & M Co	Nevada	4 30 Feb 27	Mar 18	Apr 12	J M Buffington 419 California st
Ward Ellis S M Co	Robinson District	3 50 Feb 10	Mar 18	Apr 12	D A Jennings 401 California st
Washington & Creole M Co	Ely District	14 100 Feb 18	Mar 23	Apr 12	F D Cleary 419 California st

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't. Sale.	Secretary.	Place of Business.
Alpine G M & M Co	Cal	8 125 Feb 11	Mar 25	April 14	J T Lightner 433 California st
Oscade Blue Gravel M Co	Cal	2 100 Mar 8	Apr 13	Mar 3	J M Buffington 419 California st
Cedberg G M Co	Cal	2 50 Mar 8	Apr 13	Mar 3	D M Boker 215 Sansome st
Cienega P M Co	Mexico	2 50 Mar 8	Apr 13	Mar 3	W T Townsend 330 Pine st
Cincinnati G & S M Co	Cal	10 50 Mar 17	Apr 26	May 14	W Small 419 California st
Edith Q M Co	Cal	3 30 Mar 10	Apr 22	May 14	W Small 419 California st
El Dorado State Co	Cal	1 15 Mar 4	Apr 5	May 14	Hugh Elias 416 Montgomery st
Electric M Co	Utah	2 40 Feb 18	Mar 22	Apr 12	T S Wiggins 328 California st
Emma Hill Cons M Co	Utah	2 40 Jan 25	Mar 12	Mar 25	G J Cohen 419 California st
Enterprise Cons M Co	Cal	1 25 Mar 15	Apr 24	May 18	J J Hermann 418 Kearny st
Fresno Q S M Co	Nevada	1 25 Mar 15	Apr 24	May 18	R Wescener 419 California st
Genova Cons S M Co	Nevada	1 25 Mar 15	Apr 24	May 18	R Wescener 419 California st
Ceyser Q S M Co	Cal	1 25 Mar 15	Apr 24	May 18	R Wescener 419 California st
Gold Mountain O M Co	Bear valley Cal	4 100 Jan 25	Mar 6	Mar 31	J P C Wallier 513 California st
Golden Crown M Co	Cal	1 100 Feb 25	Apr 1	May 1	Daniel Buck 11 Stevenson's Bldg
Home G M Co	Nevada	2 100 Feb 10	Mar 17	Apr 6	J J Hermann 418 Kearny st
Imperial S M Co	Washoe	21 250 Feb 4	Mar 13	Apr 12	J M Buffington 419 California st
Independence Cons M Co	Cal	5 100 Mar 10	Apr 15	May 4	A Baird 316 California st
International Gold M Co	Cal	1 20 Feb 1	Mar 4	Mar 25	G R Spinnay 320 California st
Knickerbocker M Co	Cal	2 50 Mar 6	Apr 12	May 3	S H Smith 419 California st
Little Panache Quicksilver M Co	Cal	1 20 Feb 1	Mar 4	Mar 25	G R Spinnay 320 California st
Los Prietos M Co	Cal	2 50 Mar 6	Apr 12	May 3	S H Smith 419 California st
Madison M Co	Cal	1 100 Mar 12	Apr 14	May 3	J P C Wallier 513 California st
North Fork M Co	Cal	8 25 Jan 28	Mar 12	Mar 25	H C Kibbe 419 California st
New York Cons M Co	Washoe	12 50 Feb 16	Mar 22	Apr 12	A K Deubrow 402 Montgomery st
Oceidental M Co	Nev	3 50 Feb 2	Mar 9	Mar 25	J P C Wallier 513 California st
Orleans M Co	Bear valley	3 100 Mar 16	Apr 21	May 10	J F Noemith 215 California st
Pauper M Co	Idaho	4 75 Mar 4	Apr 10	May 3	W F Bryant 402 Montgomery st
Pomona Tunnel & M Co	Utah	1 25 Feb 15	Mar 23	Apr 12	O S Healy 419 California st
Princeton M Co	Nye Co Nevada	1 100 Jan 12	Mar 13	Mar 25	R H Baldwin 419 California st
Rucky Bar M Co	Idaho	1 100 Mar 3	Apr 14	May 8	J F Owallier 513 California st
San Jose M Co	Egan Canon	6 500 Jan 27	Mar 8	Apr 13	A Carrigan 104 Front st
Silver Cloud G & S M Co	Cal	25 Feb 8	Mar 15	Apr 12	A A Enquist 419 California st
Silver Spout M Co	Cal	5 Feb 17	Mar 15	Apr 12	A A Enquist 419 California st
Silver West Cons M Co	Enreka Nev	3 100 Jan 13	Feb 20	Mar 20	F R Runk 606 Montgomery st
Table Mt Alpha M Co	Cal	6 100 Feb 5	Mar 15	Apr 5	T F Cronise 433 California st
Therava M & M Co	Cal	20 Mar 13	Apr 14	May 1	B F Hixon 409 California st
Tulipum Hydraulic M Co	Cal	20 Feb 23	Mar 25	Apr 12	T T Bullen 302 Montgomery st
Union Cons M Co	Washoe	7 100 Feb 8	Mar 10	Mar 25	J M Buffington 419 California st
Weaverfield D & H M Co	Cal	5 50 Feb 28	Mar 29	Apr 21	P H Rogers 330 Pine st
Webfoot M Co	Elko Co Nev	1 25 Jan 23	Mar 3	Mar 25	D A Jennings 401 California st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
American Flag M & M Co	Washoe	George R Spinnay	320 California st	Annual	Mar 23
Buckeye G & S M Co	Washoe	C A Sankey	331 Montgomery st	Annual	Mar 23
Andes S M Co	Washoe	Called by Trustees	507 Montgomery st	Special	Apr 5
Baltimore Cons M Co	Washoe	Called by Trustees	330 Montgomery st	Special	Apr 7
Bunker Hill G M Co	Cal	Walter F Palmer	19 First st	Special	Mar 30
California Borax Co	Cal	Lucretia Hermann	330 Pine st	Annual	Mar 10
Chicago Quicksilver S M Co	Cal	George A Lthrop	310 Kearny st	Annual	Mar 24
Daney G & S M Co	Washoe	George R Spinnay	302 Montgomery st	Annual	Mar 22
Franklin M Co	Washoe	Wm Watson	419 California st	Special	Apr 29
Globe Cons M Co	Washoe	Called by Trustees	Academy Building	Annual	Apr 2
Greene M Co	Cal	W R Townsend	419 California st	Annual	Apr 2
Lady Washington M Co	Washoe	H C Kibbe	419 California st	Annual	Apr 5
Mint G & S M Co	Washoe	A H Jennings	401 California st	Annual	Mar 30
Owens S M Co	Ely District	R Wescener	414 California st	Special	Mar 30
Woodside M & M Co	Washoe	J Glassman	331 Montgomery st	Annual	Mar 31

LATEST DIVIDENDS (within three months).—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M Co	Washoe	H C Kibbe	419 California st	3 00	Jan 11
Belcher M Co	Washoe	H C Kibbe	419 California st	25	Feb 19
Belcher M Co	Washoe	H C Kibbe	419 California st	3 00	Mar 30
Belcher M Co	Washoe	H C Kibbe	419 California st	10 00	Feb 11
Belcher M Co	Washoe	H C Kibbe	419 California st	2 00	Mar 11
Belcher M Co	Washoe	H C Kibbe	419 California st	1 00	Jan 25
Belcher M Co	Washoe	H C Kibbe	419 California st	50	Mar 5

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office at San Francisco:

MORGAN M. CO.—March 13. Location, Calaveras county. Capital stock, \$2,000,000. Directors—C. T. Botts, Wm. Irvine, Robert Irvine, H. D. Bacon and Thomas Brown.

LA COMPANIA MEXICANA.—March 13. Object to purchase quartz mills and silver. Process in Mexico. Capital stock, \$10,000,000. Trustees—J. O'Connor, Louis A. Garnett, W. S. Rosecrans, John P. Miller, Louis Sloss, Noble Hamilton, O. C. Miller.

PACIFIC HYDRAULIC POWER CO.—March 13. Object to manufacture and sell waterwheels and other hydraulic machinery. Capital stock, \$1,000,000, divided into 20,000 shares, of the par value of \$50 each. Directors—C. E. Allen, Joseph Moore, J. B. Ford, John Skae and Hall McAllister.

MOUNTAIN QUEEN MINING CO.—March 16. Location, State of Nevada. Directors, James Byrnes, Wm. H. Bell, W. H. Lawrence, J. B. Carrick, J. C. Maynard, J. P. Ames and Thos. Boyce. The capital stock, \$3,000,000, divided into 30,000 shares.

LIBERTY MILL AND M. CO.—March 16. Location, Nevada County, State of California. Directors, Louis Franconi, Owen P. Sutton, Fred. W. Hutchins, Cyrus W. Jones and Julius Gogoulin. Capital stock, \$1,800,000, divided into 18,000 shares.

LAST CHANCE M. CO.—March 16. Location, State of Nevada. Directors, James Byrnes, Wm. H. Bell, W. H. Lawrence, J.

part of it. It is impossible to tell of this time whether the company have struck a fine body of ore that is lasting or merely struck a chimney. There was shipped to the bay, from the Lava Bed, just below Oroville, during the month of February about \$60,000 worth of gold dust that had been taken out by the Chinese men, notwithstanding the high water of the previous month. At present several large companies are not at work, but over \$40,000 will be taken out this month.

CALAVERAS COUNTY.

RICH ROCK.—*Calaveras Chronicle*, March 13: Last week was inadvertently neglected to mention a recent good clean-up of the well known Foster quartz mine, near Jesus Maria. A few tons of rock, worked in an arrastra, yielded 335. The ore was taken from the surface, an open cut having been run on the lead. The ledge is from six to seven feet wide, all good quality of ore. With adequate milling facilities the Foster would take rank among our most productive mines.

BLASTS.—Several blasts have been fired lately in the Duryea and Veith hydraulic claims, with uniformly good results. "T" shaped drifts were run into the banks, powder properly placed and the drifts tightly tamped. Fuse connected with the powder extends to the mouth of the tunnel by means of which it is exploded. Blasting is becoming an important auxiliary in gravel mining where the ground is so hard as not to pipe easily.

EL DORADO COUNTY.

MINING DEVELOPMENTS.—*Mountain Democrat*, March 13: At the Mansfield mine, Kelsey township, J. L. Smith, Superintendent, a body of decomposed quartz sixteen feet wide was recently struck in the lower tunnel. A sample was sent to Rich, Hemme & Co., San Francisco, who made the following return: The sample is found to contain at the rate of \$90.00 per ton in silver and \$1507.32 in gold, less 1 percent of moisture, equaling a net total silver and gold of \$1374.13 per ton. It is considered safe to estimate a large proportion of this vein matter as good for fully \$200 per ton by ordinary milling process. There is very promise that the Mansfield is about to develop into a first-class mine.

INYO.—*From Darwin.*—*Inyo Independent*, March 8: T. May and V. A. Gregg, Esq., returned couple of days since from Darwin. They report times somewhat quiet, though building goes on rapidly in the town and the prospect generally is very cheerful. The gold mines in the Argus range were attracting considerable attention among the Darwinites. The tunnel on the Defiance or Beltran is in 75 ft., cutting through a third vein about like the others mentioned heretofore, but was being driven for still another known to lie further back. This would indicate that this body of ore will prove to be nearly or quite 100 ft. It was rumored that Reddy and Beatty had purchased Rennie's sixth interest, paying therefor the sum of \$20,000 cash. The story remains to be confirmed, but the probabilities are that is true.

MARIN COUNTY.

QUICKSILVER.—*Cor. San Rafael Herald*, March 11: Quite an excitement was created on Monday last, at Olema, in consequence of Mr. Evans (Mr. Howard's Superintendent) finding in some very rich specimens of cinnabar, which he said were obtained from a ledge at Point Reyes. Some had been tested in San Francisco, and assayed from 60 to 70 per cent. As some remarks were made about its extreme richness for surface rock, he said he had sunk a shaft ten feet where he had obtained it. As Mr. Evans is a gentleman of veracity it of course left no doubt in the minds of the people. A few days previously Mr. Frank Miller brought in some fine specimens of the Payne lode, taken from a shaft which is working about half a mile northwest of W. Payne's claim. Mr. Miller says about a year ago a hunter brought him some cinnabar which he sent to San Francisco, and it assayed 76 1/2 per cent. As he could never find the ledge we suppose it must have come from the vicinity where Mr. Evans found his. Many supposed that the paint used by the Indians on Indian bay, in an early day, was obtained from the cinnabar ledge which has recently been discovered on Point Reyes. We understand that S. W. Payne, the discoverer, is sinking shafts on his claim.

EVADA COUNTY.

PROVIDENCE.—*Nevada Transcript*, March 11: In the 620-ft level in the Providence mine, there has been a cross-cut run from the hanging wall a distance of 108 ft, and almost the entire distance through quartz. At intervals there are seams of clay in imitation of foot walls, but when cut through a body of ore is reached. A ledge a hundred and eight feet wide is immense; but that is not all there is in the Providence. The workmen have found, still further on, another ledge, running parallel with the main ledge, the width of which is not yet found. The best part of all is, the rock is looking first-rate. The sulphurets are better than any yet found in the mine.

MANZANITA.—The Manzanita mine continues to look splendidly. Large pieces of rock are found, and on breaking them in two they are usually filled with gold. The short supply of water will interfere considerably with the amount of gold that was expected to be taken out this season. A large portion of the ore which has been got ready to work, and is now to contain a great deal of gold will not be touched for want of water. If we should

get a good storm, enough to keep up the water supply, the yield of this mine will be enormous.

CINNABAR.—*Grass Valley Union*, March 11: We have received a small specimen of cinnabar from uncle Jimmy Nickerson's ledge, situated low down on Wolf creek, near Bear river. There can be no doubt about the ledge carrying quicksilver, and as it is a large ledge and easily mined the property ought to be a paying one. Work is now being prosecuted on the ledge and a goodly amount of paying ore is on the surface.

PROSPECT.—This mine continues to improve. Specimens of the quartz brought in yesterday show well in gold bearing sulphurets. Miners who have worked in the Eureka and Idaho mines pronounce the Prospect rock to be about of the same character as that found in the two first named. The Prospect owners seem to have as pretty a showing for a big property as has been developed in this district for a long time.

PROSPECTING.—*Foothill Tidings*, March 13: Prospecting is quietly going on in more places than those who sit on the corners and whistle dry goods boxes are aware of. Passing over Osborn hill the other day we saw new work done in several places, and some good looking quartz piled up ready for the mill.

MOONEY FLAT.—*Nevada Transcript*, March 11: The Blue Gravel mining company is still at work running their tunnel from Deer creek to their ground. It is now in 900 ft. They are working ten men and work three shifts so that work is progressing as rapidly as possible. They drive about 20 ft a month and expect at that rate to reach the desired point in about a year. The tunnel will open up for work about 400 acres of gravel. It will make Mooney Flat a lively camp when everything goes on running nicely. It is thought Smartsville will be eclipsed in brilliancy at that time. The Blue Point mine, at the latter place, cleaned up the other day, \$79,600 from a 29 days' run. Mr. O'Brien, who is connected with the Blue Gravel company at Mooney's Flat, is also running a mine below Smartsville, on which he has 25 men employed, and uses 1500 inches of water. Altogether the mining interests of that section look and are very promising.

PLACER COUNTY.

NEW DISCOVERIES.—*Placer Argus*, March 13th: Yesterday we were shown a specimen of iron ore taken out of a large bed lately discovered near town, but the exact locality we did not learn. Whether it exists in sufficient quantity and is of a proper quality to be utilized, we do not know.

Mr. A. H. Estill, of Lincoln, informs us that a large bed of superior iron ore has been lately discovered a few miles from that place, which it is the intention of the owners to work. Mr. Joseph Stoddard, of the Union Flouring Mills, is owner of one-half of the claim.

PLUMAS COUNTY.

MINING NOTES.—*Plumas National*, March 13th: We hear some good reports from several of the mines in this neighborhood. Loring & Leovitt have struck some first-rate paying ground in the old Quirk claims near Elizabeth town, and recently got as high as \$80 to the set of timbers, regular old-fashioned "lead" gold. Braden, Richards & Blake are making good wages in Emigrant Hill, and have good indications of something better. The O'Neil Brothers are getting some good prospects in coarse gold in their Newtown claim. Bell & Co. are also reported to be getting some pay in the Old Western claim, near Newtown, and we saw a nice specimen from their claim the other day. The Maxwell company have repaired their flume, damaged by the flood, and are piping again. Miller, Shaffer & Mnck will make the old Blackhawk claim a "pan" this spring, as usual. The Plumas ditch company will make money this spring, but will be likely to suffer with the balance of the mining interest in a short water season. The Hungarian company are still running their pipes steadily, with good results. Myers & Siler are running a tunnel at Dublin Jack, and we are informed that they have a certainty of good paying ground as soon as they get to gravel, which will only take a week or two. Gould is rushing the work in his Mill creek claim. Several companies are working on Spring Garden creek, but we have no reports from them. Many a fortune lies buried in the ravines and gulches near this valley, and a little labor is almost certain to be richly rewarded.

SONOMA.

MINING ITEMS.—*Russian River Flag*, March 11: The Mt. Jack-on furnace has been roasting good rock since the 25th ult., and will be kept running without stopping for want of ore.

The discovery of a body of very rich ore is reported in the Great Eastern.

Work is active on nearly all of the prominent mines in the Sausal region, and the developments are very encouraging.

The tunnel on the Sansal mine is now in 40 feet and being run at the rate of two feet a day. It is expected to tap the ledge after going 30 feet further, at a depth of about 90 feet. Rich cinnabar and black oxide ore were struck in a surface cut last week.

Work is being pushed night and day on the Albamora tunnels.

The Rocky Bar company are running a large tunnel to tap the ledge 150 or 200 feet deep.

The Excelsior furnace is running satisfactorily, and rich developments have been made in both the Chapman and Maracoma.

SAN MATEO.

SILVER DISCOVERY.—*San Mateo Times*, Mar.

13: There has been, at various times in the history of this county, reports of mineral discoveries made in the shape of iron, coal, and quicksilver, and now we are called upon to add another to the list, which, if it turns out as is expected by the discoverer, will place San Mateo in the ranks of silver-producing districts. But a short time since Mr. Nicholas Larco, who resides on a ranch leased from the owners, who are residents of San Francisco, and which is situated about a mile and a half east of Searsville, became impressed with the idea that certain croppings which were on his place, and very near to the line of his neighbor, Dennis Martin's ranch, were nothing more or less than silver quartz. This proved to be the case. It would seem from developments since made that the result of Mr. Larco and his mining expert's investigation was that an immense silver ledge was on the lands, principally on the Mertin ranch, and that the dip of the lode was toward the latter, and that Mr. Larco had taken to San Francisco some specimens and had them assayed, the amount returned being \$420 to the ton.

SIERRA.

ORO STOCK.—*Mountain Messenger*, March 13: Stockholders of the Oro have decided to go to work and build a mill to reduce rock from their mine. The plans and specifications are all drawn, but it has not yet been decided whether to make it ten, fifteen, or twenty-stamp. The mill will be run by water, which will never fail. It is said by those who worked the mine when first opened, that the rock will pay from ten to fifteen dollars per ton. If we build this mill and it proves a paying investment, it will not be long before means will be found to put up a mill on the Good Hope, the rock from which has never paid less than \$12 per ton. There is, also, a strong probability that a mill will soon be put up on the ledges owned by Sam Hartley & Co., at the Clements bridge. With three mills running and paying, our town would be about as good as anybody's.

It is the present intention of the Oro company to commence work upon their mill immediately, and to have it in running order by the first of August.

TUOLUMNE.

NONPAREIL MINE.—*Union Democrat*, March 13: The persistent energy and perseverance of Jos. J. Du Prat and associates for the past three years in prosecuting work in this mine, situated at Deer Flat, promises to be finely rewarded. Saturday, the 6th inst., very rich quartz was struck in the east rise, the lode being 24 inches in width. Several years ago the work was carried on to quite an extent from the surface of the vein which yielded rich ore; as it was followed down the expense of working and keeping the mine free of water became too great, and operations were discontinued for a considerable period. It is gratifying to know that the great expense and time employed in developing this mine has not been lost. But few men or companies would, under the doubtful prospect, continued so long.

THE CUMMINGS MINE.—*Tuolumne Independent*, March 13: Near Yankee Hill, is now being opened by Cummings & Clark, for San Francisco parties. They have struck some very good rock near the surface, and the prospects are that they will develop a valuable mine. The vein at Rock Gulch was known to exist years ago, but like a good many other things in this county, it has laid idle all these years waiting for some outside party to come in and show us the wealth we are tambling over every day.

SOUTSBY MINE.—On the rise back of No. 6 south, south shaft, the vein is being met with which looks very promising, and will go from \$30 to \$40 per ton. This is entirely new ground which has never been worked. In the level above, from the 5th up, they had a very rich chute which continues. Hopes are entertained for its downward tendency below it—above is good indication.

MORE ENCOURAGEMENT.—The Marks & Darrow quartz mining company, since starting the new hoisting shaft No. 6, the depth of which will cut 350 ft of lode, about 25 ft more will, it is thought, cut through the main ledge. It is impossible to say how wide the quartz will be; but the superintendent thinks that it cannot be less than from ten to fifteen feet. In testing with a small force of men, about 200 ft north of the main shaft they have found very rich croppings, which the Dep't Sup't intends reaching by drift and stops from the main shaft. The rock from that portion of the lode (all of 300 ft from first level of main shaft to the surface), assays from \$1,700 to \$1,900 per ton, together with rock shipped from the main ledge, when reduced by mill process, produced by amalgamation alone, at the rate of \$1,900 per ton.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—*Gold Hill News*, March 11: Daily yield 450 tons of ore, keeping the mills of the company all steadily running. The ore breasts and stopes on the 1300, 1400 and 1500-ft levels never were looking better than at the present. Enlarging the main north and south drifts on the 1500 and 1600-ft levels to increase the air circulation in those portions of the mine goes steadily on, steadily increasing day by day the facilities for extracting the rich chambers of ore already developed, and prepare for the further development of the great bonanza in a downward direction.

OPHR. Daily yield 150 tons of ore. The ore breasts throughout the 1300 and 1465-ft levels are all looking splendidly, and yielding

the usual amount of good ore. Work is progressing finely in all the cross-cuts and drifts on both the 1465, 1500, 1600 and 1700-ft levels, with but little change in any portion of the mine during the week.

GLOBE CONSOLIDATED.—Since our last regular weekly report the main west drift has run into a ledge 1,124 ft west of the shaft, and today is into the same 18 ft. It is a ledge of very fine and valuable character, being evidently the same as that of the Rock Island. It gives assay thus far of from \$25 to \$60 to the ton, and is a very important development.

BELCHER.—Daily yield, about 450 tons, of fair milling ore from the various prospecting levels. The three winzes below the 1400-ft level are still in ore. The south winze is down 95 ft, the middle winze 81 ft, and the north winze 85 ft. The east drift from the main incline, to open on the 1500-ft level, is now in 262 ft, and is running in vein matter. The new air shaft is down 62 ft below the 850-ft level, and making very good downward progress.

BEST AND BELCHER.—Driving the south drift at the bottom of the winze at the 1700-ft level to connect with the main north drift from the Gould & Curry shaft on that level, is making good progress.

CALIFORNIA.—Sinking the C. & C. shaft is making excellent progress, the rock in the bottom blasting out finely. The north drift, on the 1550-ft level, is still driven ahead, the face in rich ore. This drift has been advanced 12 ft during the week. The north drift, on the 1500-ft level from cross-cut No. 1 east, has been connected with east cross-cut No. 2, and is now being continued north to connect with east cross-cut No. 3, to add still further to the ventilation of that portion of the mine. The ore in the face of cross-cut No. 3, on this level, still continues of a good quality. East cross-cut No. 4 is also in fair milling ore, and is being rapidly driven ahead. The south drift from the south winze, in cross-cut No. 2, on the 1400-ft level, is advancing rapidly toward the south line, the face still in good ore. This drift is now in a distance of 56 ft. The south winze, on the 1400-ft level, is still steadily advancing downward to connect with the 1500-ft level, the bottom still in ore of a fine quality.

LADY BRYAN.—The main west drift at the 380-ft level, is in 30 ft, with strong indications of soon reaching the main ledge. A small air shaft has been commenced on the surface nearly perpendicular over this body of ore, for the double purpose of prospecting the ore, which is supposed to extend nearly to the surface, and also to more thoroughly ventilate that portion of the mine.

MEXICAN.—The north drift on the 1465-ft level has shown little change during the past week in the quality of the material penetrated. Good headway is being made with the work. The pitch of the rich west body of ore recently struck at the 1600-ft station of the Ophir winze, to the north and east, is calculated to give great encouragement to the owners of the Mexican, as it is gradually increasing the surety of finding a continuation of the same body in the mine.

IMPERIAL-EMPIRE.—Sinking the main incline is making the usual good headway. The quartz in the face of the south drift on the 2000-ft level is looking more favorable for an ore development. No change of interest in the face of the east cross-cut on this level.

JACOB LITTLE CONSOLIDATED.—The main northwest drift shows great improvement as it advances further into the bill. Stringers or feeders of rich quartz are met with among the low grade ore passed through, and two or three tons per day of the best is saved and added to the pile already on the dump.

EUROPA.—The face of the east drift or cross-cut from the bottom of the winz, 115 feet below the adit level, shows more quartz and additional evidence of being close to the ledge. It is probably just cutting into it.

SOUTH COMSTOCK.—Sinking the main shaft progresses at the rate of two feet per day. Some little water is coming in, and, judging from the quartz seams and other indications, the ledge cannot be far distant.

JUSTICE.—Sinking the main incline is making excellent headway, there being no increase of water, and the new pumping and hoisting machinery working splendidly. The main drift south from the 800-foot station is now in 30 feet. This is a very important drift, as it will open the 800-ft level and pass directly beneath the very favorable ore developments made at the 400-ft level. Considerable water is coming in from the face of the drift, indicating a near approach to the vein.

UTAH.—Three car-loads of new pumping machinery, consisting of spur wheels, sole plates, engine beds, etc., were received at the depot of the Virginia and Truckee railroad, and will be placed in position ready for use at the mine at the earliest possible moment.

SIERRA NEVADA.—Sinking both the old and new shafts is making steady and rapid progress. The rock in the bottom of the new shaft blasts out finely, and the water no longer interferes in the least with the sinking. The bottom of the old shaft is in ledge material, carrying some low grade ore, but nothing yet that will pay the cost of extracting or milling.

LEO.—Making fine progress in driving the main tunnel ahead. Face of tunnel still in promising ledge matter. The ledge is large and well defined, and carries seams of ore of good quality.

WOONVILLE.—The ore stopes on the 300-ft level continue to yield the usual amount of good ore, keeping the mill steadily running. The ore developments in the east cross-cut, on the 300-ft level are looking more encouraging.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Seventh Lecture Delivered before the University of California College of Agriculture, on Wednesday, January 27th, by PROF. C. E. BESSEY.

The Walnut and the Nettle Families. Ingrandaceae and Urticaceae.

We take up two families to-day. First, the walnut family, *Ingrandaceae*—principal genus, *Inglans*—very nearly allied to the oak, is represented by only 30 species, mostly natives of North America. They are valuable for their timber and for their fruits.

Inglans Regia, the so-called English walnut, is a native of the Himalayan portion of Asia. It has long been under cultivation, and it is probably due to this fact that its shell is so thin and so easily broken. It has been introduced in California. Its wood is used for cabinet work in Europe. Its fruits are eaten, and are largely imported to the United States. From them a valuable oil is made.

The black walnut, *Inglans nigra*, of the United States, is one of the largest trees growing east of the Rocky mountain district, and grows to a diameter of six to ten feet. It is

One of the Most Valuable Trees

For its lumber, which is largely used for cabinet work and inside finish. Its fruits, being thick-shelled and rank, are not largely used as food. In Southern California some black walnuts which are native here, and which are a little different from the *I. nigra*, are grown successfully.

The white hickory, *Carya Alba*, called in the East shell or shag bark, white or Ohio bark, is a very large tree of the Eastern U. S., attaining a size of three to four feet in diameter and one hundred feet in height; yield a very valuable timber, which is very heavy, compact, and exceedingly tough, and which is used in ax handles, in wheels, and other parts of carriages. Though suited well for use where strength in a compact form is required, when protected by paint, it is liable when not thus protected to be affected by the powder-post insect, and is therefore not used in buildings. This tree produces delicious nuts.

Several nuts are fruits of an allied species, *Carya oliviformis*, which might be grown here. There is used the wood. Ash, which is largely used in the East, might be grown here.

We should try to import the Eastern live oak, and the European oak with its hard wood, and should make careful examination of our woods, such as we have, as to strength of material.

It would also be well to have a collection of woods. Each species should be represented by a cross-section as large as possible to show the character of the bark as well as the wood, also there should be a board as wide as possible, running to the bark, and specimens of fruit, leaves, cones, etc.

The Nettle Family.

Urticaceae. A large family of nearly 1,000 species, of diverse habits and botanical characteristics, lightly held together, but still existing, as four well marked sub-orders.

Sub-order 1. The stims. These are trees or shrubs, and are natives of temperate climates in the northern hemisphere. There are somewhere from 60 to 100 species; many of which are somewhat valued for their wood, it being used in some cases to fill out.

The common elm of Europe, *Ulmus campestris*, is largely grown here for its timber, which is especially valuable for underground use, or for use under water, as in making tile drains. Must either be very dry or wet to last well. It is sometimes grown in the United States as a curiosity or for ornament, and could be grown here.

The American elm, *Ulmus Americana*, is one of the most graceful of all the trees of the eastern forests. Its wood is valuable and is used for many purposes. Its toughness depends on where it is grown. It is not good for fuel, and it inclines to warp when it dries. It extends nearly to the Rocky mountains. There is none found native here. It is highly esteemed for its beauty. An allied species, *U. fulva*, produces the mucilaginous bark known as slippery elm bark, used somewhat in medicine. Hack berries, etc., belong to this order.

Sub-order 2. The bread-fruits and figs, trees or shrubs with a milky juice found in or near the tropics. Upwards of 250 species are known. There are no native species here.

Bread-fruit is produced upon a tree known to botanists as *Artocarpus incisa*. It is a native of many of the islands of the Pacific. It grows to the size of a large apple tree. The fruit is very much like the fruit of the straw berry; that is, an enlarged, spongy receptacle

bearing little nuts. The whole mass is about a foot long and is in shape not unlike a melon. [Fig. 1.] These fruits are gathered before they are ripe, roasted and eaten by the natives, and are quite palatable.

In 1793, they were introduced into the West Indies, and now they are grown in nearly all the tropical countries.

The cow tree, *Galactodendron utile*, is a native of Venezuela. It grows to the height of 80 to 100 feet, and forms large forests. Upon incisions being made it exudes a quantity of whitish fluid, which has a pleasant taste, and which is used as a substitute for milk.

The fig, *Ficus carica*, is a native of Western Asia, but it is now grown throughout all warmer regions of the globe. Its fruit is peculiar. It is of considerable interest in this State and no doubt will become more important.

The mulberry, *Morus nigra*, is a native of Western Asia, grown largely in Europe and parts of the United States for its fruit. It is a near relative of the fig.

Ficus elastica, the India rubber tree of Southern Asia, produces the material from which its name is derived; its milky juice being evaporated for this purpose. It has thick, broad, tough leaves. [Fig. 2.] This, however, is not the tree from which most of our India rubber is obtained.

[Allusion to which is made elsewhere in the course of lectures.] This white mulberry, *Morus alba*, is extensively used for feeding silkworms.

Osage oranges, *Machura aurantiaca*, is used very largely for a hedge plant. On account of its strong spines and rigid branches, it is especially adapted for this use. It is a native of Arkansas, Louisiana, Texas and other southern localities.

Among the remarkable trees of this sub-order are the upas tree, *Antiaris toxicaria*, a poison-

Fig. 11.



Compound Leaf of India Rubber Tree.

one trees of Java, and the banyan tree, *Ficus Indica*, of India.

The banyan has root-like branches and one tree may spread over

Five to Eight Acres.

This paper mulberry, *Broussonetia papyrifera*, of China, Japan, and the islands of the Pacific, grows from 20 to 30 feet in height. Its bark, which is filled with long fibers, is made into paper and cloth. It is cultivated also as an ornamental tree.

Sub-Order 3—The Nettles.

These are herbs, shrubs, or trees and number about 300 species, found in the temperate or warmer climates. The genus *Urtica* includes the many species of nettles, which occur as weeds in temperate climates and as trees in the tropics. All are possessed of stinging bristles which are bad enough in the small species found in our latitude, but which are hardly to be compared to those occurring in India and Australia. One species, *Urtica gigas*, found in the latter country, grows to be a tall tree 70 to 80 feet high, and its sting is so severe as to even threaten death. Cattle coming in contact with its leaves become

Furious With Pain.

Ramie, or the grass cloth plant, *Boehmeria nivea*, is a perennial herb; a native of China. It is coming into cultivation for its fiber, which is made into a fine, linen-like cloth. It is cultivated in the Southern U. S. and in India.

Sub-order 4—The Hemp and Hop.

There are two species. Hemp, *Cannabis sativa*, is a native of northern India. It is grown in the U. S. for its fiber, and in parts of India for smoking. It possesses narcotic properties lying between tobacco and opium. From the dried plant are obtained what are in India known as *gunjah* and *bang*. The first is smoked; the latter, made into an intoxicating drink. The virtues of *gunjah* and *bang* are concentrated in the resinous matter found on the stems and leaves. It is highly intoxicating, and servants sometimes obtain it by running

through the field, allowing their clothes to come in contact with it, and afterwards scraping off the adhering substances. The seeds are sometimes fed to birds for the purpose of rendering them drowsy enough to be caught.

The hop, *Humulus lupulus*, is grown in all countries. In its strobili it has a secretion, and in this its virtue, which renders it desirable in the manufacture of beer.

Devil's Gate Reviving.

Any one who visits Silver City for the first time will see everywhere about him indications of an old-settled country. Many of the locust trees are six or eight inches in diameter, and were planted at least twelve years ago. The remains of stone cabins are visible, where the miners in the early days of Washoe cooked their bacon and made saleratus bread, while visions of wealth, before which the wondrous yield of the Gould & Curry passed, floated through their excited imaginations. There are the ruins of old primitive quartz mills and arrastras, which have been long since abandoned, as the rich croppings on the surface ran into barren quartz. The stream flowing down Gold Canyon, which was one of crystal purity, is now turbid with tailings and the refuse of reduction works at Gold Hill. The ancient prestige of Devil's Gate has long since faded, and of the hundreds of prospectors who sunk shafts and ran tunnels, the mouths of which lined the road on both sides, scarcely one is left. But the region has not been abandoned by any means. On the contrary, its promise is more flattering than was ever anticipated by the most sanguine of the original miners. The Justice, Woodville, New York, Lady Washington, and other well-known mining companies, are sinking shafts hundreds of feet in depth, and have a fair prospect of striking the rich ore of the genuine Comstock. Within the last two years the lower end of the vein has commenced a new era of progress. Costly hoisting-works, supplied with new and improved machinery, are being erected, and many mining experts are of the opinion that developments will be made equal in extent and richness to the best mines further north on the ledge. Silver City itself sympathizes with this mining improve-

Fig. 1.



Fruit and Leaf of Bread Fruit Tree.

ments in its vicinity, and is improving with astonishing rapidity. On the hills on the east side of town a great number of elegant and substantial dwellings were erected last season, and the number will be doubled during the coming summer. Real estate is held at a high figure, and, from present appearance, it will not be long before a continuous city extends from below Silver City on the south to Cedar Hill on the north.—*Virginia Enterprise*.

THE GOLD HILL CHASM.—Although Gold Hill may have no big bonanza just at present about which to brag, she can boast the most extensive crack in the country. This crack, fissure or chasm made its appearance on the surface of the ground to the eastward of Fort Homestead over a year ago, since which time it has gradually been increasing in size. At present it is about three-quarters of a mile in length and two and three feet in width in places. The site of the town of Gold Hill has been undermined by the various companies who have for years been engaged in working that portion of the Comstock, and the underground workings have ever been carried under the base of the hill on which stands Fort Homestead. This hill stands just east of Main street, and it appears—by the chasm which has opened behind it—to be gradually settling. As the ground which has been worked out is not only timbered, but is also everywhere filled in with waste rock, there appears to be no danger of anything more than a gradual settling. As the big crevice has not followed ravines and other natural depressions, but holds a straight course across hills and hollows alike, it is evident that the break must be through a weak place in the underlying rock; and as this weak streak can be nothing else than a large clay seam, there can be no doubt the opening is along a portion of the east clay wall of the Comstock lode. We suggested that at the time the crevice first made its appear-

ances and also called attention to the fact that along the line of the crack the sagebrush and other shrubs grew to about twice the height of those on either side, showing that the ground underneath was both softer and more moist than in other places, as it naturally would be where a large seam of clay came to the surface. The difference in the growth of the vegetation was so great that it could be seen at the distance of half a mile, and the course of the crevice could be traced, when it could not be seen, by the long line of tall bushes. We at that time recommended prospecting on the line of this break in the ground. Nothing was then done, but several companies have now fallen into this along this fissure, and are sinking shafts upon it. They will undoubtedly find the true east wall of the Comstock, and may make some discovery of great value.—*Virginia Enterprise*.

The American Patent System.

The Society of Arts, in England, has been discussing a paper proposing the abolition of the patent system; and the debate wandered into a desultory comparison of the codes of the different countries. Mr. H. D. Wood distinguished himself by an attack on the American system, which may have seemed plausible to his auditors, but which certainly displays considerable ignorance of the subject. The cardinal differences between the English and American practices seem to have been quietly ignored. In this country an attempt is made by the Patent Office to inquire into the novelty of an invention; and this inquiry, though it may not be absolutely conclusive, is at least as thorough as the inventor could make for himself. The fees he pays purchase for him, therefore, the advice of an expert; and when he goes into court, if necessary to sustain his claims, he is backed by the moral force of the verdict already rendered in his favor by the examiner. For much less money than the English applicant is forced to pay he gets much greater value. An English patent has no greater force than the announcement of an invention in a newspaper. It carries no presumption with it, in favor of the patentee. Mr. Wood mentioned a number of specifications issued at Washington, which he regarded as trivial and useless. They included, according to the published report of his remarks, the opening of an envelope by means of a thread affixed thereto, a method of fixing a small mirror to a toilet-glass to enable a lady to see her back hair, a method of cutting boot soles, the packing of ground hops in air-tight cases, and the making of shovels of cast iron. Assuming that each of these was novel, we do not see why they should be branded as useless. The object of a patent is to make it the interest of somebody to introduce a new device. If it is useful enough to make people buy it, then the granting of the patent is certainly justified. If not, then what harm has been done?

It is true that the overworked and underpaid examiners of our Patent Office are not always thorough and intelligent enough in their inquiries, and that even the remedy of appeal to the Commissioner does not make this working of our system perfect. There is room also for an honest and consistent opposition to any patent system whatever, and a preference for some other reward, or no reward at all to the inventor. But what we claim is, that if a patent system is to be maintained, the American is by far the best, inasmuch as it makes the burden upon the applicant as light as possible and gives him as much as possible for his money.—*Exchange*.

Glove Manufactory.

There are quite a number of glove manufacturers in various parts of this State. There are several in this city to which we propose to make particular reference in future numbers. There is an establishment of this kind in Napa, in which an average of seventy-five deer and fifty sheep skins are daily converted into glove material. The process of tanning employed there says the *Napa Register*, is a secret. It is essentially a chemical process of which the public know nothing, except its beautiful results.

An article of sheep glove leather is made of hers of wonderful strength and exquisite finish. It is really beautiful. It is made of various styles and colors to suit the public taste. Deer skins are also finished up in variety of styles to suit the market. The weekly product of glove leather averages 75 skins. The raw material is purchased at a points in the interior and along the coast from the Columbia river to the Mexican boundary. The purchases are generally direct, and not through Commission houses. Here may be seen piled up by hundreds, or perhaps thousands, deer skins in all stages of manufacture.

In addition to the above about 9,000 sheep pelts are tanned and made into ordinary leather monthly. They yield about 20,000 pounds of wool. Wool washing is also carried on extensively, and for two or three months in the year, from 2,000 to 3,000 pounds of wool per day are cleaned and graded. There are many localities in the State where this branch of business might be profitably introduced.

THE SPRINGING OF SHAFTS.—If a shaft spring in running, the trouble lies probably in either too small diameter of the shaft for its weight and velocity, a set of unbalanced pulleys, or unequal strain on either side by the belts.

USEFUL INFORMATION.

Physiology of Eggs.

Every fowl has two small organs near the extremity of the body called the ovaria. They are filled with elastic tissue, and feel under the finger like a sponge. The eggs are started here, and those which will mature a year or two, or three years hence, are in embryo. One is forced up, is sized by the stroma, which is seventeen inches long and passed rapidly through. When the egg leaves the ovary it consists of yolk only, but in its passage through that short canal the yolk is surrounded by enough albumen to perfect the chick. The white of the egg has in it all that nature requires for making bones, muscles, blood vessels, connecting tissues, skin and feathers.

Just before the egg leaves the body, this canal has the power of secreting lime for the shell. This shows how valuable the egg is as nutriment, and also what demands are made for rich food by a hen that lays an egg daily. Besides what she requires for her sustenance, she is called upon to secrete the material for the body of an entire chick, and also retains for the little creature sufficient to last many hours after it leaves the shell. It shows also that a hen cannot make albumen so rapidly except out of albuminous food, such as wheat, meat and small animals.

It is not true that there are a certain number of eggs, and that this number exhausted, no more can be expected; but it is true that the secretions lessen as old age comes on, and latterly the hen fails to have sufficient force to carry forward the process. The practical bearing of this is that we must see that the fowl is always well kept. The way to have good laying pullets is to quicken the circulation and strengthen the system by liberal nutriment. The yolk is food for the first three or four days. Careful housewives make a mistake by attempting to feed them before the expiration of this time. Let the mother bird have charge and success will be certain, for she knows better than any man can what the chick requires.—*Poultry Review.*

A NEW PREVENTIVE FOR THE EFFECTS OF BEE-STINGS.—Mr. G. Walker has made some interesting (but unpleasant) experiments lately, whereby he has proved that immunity from the pain and other effects of the stings of bees can be obtained by inoculation. The following description of his manner of experimenting on himself is taken from the *Lancet*:

He went to one of his hives, caught a bee, placed it on his wrist, and allowed it to sting him, taking care that he received the largest amount of poison by preventing it from going away at once. The first few stings he got during this experiment had the usual effect; the whole of his forearm was affected with a cutaneous erysipelas, and there was disorder of the nerves, accompanied with heat, redness, swelling and pain. This attack lasted till Tuesday, and on Wednesday, October 7th, he was so far recovered that, following the same plan, he stung himself three times more, also on the wrist. The attack of erysipelas this time was not nearly so severe, but, as before, he felt a stinging sensation as far up as his shoulder, and he noticed that a lymphatic gland behind his ear had increased considerably in size, the poison having been taken up by the lymphatic system. On Saturday, October 10th, he again treated himself to three stings, and the pain was considerably less, though the swelling was still extensive. At the end of the next week (October 17th) he had eighteen stings; then he stung himself seven times more during the next week and reached the number of thirty-two on October 31st, the course of the experiment having lasted nearly four weeks. After the twentieth sting there was very little swelling or pain, only a slight itching sensation, with a small amount of inflammation in the immediate neighborhood of the part stung, which did not spread further.

MODE OF ASCERTAINING THE VARIOUS KINDS OF MATERIALS IN MIXED FABRICS.—A German industrial journal gives, after M. Vupp, the following treatment for fabrics containing silk and wool, with vegetable fibers. All vegetable fibers resist caustic alkaline solutions, even when boiling, and are dissolved by sulphuric, nitric, hydrochloric acids, even when diluted with odor. Vegetable fibers when burnt do not give forth any characteristic odor. Wool, insoluble in the above acids, is readily attacked by caustic alkalies, especially when hot; the sulphur which it contains combines with the alkali, and the solution becomes black when acetate of lead is added to it. In burning, wool produces the same smell as horn. Silk is dissolved both in the acids and the caustic alkalies, and produces an odor similar to that of wool, but it contains no sulphur, and, consequently, its solution in alkalis is not blackened by acetate of lead. In order to distinguish these materials in a tissue, it is treated first with concentrated hydrochloric acid, cold; the residue is then washed in a filter, and, if necessary, bleached, by means of water containing chlorine, and then washed again in pure water and boiled with caustic soda, which dissolves the wool, leaving the vegetable fiber intact. The wool is distinguished from silk by adding acetate of lead to the liquid, as already mentioned.

A DESTRUCTIVE WORM.—It is estimated that the army worm destroys \$50,000,000 worth of cotton annually in the Southern States.

Effects of Poisons on Molluscs.

Professor William North Rice, of Middletown, Conn., states that among the most interesting results of his experiments was the observation that certain poisons, which set with extreme violence upon the mammalia, are very feeble in their action on molluscs. This is especially true of hydrocyanic acid and woorara. Specimens of *Ulyanassa obsoleta*, immersed in dilute hydrocyanic acid on Friday, showed somewhat feeble signs of life on the following Tuesday. A specimen of *Lunatic heros*, into which a quantity of woorara had been injected, was found the next day to show no sign of any injury. Indeed, both of these poisons seemed to produce death very little sooner than the animals would have died in stale water. The sudden introduction of a large amount of carbolic acid in the manner which has been described, seemed to produce no decided effect. On the other hand, chloral hydrate seems to be very suddenly fatal, the animals treated with it becoming justly contracted, and not resuming their activity when kept for a number of hours in sea water. Cyanide of potassium is similar in its effects, though not quite so instantaneously fatal. The effects of quinine are similar, though less energetic. Chloroform produces instantaneous contraction, and probably death.

WATERED BUTTER.—In the course of some investigations made by Professors Agell and Hehner, England, out of analyses of fifteen samples of butter which were determined by them, twelve of the samples, which were undoubtedly good butter, contained 6 to 13 per cent. of water; the astonishing quantity of 42.3 per cent. was found in one sample from London, or an excess of about 32 per cent. of water, for which Londoners pay from 32 to 48 cents per pound. Another butter from the same place had 24 per cent., these high ratios being due to the fact that the butter had been treated with milk. On the other hand, a sample purchased in Ventnor was found to contain under 4 per cent. of water, and according to the author it contained 50 per cent. of foreign fat. The authors also found that genuine butter spread out on a sheet of paper and exposed for a week to the air in the laboratory became, so far as the senses could judge, indistinguishable from tallow.

GOOD HEALTH.

Don't Worry About Yourself.

To retain or recover health, persons should be relieved from anxiety concerning disease. The mind has power over the body. For a person to think he has a disease, will often produce that disease. This we see effected when the mind is intensely concentrated upon the disease of another. It is found in the hospitals that surgeons and physicians who make a specialty of certain diseases are liable to die of them themselves; and the mental power is so great that sometimes people die of diseases which they have only in imagination. We have seen a person seise in anticipation of a voyage, before reaching the vessel. We have known a person to die of cancer in the stomach, when they had no cancer or any other mortal disease. A blindfold man, slightly pricked in the arm, has fainted and died from believing that he was bleeding to death. Therefore, well persons, to remain well, should be cheerful and happy; and sick persons should have their attention directed as much as possible from themselves. It is by their faith that men are saved; and it is by their faith they die. As a man thinketh so is he. If he wills not to die, he can often live in spite of disease; and if he has little or no attachment to life, he will slip away as easily as a child will fall asleep. Men live by their souls and not by their bodies. Their bodies have no life of themselves; they are only receptacles of life—tenements for their souls, and the will has much to do in continuing the physical occupancy or giving it up.

The increased longevity of latter times is less owing to improved therapeutics than improved hygiene. Dr. Lion Playfair says in a late paper read at Glasgow: When the Egyptian, Greek and Roman civilizations expired with their baths and divine maxima about ablutions and purifications, dirt reigned for a thousand years. Not a man or woman in Europe ever took a bath; hence the spotted plagues, the black deaths, the sweating sickness, the dancing manias, the mewing manias, and biting manias that ravaged the people and cut off in the middle ages, one-fourth of the entire population. Religion came to the aid of dirt; the more filthy a saint was the more saintly he was considered. Some of the hermits never changed their cloths, and only combed their hair once a year. St. Anthony never washed his feet, and St. Thomas a Becket's undergarments acquired an additional sanctity from the vermin they contained. Nervous diseases, the result of superstition, were frequent, and often attributed to demons.

SHOCK OF RAILWAY ACCIDENTS.—Shocks in railway accidents require to be treated with perfect rest and sleep. We have known the effects of a shock to last a whole year. Many lives are lost at railroad accidents for want of perfect quiet and rest for days, often weeks. If a bone is fractured, when the car run off the track and the train is broken to pieces, it is palpable to the senses; but injury to the nervous system may be more severe, and no eye can detect it, and the patient thinks it right when it is a positive injury to the nervous system.

Insulated Beds.

An insulated bed is one set on some non-conductor of electricity, so the electricity cannot flow to and from it freely. Their usefulness is as yet a matter of experiment. Their value might be tested by invalids, at little expense, for an insulated bed can be made by placing the four feet on four strong glass tumbler. Dr. Wagenhols, of Columbus, Ohio, recently read an article on the subject before a medical society, detailing many cases of acute rheumatism which had been benefited by sleeping on an insulated bed. We quote:

"On December 25th, 1871, I was attacked with rheumatism of the ankle and knee joints in one limb, then the other. I treated myself actively by alkalies, opiates, etc., in the ordinary manner recognized by the profession as of almost value in this disease. I was unable to leave my bed for three months, could not walk until April, 1872, and did not fully recover until the warm weather in June. On the 16th day of December I was again assailed by my tormentor, treated myself as before, and I thought myself happy that I was able to be out of my room in eight weeks, privileged to hobble around the streets of the city with the aid of a cane. Warm weather restored me to health, and during the summer and winter I attended to my professional duties. On February 16th, 1874, while I was congratulating myself that I should escape my annual attack, I was suddenly seized in the night time with severe pain in both ankles. In the morning I failed, after an arduous effort, to leave my bed. Fever was intense, as also the swelling of ankle and knee joints. A sense of coldness of the lower extremities existed, which was even more distressing than the pain caused by the swelling of the joints. This condition continued until the morning of the 18th. From the 16th to the 18th I was unable to sleep. On the morning of the 18th I insulated my bed by causing the legs of the bedstead to be placed in four glass tumblers. I fell into a profound sleep, waking on the morning of the 19th bathed in a profuse perspiration, without the aid of anodynes. I steadily improved, and in a few days was out of my room.

"This single case is of little consequence, but the Doctor gives a large number of others corroborating it. How much is due to insulation and how much to the expectation of a cure, we cannot tell. As the remedy is perfectly hygienic and easily tried, we hope further experiments will be made.

The closing part of Dr. Wagenhols' paper is suggestive, and we quote it:

"One of the patients makes mention of the sensation of drowsiness which came over him by the prolonged use of the insulated bed. This I have noticed in several cases, and distinctly observed it in my own. Now the question is, do the effects of this form of treatment, which in comparison with our former modes, is simply marvelous, depend upon expectant attention? Is it another specimen of the wonderful power the mind has over the body, or does it depend upon changing the electric state of the body? It certainly deserves attention, as, in either case the patient is benefited, and this is the end of all therapeutics.

"I have in my possession several communications from gentlemen of worth and eminence in the profession, who fully corroborate my experience in the particulars set forth; and I am confident that if this subject, which I deem important to the profession as well as to the community, is properly tried and thoroughly investigated, much information will be gained and large beneficial results will be accomplished.

"We live to learn; as we learn we advance in knowledge, our information and attainments expand, and thus our usefulness is made felt in communities in which we reside, and our vigor and energy is undaunted, by reason of the good results we obtain."—*Herald of Health.*

A Cure for Lockjaw.

In the course of lectures recently delivered before the British Society of Arts, by Dr. Benjamin Richardson, the following important remarks were made upon nitrate of amyl:

One of these specimens—I mean the nitrate of amyl, has within the last few years obtained a remarkable importance, owing to its extraordinary action upon the body. A distinguished chemist, Professor Guthrie, while distilling over nitrate of amyl from amyl alcohol, observed that the vapor when inhaled quickened his circulation and made him feel as if he had been run over. There was flushing of his face, rapid action of his heart, and breathlessness. In 1861-2 I made a careful and prolonged study of the action of this singular body, and discovered that it produced its effects by causing an extreme relaxation, first of the blood vessels and afterward of the muscular fibers of the body. To such an extent did this agent thus relax, I found it would overcome the tetanic spasm produced by strychnia; and having thus discovered its action, I ventured to propose its use for removing the spasm in some of the extreme spasmoid diseases. The results have more than realized my expectations. Under the influence of this agent, one of the most agonizing of known human maladies, called *angina pectoris*, has been brought under such control that the paroxysms have been regularly prevented; and in one instance at least altogether removed. Even tetanus, or lockjaw, has been subdued by it; and in two instances of an extreme kind, so effectively as to warrant the credit of what may be truly called a cure.

DOMESTIC ECONOMY.

LIVING TO EAT, AND EATING TO LIVE.—Eating is a necessity of life, but the spectacle presented at some tables when the family has assembled for a meal might well suggest the question, do these people know why they eat? To be sure no little knowledge is requisite if we would supply the wants of nature in the proper manner; but is there any hardship in informing one's self with respect to so important a matter as the preservation of a strong, healthy body? Is health, and its accessory ability to perform life's duties well, a minor consideration, quite inferior to a knowledge of arithmetic, or geography, or of the mechanics or music? An eminent English observer has said that "a man must live forty years before he knows how to eat." True enough according to the prevalent mode of gathering the knowledge of what is fit or unfit for our stomachs as we go along in life, thus making our system a sort of experimental laboratory for the analysis of all sorts of so-called pabulum. And how few survive forty years of constant experiments with their alimentary function.

The masses are yet quite ignorant of the philosophy of nutrition, and riot in their ignorance. The housewife may be skilled in the preparation of toothsome dishes, but very rarely knows what is suitable or unsuitable among her materials for the uses of the body. If the article "tastes good," that quality is generally a sufficient warrant for its appropriation.—*Annual of Phenology.*

THE modern kitchen is the cooks fortress; from it drawing-room company is carefully and jealously excluded. In all families the children look upon the kitchen as a paradise of dainty devices. In some they are never allowed to enter; but in others the little missy is sometimes privileged to make a bit of paste into ducks and drakes, or to knead some dough into a cake for the doll's birthday. Such frivolities a modern cook sternly represses. She supposes the young ladies will want to make puddings next or to come down and try recipes out of "them rubbishy books." She has no notion of encouraging such pranks. A favor has to be made of leave to use her bowls and spoons, and the young officer just home from his regiment dare not venture into the sacred precinct to concoct a real Indian curry or a Mulligatawny pillow unless he has first ascertained that cook is in a good humor. Even the lady of the house is informed very plainly that after her morning visit she is not expected to disturb the quiet of the lower regions.

HOW TO COOK OATMEAL.—First, be sure to get new, fresh oatmeal, as if it becomes damp or old it is bitter. Put one quart of water into a tinned stew pan, salt sufficient to be palatable; stir in carefully so as not to have it lumpy, three or four handfuls of oatmeal. Put it over the fire and stir continually until it has swollen all it will, using care not to have it burn on the bottom. When it has swollen all it will, add more water, and then put the stew pan into a kettle of hot water and leave it cooking for several hours—the longer the better, as the longer it is cooked the softer and more jelly-like it becomes. Having the stew pan in another kettle of hot water prevents its burning on the bottom, and you are relieved from constant stirring. It is good with milk, syrup or sweetened milk, or even with butter alone.

SOMETHING NEW IN THE PRESERVATION OF FRUIT.—The following method for the preservation of fruit has been patented in England. The fruit is placed into a vertical vessel in layers, separated by layers of pulverized white sugar, and is then covered with alcohol of 80 degrees Gay Lussac. After 12 hours the closed vessel is inverted and the maceration allowed to continue from 12 to 72 hours, according to the nature of the fruit, which is then removed and allowed to drain and dry. About two pounds of sugar and two pounds of alcohol are recommended for four pounds of fruit.

RAISED CONNECTICUT DOUGHNUTS.—Heat a pint of milk just lukewarm, and stir into a small cup of melted lard and sifted flour, till it is a thick batter, add a small cup of domestic yeast, and keep it warm till the batter is light, then work into it four beaten eggs, two cups of sugar rolled free from lumps, a teaspoonful of salt, and two of cinnamon. When the whole is well mixed, knead in wheat flour until as stiff as biscuit dough. Set where it will keep warm, till of spongy lightness, then roll the dough out half an inch thick, and cut into cakes. Let them remain till light, then fry them in hot lard.

CRUSTED APPLE PUDDING.—Pare, core and stew slightly, two quarts of tart mellow apples, and place them in a pudding dish; then, to one and a half pints of wheat meal, add one gill of Zante currants, and boiling water enough to make a dough, stirring lightly until mixed; roll it out one-third of an inch thick, and spread over the apples. Bake it in a quick oven forty or fifty minutes, take out, reverse on a hot plate, mash the apples with a spoon, and sweeten, if desired; cut it in pieces like a pie, and serve warm, with some fresh sauce.

SHAKESPEARE CAKE.—Six cups of flour; one of sugar; one of rich cream; eight eggs.



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QUICKSILVER IN OREGON.—The Jacksonville Times says: The cinnabar deposits discovered in Sam's valley are reported to be exceedingly rich in the metal. This district is said to embrace about ten miles of country, several of which are already claimed. One of the locators claims that he does not exaggerate in the least when he says these mines will rival the New Almaden in point of abundance and richness. The rock is of a yellow cast, but when crushed exhibits a blood-red color, strongly impregnated with quicksilver. Some work has been done on these mines, and those interested are sanguine of having struck it rich.

THE "City of Peking" reached Yokohama on the 13th inst., making the voyage from this port in 20 days, two days less than the schedule time. She lost a propeller arm on the voyage. It will be remembered that she lost three arms on the voyage from New York to San Francisco. The "City of Tokio" also lost an arm of her propeller on the voyage out.

THE Silver City (Idaho) Avalanche, says: "The prospect for lively times the coming spring are decidedly brighter than ever before known in this camp. All the mines on War Eagle mountain were never in such good shape for yielding large quantities of good ore as they are at present, and preparations are being made for a vigorous mining campaign during the coming summer."

SOCIETY ISLANDS.—A correspondent asks us the rates of fare to the Society islands by steamer. No steamer runs there, but schooners leave here for the islands about once a month, the fare on which is \$75. The islands are about 30 days' sail from this port.

THE partnership heretofore existing between W. A. Go dyer and I. A. Blake, civil and mining engineers, has been dissolved. Mr. Goodyear is now to be found at room 76, No. 120 Sutter street, and Mr. Blake's office is at room 10, Mercantile Library building.

THE Central Pacific railroad company has declared its second dividend. This one is six per cent., aggregating \$3,256,530, or \$6 per share.

We have received from A. L. Bancroft & Co. "Brush's Determinative Mineralogy and Blow Pipe Analysis," a short review of which appeared in last week's issue.

Among the Foundries and Machine Shops.

Of the work accomplished at our machine shops since the last issue of the PRESS we notice the boiler for the steamboat *James M. Donahue*, made at the

San Francisco Boiler Works,

And placed in position on Saturday last.

This boiler is the largest ever constructed on the Pacific coast; the diameter of the shell is 11 feet, 6 inches; 14 feet across the front; length of boiler, 23 feet, 6 inches; height from bottom of boiler to top of chimney, 26 feet, 8 inches; height of smoke-stack, 40 feet, diameter, 52 inches; weight of boiler, 46 tons. The type is, a flue and return tubular. It is designed for either wood or coal.

In this connection we might speak somewhat particularly of the *Donahue*. She is built to the order of Mr. Peter Donahue, and designed to run from this city to Donahue in connection with the Northern Pacific railroads. She is a side-wheel steamboat of 750 ton burthen; 220 feet long; breadth of beam, 32 feet; depth of hold, 9½ feet. Being intended only for a day boat, she has but six staterooms, four of these being large and intended for family, or, in steamboat parlance, "bridal rooms," located in the forward part of the main saloon. The lower cabin is fitted for a dining saloon. The upper or promenade deck is covered, and extends forward and aft 180 feet, its interior furnished and ample light afforded by windows on the sides. The cabin front and dining saloon will be hard wood finish; the interior of the main and of the upper saloon is to be done in white and gilt. The engine is of the vertical beam pattern. Diameter of the cylinder, 48 inches by 11 feet stroke. The wheels, of the composite type, are 28 feet, 6 inches in diameter; width of buckets, 8 feet; depth of buckets, 24 inches. The *Donahue* is a finely modeled, roomy boat; will be fitted with all the appliances necessary for the comfort and safety of passengers, and will be a credit to our naval architecture. Her construction has been under the general supervision of Capt. W. W. Vanderbilt, for a quarter of a century in the employ of the P. M. S. S. Co., and for a good portion of the time their general superintendent. The hull was designed by Mr. Wm. A. Collier, Mr. Daniel Ross is executing the wood and carpenter work, and Capt. Wm. Gallaway acts as overseer. It is expected that the *Donahue* will be ready to take her place in the line about the middle of April.

The San Francisco works has also a large amount of miscellaneous work on hand, in different stages of completion, among which we notice the following: Two steel boilers for the Bay sugar refinery, two boilers for the Golden Gate mills; nine miles of 24-inch water pipe for the Contra Costa water company; two boilers for the Miners' foundry; 1100 feet of 48-inch pipe for the San Leandro tunnel, and the tanks for the Palace Hotel, nearly completed.

The Hope Iron Works.

Mr. W. W. Hanscom, late of the *Ætna* works, is engaged in erecting a foundry and machine shop on the corner of Minnesota and Santa Clara streets, (Portrero). The building when completed will be 260 feet long by 40 feet broad, to be divided as follows: Machine shop, 160 by 40; foundry, 100 by 40. It is to be known as the "Hope" iron works. A boiler is in course of construction for this establishment at the San Francisco boiler works. Mr. Hanscom's reputation as an engineer and practical founder ensures the excellence of any work he undertakes. He intends making a specialty of vertical stationary and propeller engines, for yachts and small steamers. Mr. Hanscom hopes to have his works in operation within thirty days.

Galice Creek.—Concerning mining matters in Southern Oregon, the *Times* of last Saturday says: The weather of the past week has been rainy and disagreeable, so as to render prospecting and other mining developments almost out of the question. Several citizens of Jacksonville have returned from Galice creek, but report no further developments. There are about 150 people there at present; but large numbers are constantly coming and going, as the accommodations are not ample enough as yet.

H. G. CAVIN and **James Leathen** arrived lately from Cornucopia. They report the weather as having been very stormy, with several inches of snow at that camp when they left there. They speak very highly of the prospects of the camp, and predict for it a brilliant future.

The total yield of the Consolidated Virginia mine for the month of February was \$1,205,390. This and the payment by the company of a dividend of \$10 per share speaks well for the bonanza mines.

The Virginia City *Enterprise* advises miners and laboring men not to come to the Comstock range seeking work, as there are twice as many men there now as can at present find employment.

Coal as a Raw Material.

Professor Wm. H. Brewer, who was formerly connected with the California State Geological Survey, and now Professor of Agriculture at Yale College, delivered a very interesting lecture at the State University on Friday, the 12th inst., on "Coal as a Raw Material." We regret that our space prevents our giving more than a brief synopsis of the lecture. Professor Brewer is well known on this coast from his connection with the Geological Survey, and scientific matters generally.

Eleven years ago, the lecturer stated, he had delivered a course of lectures to the old College of California. He had not finished the subject on that occasion, so he would now partly complete the course, and also give some of the discoveries that had been made since that time. As the title of the lecture indicated, coal was to be discussed, not with regard to its common use as a fuel, but as a raw material out of which other substances can be made.

The Sun the Fountain-Head of Force.

It is now a well recognized fact that coal is of vegetable origin, made perhaps of swampy material, or of vast forests. It occurs in extensive strata, sandwiched in as it were between other kinds of rock, and not in veins, as silver, copper, and many other metallic ores are found. Its use as a fuel, although comparatively recent, has become so general that it need only be referred to. But, besides its use for this purpose, an immense number of substances are made from coal, many of which are worth more than their weight in gold. It is interesting to follow out the theory of the conservation of force in coal. This theory is, as its name indicates, that force is never destroyed, being simply changed from one kind of force to another. According to this idea the sun is the fountain head of all force on this earth. So that when coal is burned we are merely receiving the heat and light shed by the sun on vegetation in bygone geological eras. All forces used on this earth are derived from the sun, directly or indirectly, except the force of the tides, which has been utilized to some extent. In this State there is another variety of force not dependent on the sun, which may at some future date be rendered available, but which as yet is rather unmanageable—earthquakes. The force derived from the sun, through the instrumentality of coal, may be better appreciated when it is stated that it has been estimated that steam, at the present day, does this work of a thousand million men.

Coal consists principally of carbon, with which is united hydrogen and oxygen, together with some earthy matter, and is divided according to the amount of volatile matter contained, into anthracite and bituminous or soft coal. The former is used for fuel only, and the differences between the two are similar to those between charcoal and wood—charnel, like anthracite, burning with little blaze but intense heat.

Substances Made from Coal.

But the lecture is not to deal so much with the uses of coal for heating purposes as its uses for the manufacture of other valuable substances. These substances, although made from the coal, are not necessarily in it, as soda, which is not found in appreciable amounts in sea-water, is nevertheless made from the salt contained. So grapes contain juice from which brandy can be made; from the brandy, vinegar; from the vinegar in connection with lead, sugar of lead, and so on.

It is impossible to go into much detail with regard to the innumerable products resulting from coal. So only a few can be considered. Leaving out the use of coal for ornamental purposes in the form of jet, the principal products are the results of the distillation of the coal.

This distillation occurs in the gas works where the coal is heated in large iron retorts, and is separated into three parts, a solid part remaining in the retort as coke; a gaseous part, purified by passing through water, and other chemical substances, and delivered to the consumer finally, as common illuminating gas; and lastly, a liquid part; condensed in the water. Coke is not the least important of the products. It has a much greater heating power than bituminous coal, and in some parts of Pennsylvania it is made for smelting iron. As coke is used for galvanic batteries, it assists in carrying news around this world on the telegraph. As for gas, its uses are too well known to need mentioning.

Profit on Gas.

The cheapness of gas, considering only the cost of the necessary coal, is rather astonishing to one who has never thought upon the subject. A few years ago the lecturer had occasion to make some inquiries regarding the cost of gas in the Eastern States, and he found that in one large city, deducting the value of the coke, coal-tar, etc., from the cost of the coal, the gas cost but five cents per thousand feet, and it was sold in the same town for three dollars per thousand, though of course this was not all profit.

Coal Tar.

This substance, black, dirty, with a disagreeable odor, would seem to be the last substance in the world from which anything of value could be obtained. But by the researches of the modern chemists this disagreeable substance has been used in the production of compounds of great value, and approaching the

rainbow in brilliancy. Coal tar is sometimes used as such, for painting fences, railroad ties, etc., on account of its preservative properties, but commonly one of its products, carbolic acid, is used for this purpose. Ammonium salts are also made from this same substance in many places, and used either as manures or for manufacturing ammonia. The results of the distillation of coal tar, left in the retort, is called asphaltum, differing considerably from what is known by the same name in California, but being used for similar purposes.

There are many oils resulting from the distillation of coal tar, some of the light ones being used to produce local insensibility to pain, such as the freezing of the gum to which the dentist resorts. One of these light oils, benzol, exhibits in a remarkable degree the number and values of the coal tar productions. Fifty years ago, in 1825, Faraday discovered, while experimenting on coal tar, the substance now known as benzol. Twenty years after a French chemist found that when benzol was treated with nitric acid, a substance called nitro-benzol resulted, having the odor of bitter almonds, and now used for giving almond soap its odor. About the same time, a Dutch chemist discovered a beautiful blue color, while experimenting on indigo, and shortly after a blue solution was obtained, in alcohol, from nitro-benzol. It was soon proved that the two blue colors were of exactly the same constitution, and they were called aniline. They were regarded as curiosities, but no practical use was made of them, as there were many kinds of blue dyes, and much cheaper than aniline. But an English chemist, Perkins, while searching for a cheap method of preparing quinine from nitro-benzol, obtained a beautiful alcoholic solution, of a mauve color. This was found to be such an effective dye that numerous experiments were made on this substance, and the result is the production of considerably over three hundred dyes of different colors. The intensity of these dyes is most astonishing. A piece of some of them, the size of a pea, imparts a very perceptible color to a hoghead of alcohol.

Many have thought that practical discoveries could only be made by practical men, but the discovery of the aniline dyes shows how far this is from being correct, as they were found by men working in the pure science.

Professor Brewer delivered another lecture yesterday on "Western Explorations."

Notices of Recent Patents.

Among the Pacific Coast patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of mention:

FLUX FOR TREATING ORES.—P. N. Meckay, San Francisco, Cal. This invention is an improvement in the flux for treating ores, patented in December, 1873, by the same person. The improvement consists in combining the mineral cryolite with the crude borax or any of the borates, silica and chloride of sodium, claimed in the former patent, in preparing the flux. For instance, in purifying iron or steel containing an excess of silicon, the inventor uses two per cent. of either of the borates, two per cent. of cryolite, and five per cent. of chloride of sodium, mixed intimately together as a dry powder and injected into the molten mass through the tuyeres. In fact, this invention consists in the addition of from one to five per cent. of cryolite to the fluxes described in the former patent.

SECURING PROPELLOR BLADES TO THE HUB.—Jas. H. Loftus, Oakland, Cal. This invention is an improvement on the construction of propeller blades, and in the method of securing the same to the hub, so that they will be greatly increased in strength and can be replaced when necessary. The usual manner of forming the propeller is to cast the hub and blades in one piece, but in this improvement the hub only is made and secured to the propeller shaft. In the face of this hub are formed wide slots, parallel with its axis, and of sufficient width and depth to admit of as great a thickness of metal as may be contained in the part of the blade which is fitted to the slots, and also the bracing plates to be used. As many slots will be made as there are blades to the propeller. The propeller blades are formed of sheets of metal of sufficient thickness to withstand the pressure.

LIQUID MANURE.—Chas. H. Hoffman, San Francisco. This is an improved compound for fertilizing the soil, and which is also useful for germinating seeds, and for protecting seeds and plants from the ravages of insects, moles, and such small animals as are destructive to vegetable life. The inventor claims that this manure will cause vines and trees prepared with it to mature two or three weeks sooner than usual and will bear fruit sooner, and of a better quality.

WAGON BRAKE.—John Grider, Milton, California. This is a device to be applied to the brake beams of wagons and consists in the use of a partial socket or cap of cast-iron which is bolted to the end of the brake bar and has formed with it a fixed jaw and a movable jaw which holds the brake shoe. A slot being made in the face of this cap, the movable jaw enters this slot and a screw from the outer end of the brake bar serves to operate the jaw and causes it to clamp the brake block firmly against the fixed yard.

Terraces in the Coast Range.

Related to the Delirius of Glaciers, and of the Ancient Rivers.

At the last meeting of the California Academy of Sciences, Mr. Amos Bowman (late of the late Geological Survey) read the following paper:

On the subject of the Pliocene sea—in other words the Pacific ocean—as it stood with reference to the continent of America, during the accumulation of the ancient river, or hydraulic mining gravels of California, a remark from me called for at this time, in order to prevent persons interested in this line of facts from falling into error. In my examination of this subject on behalf of the State Geological Survey, no fact was more clearly made out than that the ice period occurred ages later than the ancient river filling period. The most inexperienced observer, if honestly looking for the facts in the case, within the region of the Sierra Nevada covered by both the Pliocene river gravels and the glacial detritus would be obliged to stumble upon some fact or other in proof of this every day.

Yet Prof. Davidson, Dr. Willey and the late editor of the "Overland," have each promulgated as the causes of the ancient river gravel accumulations the ice phenomena of a period comparatively recent. Prof. Davidson pronounces the ancient river gravels at Smartsville glacial morain. There is no glacial detritus within thirty miles of Smartsville, nor within 1,000 feet of that altitude, which is but 750 feet above the sea.

Prof. Davidson, in his capacity of Assistant in charge of the Coast Survey on this coast, several years ago mentioned to me several localities additional to those enumerated by Blake and Newberg in the United States Pacific Rail Reports, where terraces existed at high altitudes along the coast. As I had just then revised the relation of the ancient rivers to the sea of the San Francisco peninsula pliocene, and was following the latter to its connection with certain ancient river deposits of the Coast Range, intermediate between the present sea and the Sierra Nevada, I urged Prof. Davidson very strongly to write out and present to the Academy a list of these terraces, in order that he might be aided by their additional testimony along with the anfrictuous deposits lying so high up on the flanks of the Sierra. He did so, I was much pleased to see, in a highly valuable paper; but not content with a straight and simple statement of the facts, he proceeded to build up an original theory. This theory was in broad terms that the ice made these terraces. He does not state that he visited any of the terraces in Oregon or California in search of strata and *roche moulées*. On the other hand he distinctly does not commit himself to anything of the sort.

The fact is that these strata do not exist anywhere near the coast terraces, south of the Columbia river. North of the Columbia, the great ice cap of the cold period reached down to the sea, and every hillock and mountain is rounded and polished, or striated. Prof. Davidson had both land glaciers and icebergs, that floated in the sea, to account for his terraces. If the one should be proven to be unreal or impossible, the other could be fallen back upon.

In order to make out the glacial or land ice (not iceberg) theory, however, he deemed it necessary to declare first that they were not sea terraces. I had at that time stated to the Academy the facts with regard to the position and altitude of the San Francisco and Coast Range pliocene terraces, so that he had to ignore, in order to make out his theory, all these, and other important facts accepted by the geological survey, as stated by me to the Academy.

Prof. Davidson in this article perpetrated the thoughtless inconsistency of denying that the sea level had anything to do with these ancient terraces, yet at the same time promulgating that they were formed by icebergs, that must have floated in the sea, or land glaciers that at these levels went into the sea.

Another error in this connection has gone on the records of the Academy. Dr. Cooper, at a recent meeting of the Academy, presented a resume of the geology of the pliocene period, which I am sorry I was not able to listen to. Every contribution of fact on this subject is of the greatest scientific value to all interested in the geology of California for many reasons. The Doctor's remarks, as published from his manuscript in the MINING AND SCIENTIFIC PRESS, are unfortunately very general, embracing little that had not already been published or made accessible in the library of the Academy. While the definite tangible line of facts in his address, on which, one might actually take hold, consisted in his delineation of the outlines of the pliocene sea on the State map. The map hangs there, on the wall, but the red paper strips and tacks that were pinned upon it are no more. How are we to profit by the Doctor's contribution if we would give it the closer attention and scrutiny that the subject deserves? I trust and hope that he will do the Academy the service of coloring the map, or

at least drawing faint red lines, which will improve and enhance the value of the map.

Dr. Cooper recognizes this pliocene sea which Prof. Davidson ignores, as having left its marks on the peninsula of San Francisco. But Dr. Cooper does me the honor to say that the terraces at altitudes of 700 and 1,000 feet, which were described by me in the proceedings of the Academy two years ago, as occurring at the same levels as the pliocene beds to which I referred, terraces so abundantly confirmed by Davidson's testimony a year later, were seen by me only in imagination.

According to Dr. Cooper, Prof. Davidson then saw his terraces only in his doubly-large imagination; for Prof. Davidson reported twice as many as I did, as he saw them from the sea, and some of his were twice as high as mine. To make it clear to the Academy that the facts heretofore reported by me on this subject of terraces were imaginary, the Doctor points out that I failed to observe that the strata of the San Francisco pliocene dip very considerably towards the sea, northwest; consequently, according to Dr. Cooper, it is a mistake to suppose that there could be any terrace on the surface. He admits the pliocene age of the rock, and also the fact that seen at a distance the formation would probably look, to eyes less

newer than the miocene is established by the fact that they lie and surface also the miocene hills high up in the Coast Ranges. Being thus limited between the miocene and post pliocene, they cannot have been anything else than pliocene.

The significance of the geology of the pliocene period on the Pacific coast is immense. The most wonderful system of extinct rivers delved into and laid bare for miles to the bed rock, and even to the deepest gutters and "pot holes, by the hand of man (on account of the fortuitous circumstance of their containing gold); rivers flowing in the middle tertiary from a mountain's side, into which they had eroded canyons over a thousand feet deep; which, then, in the period of which we are speaking, in a tropical climate, with heavy rainfall, became suddenly the agency for the deposition and storage, so to speak, of a continuous eurytherous, sedimentary formation, extending from the margin of a shallow sea, fifty to seventy-five miles inland, to points on the very shoulders of the Sierra Nevada, 6,000 feet above the sea.

They drained valleys inhabited at the time by the human race—as is made out with a fair showing—at a time when none of the present species of mammals beside man were yet created. To admit, as Dr. Cooper did, that the

vegetation, washed by the waves of many great fresh water lakes, like those of Camasa; and that the mighty proportions of the stuken continent of the Pacific ocean, outlined by Dana in the "Wilkes' Exploring Expedition Reports," was then, under the eyes of the ancient Californian, a reality, not yet quite given over to the coral insect and the geologist to be rescued from oblivion, but visibly in process of undergoing a downward movement, corresponding to, and probably coterminous with, the upward movement of the great Cordilleran plateau, the date of which we are thus enabled to fix.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last. Henry R. Taylor and J. W. Anderson were elected resident members. The donations to the museum were unusually light, and were embraced in a few botanical specimens presented by John Muir, and a section from the branch of the *sequoia gigantea*, presented by Mr. Turrill. A few Government scientific works were added to the library—and also a rare volume entitled "The Universal Geography," printed in London, in 1711, and abounding in quaint illustrations, maps, etc. The book was recently presented to Commander J. S. Skerrett, of the United States Navy, by His Excellency John O. Dominis, Governor of Oahu, Hawaiian Islands. The book is printed in Latin. Also a copy of Commander Belknap's "Deep Sea Soundings in the North Pacific Ocean."

It was announced to the Academy that the completed work of the State Geological Survey, as far as regards the botany of California, would shortly be published, through the exertions of certain gentlemen of this city.

Charles Wolcott Brookes, Japanese Consul, read an extended and interesting paper on the Commerce of the Ancients. This is an introductory paper, as the author intends following it up by giving an account of the commerce of Japan and China, while investigating the origin of the Japanese.

Amos Bowman read a paper which is given in another column of this issue.

Dr. C. B. Brigham read a communication describing the arrangements adopted for the "International Congress of Americans," first session to be held at Nancy, France, from the 19th to the 22d of July next.

Judge Hastings called the attention of the Academy to the fact that some persons at the East had published a book giving the same explanation of the so-called spiritualistic phenomena as presented by himself to the Academy months ago, ascribing it to the action and influence of the imponderable ether. He believed that larceny had been perpetrated in some form, as no other person could possibly have reached the discovery originally promulgated by himself. The Secretary of the Academy, in answer, said that the Publication Committee had refused in every case to publish the papers submitted by Judge Hastings, and that his effusions had been carefully locked up in the Secretary's desk, so that they should be prevented from reaching publicity through the proceedings of the Academy. This rather spoiled the Judge's theory that his ideas had been stolen.

A Rustic Shelter.

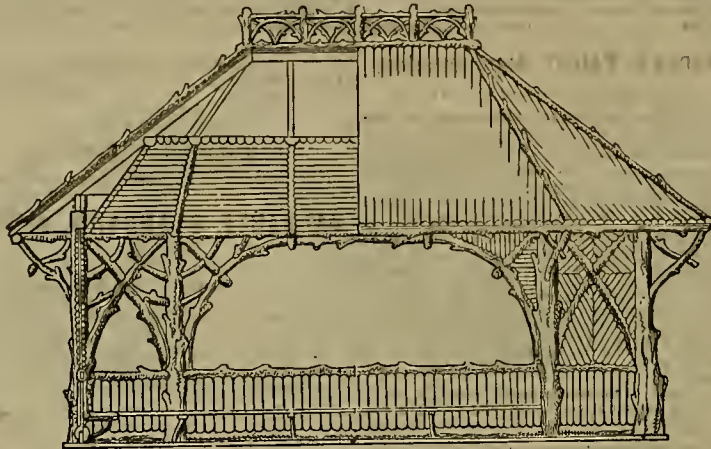
The accompanying sketch is of a rustic shelter erected in 1872, by Mr. Anton Gerster, on the shore of the large lake in Prospect Park, Brooklyn, N. Y. Its dimensions are 28x16 ft. Posts, railing and plates are of sassafras timbers, twelve inches in diameter.

The octagon portion is enclosed with slips of red cedar, with ceiling boards between, making a perfect tight roof. The inside is a high ceiling as shown in the plan.

The ridge is of rustic ornaments. In short, the plan is a working one, showing on the left, the inside with seats and ceiling finish, on the right, showing the outside finish. The seats are in the octagon portion, which gives seclusion to those wishing to rest there, and to others an opportunity to look from the back and front without interrupting those who are seated. It is also used as a station for the boats plying on the lake; hence it is useful as well as ornamental. It was erected at a cost of about \$1,500 by day's work. There are many places in and around San Francisco and Oakland where such a work would be very becoming. There is also very suitable timber for rustic purposes not far from here which would enable the artist in rustic to build at most reasonable rates. A structure of this style would add greatly to the attractions of Woodward's Gardens.

The average daily ore product during the past week from the Consolidated Virginia mine was 350 tons; from the Belcher, 450 tons; Crown Point, 400 tons; Ophir, 150 tons; making a total daily yield of 1,450 tons of first-class ore from four mines on the Comstock.

THE Act passed by the Legislature of the State of Nevada at their last session, concerning the taxing of the mines on the same basis as other property, will have the effect of increasing the valuation of taxable property in Storey county from \$5,000,000 to \$18,000,000.

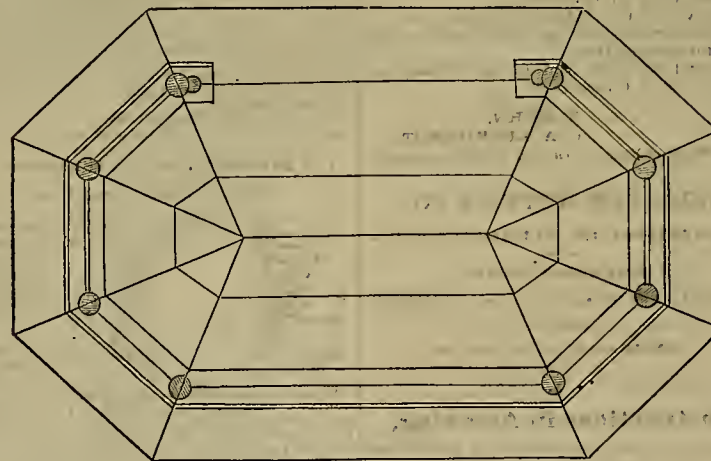


A RUSTIC SHELTER.

geologically level than his own, like a terrace. His idea of the "true pliocene terraces" is that they are to be found only low down, near the levels of the present bay or ocean.

Dr. Cooper simply errs in accepting the word "terrace" as signifying the same thing as a bed or stratum. Instead of making out a

Table mountain skulls and stone implements were found under a lava flow, but to ascribe to them a later than a pliocene date, would be to assume that the lava flows continued in places throughout the glacial epoch; and accompanied by washed gravel and water, sought and followed down what are now ridges of the



GROUND PLAN.

case of superficial observation of fact on my part, in the present case, he has made out a case of superficial interpretation, and misuse of geological terms, by himself.

My whole line of facts related to terraces, not to strata; to surface lines and surface deposits, as determined in age by the underlying beds, or strata containing fossils. The terraces followed these beds in order of time. They were formed by a receding sea. That these terraces were not older than the pliocene is evident from the fact that they form the tops and sides of the pliocene hills, and that they are as old as the pliocene is very fairly inferred from the fact that the sea had not receded to any "low levels around the bay" at all, until ages later; when the ancient rivers had become extinct and the volcanic outflows had marked another intervening period, and the glacial phenomena still another long lapse of time preceding the recent, in which we live.

Such being the case, no "true pliocene terraces" can have existed at low levels around the bay. The Doctor meant pliocene beds when he talked about terraces. The terraces that exist at low levels around the bay and along the coast, are post pliocene and recent. That the high terraces, described by me and by Professor Davidson, are older than the post pliocene, is further demonstrated by the fact that no post pliocene sea ever left any shells at such altitudes. The pliocene sea did, as I showed. That those terraces are generally

Sierra, precisely like those of the ante-glacial rivers. The evidence in general of the succession and newer date of the cold period however, is, as remarked, so clear, that Cooper's hypothesis is worthless unless it can be supported by some fact demonstrating that these lava blocks, accompanied by washed boulders, overlay in some places, the moraines and striated rocks; which would be something new, to me at least, and I think, to all other students of these phenomena. He would have to claim that the river of Table mountain left its old bed at a later period than the other rivers of the Sierra; that the canyons of the Stanislaus and the Mokelumne were begun upon by these rivers, at a later period and under different conditions with regard to erosion and filling, than the other canyons of the Sierra.

The testimony of these pliocene sea terraces is, that the whole Pacific coast range, and probably also the great basin or plateau of the interior, for a thousand miles at least, has risen since the advent of man (if the doctor's admission concerning the Calaveras skull be accepted) to an average in places of fully a thousand feet; that the States of California, Oregon, Washington and Arizona were more than half engulfed under brackish or salt water seas at the same time—such as are still in existence on the shores of British Columbia and Mexico; that the mountain water lines of Salt Lake and the great basin of the interior were, during this same period, of tropical precipitation and

Business Directory.

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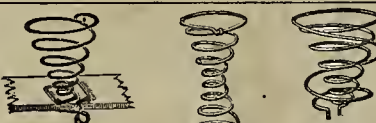
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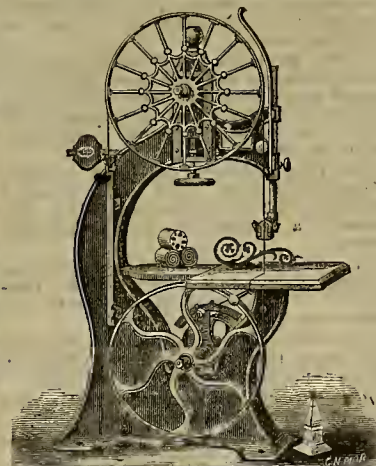
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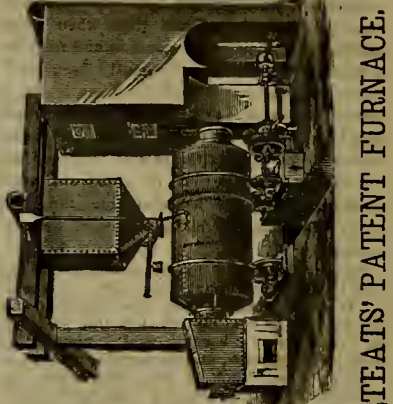
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 ore preparatory to smelting, better and cheaper than
 any other invention. The Furnace is so constructed
 that one man, of ordinary ability, tends five or more
 furnaces; controls them with ease; adding heat or air;
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 17v26-tf 315 California Street, San Francisco.

OAKES'S PATENT


Quicksilver Strainer.
 Patented January 26, 1875.
 For description see MINING AND SCIENTIFIC PRESS,
 March 6, 1875.
 For Cleaning Quicksilver Before Using it
 for Amalgamation,
 Mill men are invited to examine the Patent Quick-
 silver Strainer at the office of the Agents,
H. J. BOOTH & CO.,
 UNION IRON WORKS, San Francisco.

Quartz Mill for Sale

At Mineral Hill, Elko County, Nevada, four miles from
 Mineral Hill Station, on the Palestine and Eureka Rail-
 road, and 35 miles from the Central Pacific Railroad.
 The Mineral Hill Silver Mines Company (Limited
 offer for sale their new 20-stamp mill (dry crushing)
 built by H. J. Booth & Co., of San Francisco.
 The mill is complete in every respect, with engine,
 Boilers, Stetefeldt Furnace and all modern appliances,
 and is as good as new, having only run two months
 upon ore.
 The whole is offered very cheap for cash. For further
 information apply to
H. H. OAKES, Superintendent.
 Mineral Hill, Nevada.

Glasgow Iron and Metal Importing Co.
 Have always on hand a large Stock of
 Bar and Bundle Iron, Sheet and Plate Iron
 Boiler Flues, Gas and Water Pipe, Cast
 Steel, Plow and Shear Steel, Anvils,
 Cumberland Coal, Etc.
WM. MCGRINDLE, Manager, 22 & 24 Fremont St., S. F.
 m6-m2

Abandonment of Claims.

The mining suit referred to in our last week's issue is one of general interest to the mining community, as it proves that people cannot abandon their claims, and then, when other parties prove their value, come in and reap the reward. This has very frequently been done before this, and has tended in a great degree to prevent the sales of mining property. People who buy claims want them clear of all incumbrances or clouds to title; and it has been unfortunately the case that in many instances former owners have asserted that they had never abandoned the claims and sued for possession.

Judge Wallace in his instructions to the jury in the Geyser quicksilver mine case said: "If the jury believe from the evidence that the plaintiff or his grantors left the premises in controversy vacant and unoccupied for a series of years, and during that time exercised only casual acts of ownership upon the claims at long intervals, and that during that time no actual work was done toward working or developing the mine, either upon or in proximity to the claims, and that the defendants finding the ground apparently abandoned, entered upon and located the same in pursuance of the mining laws of the district and the laws of Congress, and have continued to comply with said laws, and have in good faith, reasonably believing said ground had been abandoned, expended large sums of money in developing said mines, then you are authorized to find the fact of abandonment."

This is perfectly just and should be remembered by all miners.

The Judge also said: The failure of a miner, upon the public land of the United States, to do the amount of work or spend the amount of money upon his claim, required by the local rules within a time appointed on pain of forfeiture will not of itself take away his mining right, but the ground must be duly relocated in a lawful mining district and with the proper recorder thereof (when record is required by its law) before his right can be taken away for such failure; and if he begins to do the work or expend the money required before his ground is so relocated his preceding failure in either respect is cured. The jury are instructed, that where a party relies upon mining rights acquired by mere occupancy, possession, appropriation and work, such rights continue so long only as the claimant continues the enjoyment or shows an intention to continue it. Such parties may lose their rights by abandonment of them if he indicates an intention when he relinquishes the enjoyment of them never to resume it.

The ceasing to enjoy mining rights acquired by mere occupancy and appropriation, whether depending upon prior actual possession or compliance with mining customs, will destroy the rights, provided the discontinuance be absolute and decisive and unaccompanied with any intention to resume them within a reasonable time.

Where a party relinquishes his possession of mining claim with no intention to resume the possession or to work the mine in good faith, or to subject the same to appropriate uses, but lies by and suffers the premises to become apparently vacant, disused and abandoned, and thereby induces others to appropriate the same in the reasonable belief that the same are unclaimed and subject to appropriation, and then intending only in the event that such mine is shown to be valuable by the labor and expenditure of such subsequent appropriation, to assert a claim thereto and endeavor to obtain the possession thereof, and others to appropriate and develop such mine in the reasonable belief it is vacant and unclaimed, induced thereto by the acts of prior claimants, such prior claimants will be held to have abandoned the same. If the jury find from the evidence that the plaintiff or his predecessors had forfeited their rights to the mining ground sued for, and that after such forfeiture and while said ground was unoccupied the defendants or their grantors, entered under the rules of the district and located said ground and have since continued to occupy the same and have complied with the rules and regulations of the district, then you will find for defendants. In considering the question of forfeiture, the intention of the person claiming the ground is entirely immaterial. As the suit was decided in favor of the defendants, it is probable that the jury considered that the ground was abandoned, and that the other locators were entitled to possession.

LARGE MAGNETS.—The Sheffield Scientific school, New Haven, has received an important addition to its philosophical apparatus in the form of an immense electro magnet, together with all its appropriate accessories. This splendid instrument was a present from William Wallace of Ansonia, by whom it was constructed. There is only one larger instrument of the kind in the country, perhaps in the world. This was also made by Mr. Wallace, and was purchased by the Stevens Institute of Technology, at Hoboken. It weighs altogether nearly half a ton, and is capable of lifting, it is said, twenty times that weight, or over ten tons, when in full action. The public, it is presumed, will have an opportunity of seeing it in operation before long, as one of the lectures in the mechanics' course, now going on at the school, is on the subject of magnetism.

Agricultural Items.

THE Sherman Island overflow occasioned the destruction of a large area of grain, but as the water is receding the farmers are hopeful that they may yet grow a crop of potatoes the present season. A portion of the land will doubtless be drained in season to make a crop of hay. Above Mayberry slough the wheat crop never looked more promising. The grain is tall and thick and will be considerably earlier than usual.

THE Petaluma *Argus*, of the 12th inst., says: Between five and seven thousand sacks of potatoes are now stored in the different warehouses in town. Last week over seven thousand sacks were shipped to San Francisco, an unusually large quantity for this time of the year. Farmers are at present hauling potatoes to town in moderate quantities. The price paid by dealers is \$1.50 per one hundred pounds.

EXPENSIVE LEASE.—Farm leasing in the Eastern States is generally resorted to by those who lack means to buy even the cheapest farms. Here it is otherwise. A farm in this State consisting of 20,000 acres has just been let for five years at an annual rental of \$40,000. The farm is stocked with 1,900 head of cattle, 100 horses, 50 mules and 1,500 hogs, costing the lessee, with crops, \$74,250.

The contributions of wheat from the United States to the bread supply of Great Britain in 1874 constituted 55 per cent. of the whole imports, and those of Russia 13 per cent. The aggregate export of wheat and flour from the United States to Great Britain during the year exceeds an equivalent of 52,000,000 bushels.

REFERRING to the Stockton wheat market, the *Independent* says: It is estimated there are at least eight thousand tons of wheat still remaining in the warehouses of Stockton, two thousand tons of which have been sold for shipment. The market is dull at present, particularly so for wheat of an inferior quality.

A New irrigating district is soon to be formed in Los Angeles under the Bush irrigation law, which will include Anaheim and the surrounding country to the extent of 12,000 acres. The water will be brought from Santa Ana river. This will be the second district formed under the new law, and will bring in all about 26,000 acres under irrigation.

This is the way that trees grow in Los Angeles county, according to the *Los Angeles Express*, which says: "The eucalyptus trees at B. D. Wilson's park, Wilmington, are only one year old from the seed, and have attained a height ranging from eight to fifteen feet, and a very luxuriant growth of branches and foliage."

A REPORT from Sierra valley says the soil is in excellent condition for plowing, and farmers all over the valley are getting in their grain. Crops will depend entirely upon the spring rains. Unless there is a good supply of rain the hay and grain crops will be complete failures.

A GENTLEMAN who has an eye to the abundance of the earth, and who had his weather eye open while passing through green fields, says that more promising grain than is now growing on the Denniston Rancho was never seen in that locality.

ABOUT 15,000 acres of grain have been planted this season in the Borden settlement, Fresno county. Of this amount, Major Reading, Friedlander, Major Holmes and Mr. Hall have about 6,000 acres. Grain is looking as well as could be desired.

THE Sacramento Sugarie has all its beets sowed, and most of them are above ground. The area laid down this year to sugar beets, by this company, is larger than ever before; and they look for a better yield than usual.

THE Bluzome ranch was sold yesterday at Santa Rosa, by Sheriff Latapie, at auction, for \$20,000, the Bank of California being the purchaser. The ranch is a portion of the Casalamuyomi grant, recently patented.

SANTA ANITA RANCHO, one of the finest ranches in Los Angeles county, comprising an area of 8,500 acres, has been sold to E. J. Baldwin, of San Francisco, for \$200,000, cash.

THE grain-field on all kinds of land in the vicinity of Marysville, Yuba county never looked more promising. Some of it is so stout that it will lodge before cutting time.

THE San Mateo *Gazette* is authority for the statement that in the San Pedro valley, near School House station, the potato blight is showing itself.

FARMERS in Borden settlement, Fresno county, have begun to irrigate their fields. They have planted this season about 15,000 acres of grain, and it is looking finely.

A BIG canal to drain the tule land in Big Meadows is talked of by the owners of swamp and overflowed land in that section.

BETWEEN five and seven thousand sacks of potatoes are now stored in the different warehouses in Petaluma.

TULE fire are now in order, the tules now being in the best condition for burning preparatory to cultivation.

THE crops at Half-moon bay are most encouraging.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

SUBSCRIBERS who by mistake get two copies of this paper, should notify us without delay.

Industrial Items.

ARTICLES of incorporation were filed in the San Joaquin County Clerk's Office last week by the San Joaquin and Fresno water company. The purposes of the company are the construction and maintenance of a canal and other works to divert the water of the San Joaquin river, and convey it through the counties of Fresno, Merced, Stanislaus, San Joaquin and Contra Costa, for the purposes of agricultural transportation and mining.

WE LEARN from the *Visalia Delta* of the 11th inst., that artesian water has been struck in the Mussel Slough country, the water rising two feet above the surrounding country. The pipe is in tough clay, and when this is penetrated it is believed a strong flow of water will be the result.

CASINOS for fifty box cars for the Northern Pacific narrow gauge railroad are being made at the Vallejo foundry. They include all the iron work except the wheels, which are obtained from the East.

MR. W. H. MARTIN, of this city, has gone to Kansas to escort a colony of about fifty families to this State. They have had an agent in the State for weeks hunting up a location, but it will not be fixed until the arrival of the colonists.

THE Santa Cruz *Sentinel* of the 13th says: The two foundries and two planing mills in Santa Cruz are busy turning out machinery and doing work for the two railroads now being constructed into town.

It is reported probable that a starch factory will be put up near Loma by another season, for which the enormous potato crop of that section will furnish staple.

It is predicted that the number of elegant residences erected in San Francisco during the year 1875 will exceed that of any previous year.

A COMPANY has been organized and a woolen mill is to be erected at Petaluma, and in running order by May.

THERE are very strong probabilities of Santa Cruz having an outlet by rail via San Mateo.

General News Items.

LETTERS from the Isthmus say that Commander Lull's survey for a canal route is proving very satisfactory, but reaching results both promising and unexpected. The Chagres river cannot be made available except as a valuable feeder, nor is a tidal canal feasible. The summit cut needs to be only five and a half miles long, with a mean depth of cutting of only fifty feet. The water supply is found to be bountiful.

THE Virginia and Gold Hill papers report that large numbers of immigrants from the East are flocking to those places. Drawn thither by stories of the "bonanzas." They are mostly destitute, and as there is no work for them, they would have done much better to have remained at home.

A MAN fell into a vat at the San Francisco Sugar Refinery a few days since. Luckily he caught by his hands, and only his lower limbs were badly scalded. Had his injuries proved fatal his body would have proved a sweet morsel for the coroner.

Two Yuba blacksmiths got into a quarrel in Marysville Saturday night, and one named Stoddard shot his companion, Glenn. The wound is a serious one. Rum the inspiring cause.

Most glowing accounts of the gold prospects continue to arrive from the Black Hills. Government still adhere to its purpose to keep miners out of the district, however.

POSTOFFICE circular instructions show that the recent legislation has fixed postage on transient newspapers at one cent per ounce.

JOHN MITCHELL has been returned a second time to Parliament from Tipperary.

WHALING operations along the lower coast have proved very successful this season.

E. P. WELCH, a condemned murderer, escaped from the Inyo county jail the 5th inst.

ARCHBISHOP McCloskey, of New York, is to be made a cardinal.

DUCK shooting since the 15th is unlawful.

A LARGE PROPORTION of United States and Foreign Patents granted to inventors on the Pacific coast during the past ten years, have been obtained through the agency of DEWEY & CO., publishers of the MINING AND SCIENTIFIC PRESS. Our business was established in the year 1860. We have an extensive patent library, with full record of cases on this coast, and can give the best and most reliable advice as to the patentability of new inventions.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch, Dated Washington D. C., March 18, 1875.

FOR WEEK ENDING MARCH 2, 1875.*

TICKET CLASP.—M. Disney, Oakland, Cal.
TELEGRAPH SOUNNER AND RECORDER.—Daniel F. Leahy, Portland, Oregon.
CONNECTION FOR BEN BOTTOM SPRINGS.—Alex. C. McMains, S. F., Cal.
CANNLSTICK.—Wells Kilburn, Napa City.
FRUIT DAIRER.—Thomas C. Waters, S. F., Cal.
MUSIC LEAF-TURNER.—George L. Dimpfel, Benicia, Cal.
DOUBLE REVERSIBLE HINCE.—Edward Halsey, San Jose, Cal.
PRESERVING APPARATUS.—John P. Schmitz, S. F., Cal.

TRADE MARK.

For Watches.—J. W. Tucker, S. F., Cal.

*The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph) in a paper, at the lowest rates. All patent business for Pacific coast inventors transacted with effect security and in the shortest time possible.

Hints about Advertising.

If you have goods to sell farmers, how much better will it pay you to advertise in a farming paper, closely read by 15,000 intelligent farmers, than in miscellaneous daily or weekly journals with 30,000 readers, comprising only 2,000 farmers. A mining journal in California with 15,000 readers reaches more intelligent miners than any other 10 papers in the Union.

Purchasers are more likely to look for information in the advertising columns of a paper devoted to their special interests, than elsewhere, when ready to buy. Some will not read advertisements upon any other occasion, but seek the best paper when wanted.

If you happen to be the only advertiser in your line of business in a paper, all the better. But if several firms advertise the same, your own judgment will question whether you can best afford to go unrepresented.

Weekly journals are read most leisurely and carefully, and at a time when the subscriber is most favorably inclined to examine advertisements. The newspaper most specially representing your particular branch of industry is usually best suited to your patronage, and the most profitable medium you can employ.

An advertisement in an honest and handsome sheet is favorable to the reputation of the advertiser. The readers of the Press are a superior and industrious class, who are able to purchase and who seek to patronize the best and fairest dealing tradesmen. Advertising in cheap priced mediums (of limited circulation) is like buying goods at retail when you could as well take them at wholesale.

Information imparted to a list of superior and intelligent, and active, and industrious readers (naturally looked up to by others for information), is seed sown in good soil for the advertiser.

Fame and fortune are gained, nine times in ten, by liberal and judicious advertising.

Hints to be Remembered.

A note dated on Sunday is void.

A note obtained by fraud, or even from one intoxicated, cannot be collected.

If a note be stolen it does not release the maker—he must pay it.

An indorser of a note is exempt from liability, if not served with notice of its dishonor within twenty-four hours of its non-payment.

A note by a minor is void.

Notes bear interest only when so stated.

Principals are responsible for their agents.

Each individual in partnership is responsible for the whole amount of the debts of the firm.

Ignorance of the law excuses no one.

It is a fraud to conceal a fraud.

The law compels no one to do impossibilities.

An agreement without consideration is void.

Signatures in lead pencil are good in law.

A receipt for money is not legally conclusive.

The acts of one partner bind all the others.

Contracts made on Sunday can not be enforced.

A contract made with a minor is void.

RATES OF POSTAGE—Domestic Postage.

ON ALL LETTERS throughout the United States, 3 cts. for each half ounce or fraction thereof.

ON LOCAL LETTERS, 2 cts. per half ounce where there is a free carrier's delivery; other offices, 1 cent.

POSTAL CARDS, 1 cent., in the United States.

VALUABLE LETTERS may be registered by payment of a registration fee of 8 cts. in addition to Postage. Money can be sent with absolute safety by mail, by procuring a Money Order. The fees are: On orders not exceeding \$10, 5 cts.; \$10 to \$20, 10 cts.; \$20 to \$30, 15 cts.; \$30 to \$40, 20 cts.; \$40 to \$50, 25 cts.

PRINTED BOOKS, in one package, to one address, 1 ct. for each 2 ounces or fraction thereof, not over 4 lbs.

ON TRANSIENT NEWSPAPERS, or other Printed Matter (Books excepted), and on Circulars, Pamphlets, Book Manuscripts and Proof Sheets, Maps, Sheet Music, Chromos, Engravings and Photographs, 1 cent for each 2 ounces or fraction thereof, not over 4 lbs.

SEEDS, Cuttings, Bulbs, Etc., 1 cent for 2 ounces and fraction of 1 ounce, not over 4 lbs.

SAMPLES OF MERCHANDISE (Liquids excepted), Ores, Etc., Flexible Patterns, Paper, Envelopes and Blanks, 1 ct. for each 2 ounces, not over 4 pounds.

ALL TRANSIENT MATTER, except duly certified letters of Soldiers and Sailors, must be prepaid by stamps.

ON matter not above specified, same rate as Letters.

THE SCIENTIFIC PRESS.—This valuable journal entered upon the seventeenth year of its publication on the 4th of July. The steady advance in character, that every reader has noticed in the paper, renders it unnecessary to make any platitude of improvement, and the publishers simply content themselves with the announcement that they will continue to make their paper as interesting as possible. That it is interesting to a large class of readers, the wide circulation and extensive influence of the Press, is sufficient evidence.—*Pacer Argus*.

April, 1875, to pay the delinquent assessment, together

Office—Room 13, No. 319 California street, San Francisco

Geneva Consolidated Silver Mining Com-
pany—Location of principal place of business, City
 and County of San Francisco, State of California.
 Location of Works, Chino Mining District,
 White Pine County, State of Nevada.

Notice—There are delinquent upon the following
 described stock, on account of assessment No. 4, levied
 on the second day of January, 1875, the several amounts
 set out in the names of the respective shareholders
 as follows:

Names.	No. Certificate.	No. Shares.	Amount.
George W Bihnen.....	5	300	\$60 00

T T Miliken, Trustee.....	9	570	100 00
T T Miliken, Trustee.....	10	78	15 00
T T Miliken, Trustee.....	20	416	80 00
T T Miliken, Trustee.....	45	825	125 00
T T Miliken, Trustee.....	67	160	20 00
T T Miliken, Trustee.....	88	1000	200 00
T T Miliken, Trustee.....	92	2000	400 00
T T Miliken, Trustee.....	93	1800	360 00
T T Miliken, Trustee.....	94	141	148 20
T T Miliken, Trustee.....	105	600	100 00
T T Miliken, Trustee.....	106	500	100 00
T T Miliken, Trustee.....	107	500	100 00
T T Miliken, Trustee.....	108	500	100 00
T T Miliken, Trustee.....	109	500	100 00
T T Miliken, Trustee.....	110	500	100 00
T T Miliken, Trustee.....	111	500	100 00
T T Miliken, Trustee.....	123	2000	400 00
T T Miliken, Trustee.....	125	2000	400 00
Charles Camden.....	23	312	62 40
Charles Camden.....	43	1250	250 00
Robert Merrill.....	24	1000	200 00
M W Kales, Trustee.....	99	500	100 00
M W Kales, Trustee.....	100	500	100 00
M W Kales, Trustee.....	101	500	100 00
M W Kales, Trustee.....	102	500	100 00
James T Maclean.....	28	145	29 00
James T Maclean.....	38	750	150 00
James T Maclean.....	87	125	25 00

James T Maclean	38	125	25 00
James T Maclean	40	125	25 00
J B Stanford	45	250	50 00
H Barroilhet	82	1250	250 00
Robert McBeth	34	1250	250 00
D M McBeth	35	1250	250 00
Geo F Oelcke	41	1250	250 00
S M Theall	47	625	125 00
Jeremiah Callaghan	53	625	125 00
D W Douthitt	57	500	100 00
Geo Treat, Trustee	84	2000	200 00
Geo Treat, Trustee	88	100	20 00
J W Phillips, Trustee	65	100	20 00

And in accordance with law, and an order of the Board of Directors, made on the second day of February, 1876, so many shares of each parcel of such stock as are owned by the above named parties at public auction at the office of the company, room 14, 302 Montgomery street, San Francisco, on Wednesday, the thirty-first day of March, 1876, at the hour of 12 o'clock, m., together with the interest thereon, to be paid by the said parties, day, to pay delinquent assessments thereon, together with costs of advertising, to the said parties.

I, T. MILLIKEN, Secretary.

Office, 302 Montgomery street, room 14, San Francisco, Cal.

Keystone Quartz Mining Company—Principal place of business, San Francisco, California. Location of works, Butte Township, Sierra county, Cal.

Notice is hereby given, that at a meeting of the Board of Directors held on the 8th day of March, 1875, an assessment (\$2.00) on each share of the capital stock of the company, was levied on the capital stock of the corporation, payable immediately. In United States gold coin, to the Secretary, at the office of the company, on or before the 15th day of April, 1875, at San Francisco, California.

Any stock upon which this assessment shall remain unpaid on or before the 15th day of April, 1875, will be delinquent and the same will be sold at public auction, and unless payment is made before, will be sold on Monday, the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

LOUIS VESARIA, Secretary.

Office, Northwest corner Pine and Sansome streets, San Francisco, California.

Greens Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley Township, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of March, 1875, an assessment (No. 2) of one dollar per share was levied upon the capital stock of said company, payable on or before the 15th day of April, 1875, to the Secretary, at the office of the company, Room 8, No. 315 California street, San Francisco, California.

It is further ordered, that any shareholder who has not paid on Wednesday, the 21st day of April, 1875, will be advertised on that day as delinquent, and unless payment shall be made before, with the delinquent assessment, together with costs of advertising and expenses of sale.

J. F. NESMITH, Secretary.

Office—Room 8, No. 315 California street, San Francisco, Cal.

Silver Sprout Mining Company.—Principal place of business, San Francisco, State of California. Location of works, Knerange Mining District, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 7th day of March, 1875, an assessment of five cents per share was levied upon the

capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, at the office of said corporation in San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of April, 1875, will be delinquent, and the same, if not paid on or before the 16th day of May, 1875, is made herefore, will be sold on Thursday, the 16th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and sale.

T. B. WINGARD, Secretary.

Office—Room 13, No. 318 California street, San Francisco.

Theresa Mill and Mining Company.

Principal place of business, San Francisco, State of California. Office of the Company, Connelville, Allegheny County, California.

Notice is hereby given that at a meeting of the Board of Directors of the Theresa Mill and Mining Company, at its assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, at the office of the Company, Room 13, 408 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 16th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made herefore, for sale at public auction, and unless payment is made herefore, will be sold on Thursday, the 16th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and sale.

T. B. WINGARD, Secretary.

Office—Room 13, No. 318 California street, San Francisco.

Office—Room 15, 408 California street, San Francisco.

Tuolumne Hydraulic Mining Company.

Principal place of business, city and county of San Francisco, State of California. Location of works, Tuolumne county, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 21d day of February, 1895, an assessment of twenty (20) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, room 14, 302 Montgomery street, San Francisco.

Any stock upon which this assessment shall remain unpaid on the 25th day of March, 1895, will be delinquent, and liable for sale under the provisions of the laws of this State in that behalf made, and will be sold on Saturday, the seventeenth (17th) day of April, 1895, to pay the delinquent assessment together with costs of advertising and expense of sale.

Office, Room 14, 302 Montgomery street, San Francisco.

Iron and Machine Works.

San Francisco Boiler Works,

123 and 125 Beale Street.....SAN FRANCISCO

F. I. CURRY,

Late Foreman of the Vulcan Iron Works, Proprietor

High and Low Pressure Boilers of all Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED

SPIRAL BOILER.

SHEET IRON WORK of every description done at the Shortest Notice.

All kinds of **JOBGING** and **REPAIRING** promptly attended to. 17v25-3m

THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868.
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,
SAN FRANCISCO.

Manufacturers of Steam Engines, Quartz and Flour Mill Machinery, Steam Boilers (Marine, Locomotive and Stationary), Marine Engines (High and Low Pressure). All kinds of light and heavy Castings at lowest prices. Gams and Tappets, with chilled faces, guaranteed 40 per cent. more durable than ordinary iron.

Directors:

Joseph Moore, Jesse Holladay, O. E. McLane,
Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary
24v17-47

FULTON

Foundry and Iron Works.

HINCKLEY & CO.,

MANUFACTURERS OF

STEAM ENGINES.

Quartz, Flour and Saw Mills,

Hayes' Improved Steam Pump, Brodie's Improved Crusher, Mining Pumps, Amalgamators, and all kinds of Machinery.

N. E. corner of Tehama and Fremont streets, above Howard street, San Francisco. 5-47

Empire Foundry,

Nos. 137, 139 and 141 FEMONT STREET, SAN FRANCISCO.

RICHARD SAVAGE, Proprietor.

Heavy and Light Castings of every description. House Fronts, Mining and General Machinery estimated and constructed at shortest notice. On hand the celebrated Occident and French Ranges, Burial Caskets, Grates and Fenders, Road-Scrapers, Hydrants, Tugger Irons, Ploughwork, Sash Weights, Ventilators, Dumb Bells, Gipsies, Ship Castings, SOIL PIPE of all sizes, Fittings and Cauldron Kettles in stock at Eastern rates. SHOES and DIES a specialty. Ornamental Fences in large variety. 4v30-17r.

UNION IRON WORKS, Sacramento.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS,
CROSS' PATENT BOILER FEEDER AND SEDIMENT COLLECTOR

Dunbar's Patent Self-Adjusting Steam Piston

PACKING, for new and old Cylinders.

And all kinds of Mining Machinery.

Front Street, between N and O streets.,
SACRAMENTO CITY.

G. W. PRESCOTT.

W. R. ECKART.

Marysville Foundry,

MARYSVILLE, OAL.

PRESCOTT & ECKART,

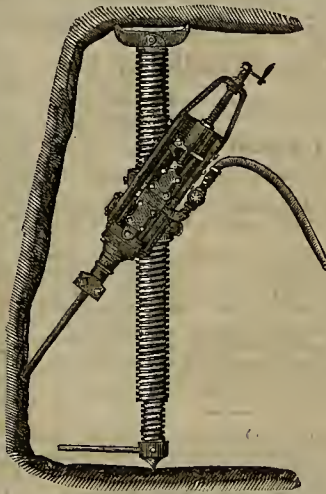
Manufacturers of Quartz and Amalgamating Machinery. Hoisting Machinery, Saw and Grist Mill Irons, House Fronts, Car Wheels, and Castings of every description made to order. 5v28-1y

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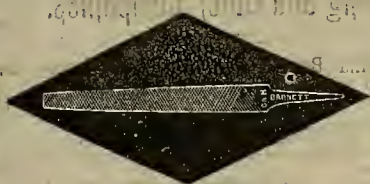
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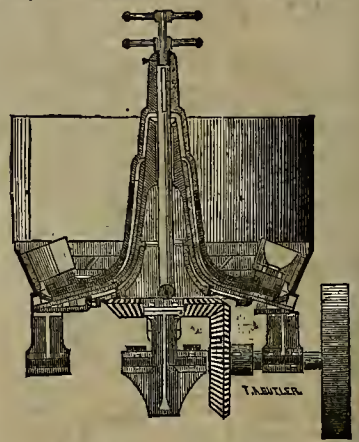
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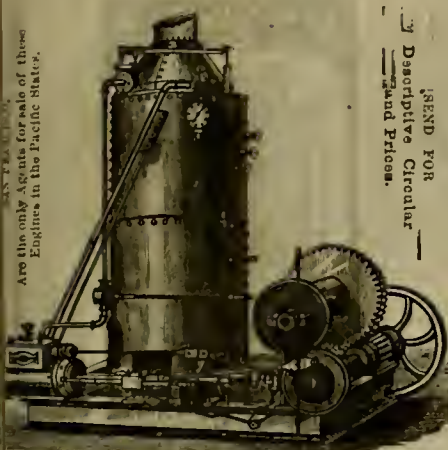
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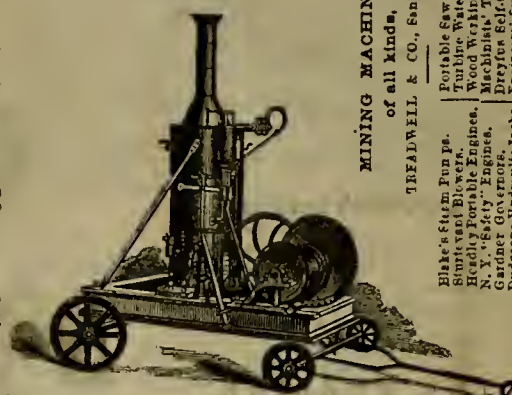
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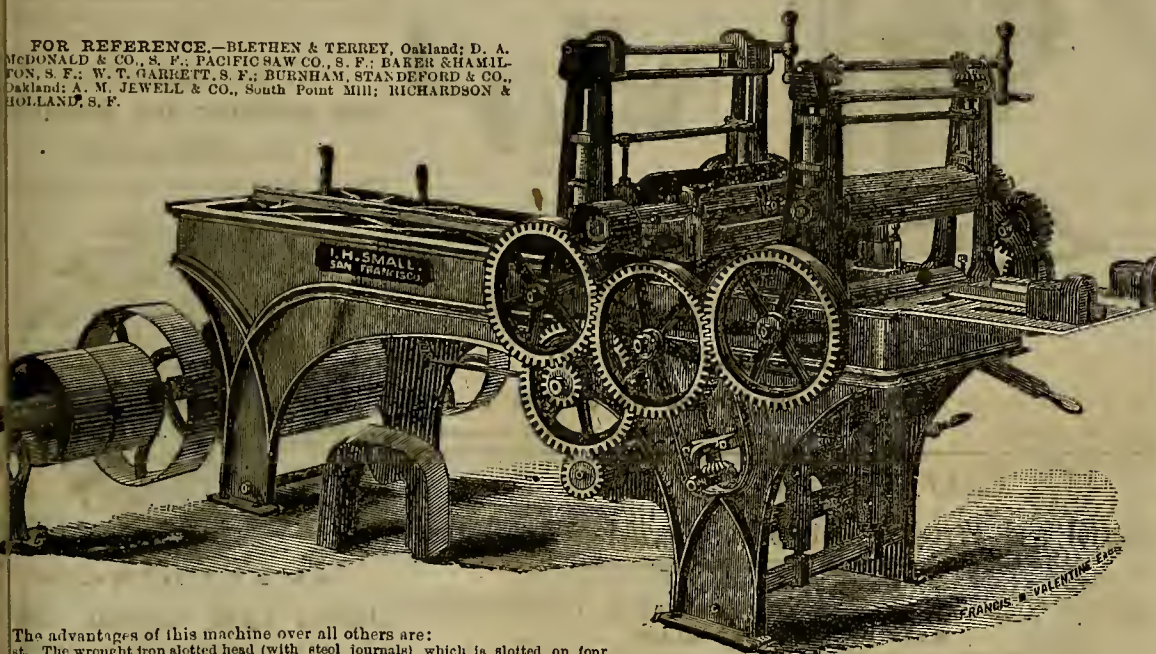


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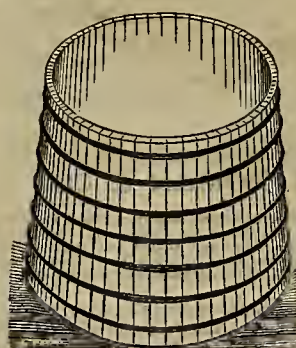
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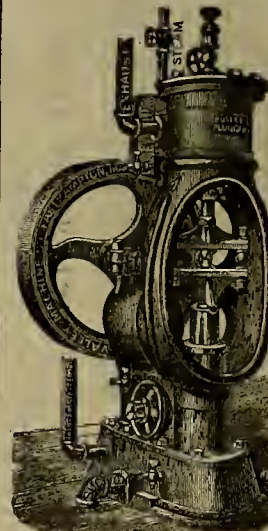
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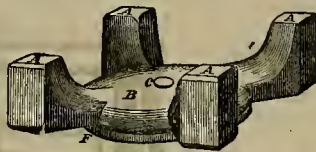
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SAN FRANCISCO, SATURDAY, MARCH 27, 1875.

VOLUME XXX
Number 13

The District Telegraph.

In most of the large cities in the East, the district telegraph is an "institution" which can no longer be considered as an experiment, and its convenience to the public is such that it would be difficult to do without it. Until recently, no attempts have been made to inaugurate this system on this coast, but recently a company has been organized, the boxes are being made, and shortly San Francisco can boast of its equality with other great cities, in having its district telegraph. As this is an enterprise with which the public is likely to have intimate relations in the future, a sketch of its character and purposes will be interesting:

The object of the district telegraph is to place at the immediate service of each of its subscribers a specially trained force of messengers, watchmen and policemen, and to do all this at so low a price as to enable any one in moderate circumstances to avail himself of the company's services. The city is divided into districts of such size that the extreme points in the district can be reached in three minutes from an office situated in the center of the district, where there is a force of operators, clerks, messengers, firemen and policemen. A signal box, such as is shown on this page, is placed in the house or office of each subscriber, and is connected with the district office by telegraph wires. The signal box has a switch arm of three positions, as shown, respectively: "messenger," "police," and "fire." Each box has its own number, which is recorded at the district office against the name and address of the subscriber. In the interior of the box is a train of wheels, clock gearing, which, when the arm is turned, starts in motion, and the number of the box is given at the station, in the same manner as the fire-alarm box.

If a messenger is wanted, the switch is moved to "messenger," and instantly a trusty boy is sent to answer the call. Placing the switch arm to "police" brings a private policeman, and switching to "fire," brings the firemen, as afterwards explained. The basis of the system is, that the messenger, police or fireman's service shall be performed within three minutes, at any time of day or night. In such cities, where it is established, the employees of the company perform a great variety of public service.

The messengers run errands, carry parcels, make collections, tend offices, distribute handbills or cards and do about everything within the range of a boy's capacity. The companies are very careful in selecting boys and are responsible for their honesty, in a fixed sum. The business generally requires about one boy to each ten boxes and affords respectable employment to a great number of lads, who are, by strict discipline and business association, gradually trained to fill more important duties. In many cases people employ boys who are only needed for an hour perhaps each day; by this system many of these boys can be dispensed with, and at the same time they can find employment with the company.

The policemen are frequently called to remove obtrusive servants and other nuisances; and if burglars are heard in the house, or the occupants are alarmed by suspicious noises on the premises, a touch of the button brings assistance at any time of day or night.

In cases of fire the system is invaluable. Under the best system of city fire alarms it takes an average of ten minutes to reach a fire-alarm box, find the person in charge of the key and send in the alarm; and then the department must have time to reach the fire. With the district telegraph in the house the signal can be sent instantly and within three minutes firemen are working on the fire with extinguishers.

In this city a fire patrol has recently been organized by the Insurance companies, and arrangements have been made so that this patrol will respond to calls from any three district signal boxes. By turning the switch arm to "fire," a signal is conveyed to the central office. The operator then sends the alarm by telegraph to the fire patrol station, giving street and number, and the fire patrol with all the apparatus necessary to extinguish incipient fires and save property are soon on the ground.

At the same time the district office sends the alarm to the nearest engine-house, so that the steam fire engine will also come. In case the

fire gets too much headway word is sent by telegraph to the fire alarm office, and a general alarm is struck in the usual way. The company will have independent wires to each engine house in the district, so that no delay is necessary, as the gong will be struck as soon as a signal is made for "fire." It will be seen from this that the system is very simple and efficient in case of fire, as all this is accomplished by telegraph, and with as little fuss as possible. The patrol first comes to the house, and if more help is necessary then the nearest engine in the district, and then if the fire threatens to be destructive the whole department turns out. Usually independent firemen are kept by the fire companies, but the existence of the fire patrol here does away with the necessity of special policemen.

This telegraph company will, of course, have independent wires and gongs of its own. Still, if any one wishes to telegraph to any part of the world he can send the despatch by a mes-



District Telegraph Alarm Box.

senger, who is called to receive it, and need not move from his chair. The boy can also be instructed to wait for an answer, if desired.

The central office of this company is at No. 417 California street, in a room 25 by 75 feet. The first district will include a five-minute service from that center. Only one district has as yet been organized, and those on the outside limits of the district can get a message in five minutes. The boxes are being made in this city by the Electrical Construction and Maintenance company. The officers of the District Telegraph company are:—James Gamble, President; Geo. S. Ladd, Vice-president, and Stephen D. Field, Secretary and Treasurer. The rates to be charged are \$2.50 per month for use of boxes. Of course no charge will be made for putting boxes in and keeping them in order. The sum of 15 cents per half hour will be charged for the time actually employed by the boys. These boys are to be uniformed, and the policemen employed are specials.

This system is no experiment, having been tried with great success in other large cities. Here, only one district will be laid out for the present; but in time no doubt the whole city will be districted and then there will be a central office for each district. The advantages of the method are so obvious that they need no explanation after what has been already said. The tariff is not high and many business men will no doubt avail themselves of the facilities this offered them, at their offices as well as their homes. The messengers can be told to do anything that boys can do, and people are charged only for the time actually employed. The police system will do away with many special police, and the fire alarm is invaluable.

Students in the Field.

The first of a series of explorations, under the auspices of the University of California, is to be made during the coming spring recess, which began last Thursday. These explorations or surveys are designed to illustrate and teach in the field what is taught in the lecture-rooms at Berkeley, and will include geology and mineralogy, topography, surveying, zoology, botany and related studies. In conducting this out-door work the party will be under the usual discipline which is observed in governmental expeditions of the same general character. The objective point in this instance will be Mount Diablo and the country intervening between said place and Berkeley. In order to make the work more effective the number of the

Hydraulic Mining in California.

No. 18.

Distributor.

This is a strong cast-iron box, receiving directly from the supply-pipe all the water to be used by means of hydraulic machines in the mines. It is provided with two or more openings, to which the pipes, directly connected with the hydraulic nozzles, are attached. These openings can be closed by strong iron gates, raised or lowered by means of a screw. To change the water from one hydraulic nozzle to another the gate for the latter is opened by turning the screw. At this point two streams of equal power will issue from the two nozzles. Now, the screw of the first hydraulic nozzle is turned, the gate closes slowly, and the whole of the water is changed from one nozzle to the other.

These distributors are provided with as many as four gates, so that four hydraulic nozzles could be supplied from one of them, provided the supply of water and the feed-pipe were large enough to furnish the four nozzles at the same time. The distributor must be firmly fixed to the ground.

The Supply or Feed Pipe.

The size of this pipe must necessarily depend on the supply of water. In mines which use from 1,500 to 2,000 inches of water, feed-pipes of 22 inches diameter are generally used. When the supply of water is higher than that, and rises to 3,000 inches or more, it is advisable to use a pipe of 30 inches diameter, since the friction is lessened to a great extent by the large size.

The feed-pipe should descend from a strong bulk-head in as direct a line as possible, and with the least angles, to the mine. It should not be permitted to fall and rise again, unless this is unavoidable; and then it should be provided with an extra number of air-valves, with brass floats. (The depressed portion of the pipe would retain the water all the time, and might be at any moment the cause of a collapse, unless efficient air-valves could supply air quick enough to prevent a vacuum.) These air-valves ought to be provided with brass not wooden floats, since the swelling of the latter will, under some circumstances, wedge them so tightly in the valve that the atmospheric pressure is unable to remove them; a collapse is the consequence.)

The water at the bulk-head must cover the mouth of the pipe for a depth of 3 or 4 feet, to lessen the amount of air; some of which, under all circumstances, will enter with the water. Where the feed-pipe has a permanent position, it is the best plan to have joints riveted together; that part of the pipe which is liable to be shifted must be connected by hooks and wire, and the joints must be calked carefully. The pipe must be placed in such a position that it is immovable; on precipitous ground braces and frame-works, weighted down with stones, ought to be used at intervals. An air-pipe must be attached to the feed-pipe at or near its upper end. (See Fig. 1.)

The iron used for these feed-pipes varies from No. 16 to No. 11, and lower, according to the greater or less pressure; however, care should always be taken not only to employ the best charcoal-iron, but also to have it strong enough against all chances.

For a 22 inch pipe No. 16 iron was used for pressure up to 150 feet; No. 14 from 150 to 250 feet; No. 12 from 250 to 310 feet. For a 30-inch pipe No. 14 iron was used for pressure up to 150 feet; No. 12 from 150 to 275 feet.

The pipes supplying the hydraulic nozzle from the distributor will differ in size, say from 10 to 15 inches; must be made of No. 14 or No. 12 iron, and must be connected either by flanges or by hooks and wire; well calked and firmly secured in their position.

All the pipes should be protected by immersion in Dr. Angus Smith's preparation of coal-tar.

Fig. 1. A. Hook and Wire Connection; B. Flange.

party is limited, including some of the professors in the scientific colleges, and others selected according to their specialties in natural sciences.

When the party returns, the material collected and the field notes and general observations are to be properly worked up and a report will be made to the authorities of the University by the Secretary of the Association, F. A. McLean.

The expedition is under the charge of Prof. Jos. LeConte. The party is composed of the following persons in their specialties: In Natural Science, Prof. Jos. LeConte; Geology, Prof. W. B. Rising and F. State Jr.; Chemical Geology; A. W. Jackson, Jr., Mineralogy; F. P. McLean, Botany; John Sillman, Geology. The Engineering Department is under Prof. John LeConte, assisted by G. O. Edwards, L. L. Hawkin and E. A. Parker.

The above mentioned will probably be joined at the mountain by President Gilman, Prof. W. H. Brewer, of Yale, now lecturing at the University; Dr. A. Kellogg (creator of the museum of the California Academy of Sciences), and W. P. Gibbons, botanists, and Secretary R. E. C. Stearns in natural history. We shall give some account of the result of these explorations.

While speaking of the University, we may mention that Prof. D. C. Gilman has resigned the Presidency for the purpose of accepting a similar position in another university in the East. Prof. John LeConte, a member of the Faculty, has been appointed temporary President. While regrets are felt at Professor Gilman's departure, the appointment of Professor LeConte, who has been so long connected with the University, is a cause of congratulation.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

CORRESPONDENCE.

Mexican Mines.

The Native Silver District of Morelos, State of Chihuahua, Mexico.

(Written for the Press by A. E. Koels.)

[Continued from last week.]

Some distance to the northeast on the same side of the mountain, but on another spur, we find the

San Anastasio Mins.

With similar general direction, and about 18 degrees dip; also similar in point of general characteristics of the lode in point of matrix, nature of its ores, and signs of nearing such, although these latter contain more iron pyrites and more or less ruby silver. Like the San Gil lode, the San Anastasio shows an average width of three-fourths to one yard, in many places considerably widening out.

Discovered several years later than the San Gil by the same avila, its chlorides on the surface soon changed into native silver mixed ores, frequently becoming very massive and thick, so that the same had to be chiseled out, not breaking out by the blast.

The ownership passed in time into the hands of a very intelligent and energetic miner, Sr. Don Manuel Seenz, whose enterprise was soon rewarded by a large bonanza. Like all mines this also did not carry its metal in one continuous stretch, but rather in deposits more or less toward a certain direction—chimney-like; yet it has hardly ever failed to give sufficient low grade ores, of from \$50 to \$80 per ton, to cover the running expenses, and those very docile for amalgamation.

The silver is not coming out of the mine as bright and white as that of the San Gil; being more or less tainted by oxides, yet very pure, and gives considerably of the peculiar close called these black silver (*plata negra*) Pronstite which loses only 1 to 2 per cent. in smelting; also another interesting kind which looks like brightly polished steel.

Under the present administration of Sr. Don Angel Guerrero, the mina bids fair to give another great bonanza before long. In fact the barren spaces of the lode seem in no direction to be large, but need thorough prospecting.

The depth of the mine is 140 yards, and of its value speaks the large rubbish pile (*terrero*) whose silver contents are alone calculated to range over \$100,000.

A general working shaft, following the inclination of the vein down to the bottom of the mine allows the taking out of the rubbish by means of a windlass moved by mules. A great number of threads tend to enrich the lode, some of them carrying visible native silver on the surface. Four or five regular veins running with short distances parallel to the San Anastasio higher up on the slope, belonging to its claim have been but very little prospected, yet give all the most flattering promises and inducements for a tunnel enterprise which I understand will indeed be given at a later period. The mill driven by splendid, never-failing water power, is well appointed and of sufficient capacity.

The San Pedro.

About eighty yards west of the former, belongs to the Sáez heirs. Water having filled its lower works, which are said to be 120 yards deep, I did not inspect it thoroughly. The work in it has been stopped for over fifteen years. For a considerable time, however, it gave a great bonanza, a large part of which was in very massive native, especially "black silver." The water entering through fissures caused the stoppage of the workings; the last ones are reported to be in very good fourth-class ore, and public opinion states that very little work on them would bring the mine again into a bonanza. Its location is very favorable for tunnel enterprise, its general features resembling closely those of the San Anastasio.

To the southwest of the San Gil, higher up on the same side of the hill, lies the

Santa Matilda.

Consisting of two very formal lodes, lying in excellent mineral ground, about three-quarter yards wide, running southeast to northwest with a dip tending to unite them in about 100 yards depth. At the place and time of its discovery, some twenty years ago, it gave very rich chlorides and a considerable amount of first and second class native silver. A gallery driven by its present owner, Signor Don Ignacio Rocha, to a considerable length on the lower vein failed to give result; the upper one, called Cinco Señoras, promises, however, very fairly. The depth of the workings does not pass sixty yards. In most general features it resembles San Gil, giving also much ruby silver.

The geological formation of the mountain begins to change unfavorably a short distance west of the mins. The owner, I understand, is desirous to enter into acceptable arrangements with parties willing to work the mine in a regular way. It is very favorably spoken of by the mining population.

Going over to the west side of the mountain, we find on it, or on spurs running out from and hills separated from it by deep ravines,

quite a number of mines and veins, either entirely virgin yet, or at best but very little prospected far want of enterprise and capital, although some of them seem to offer very fair hopes of giving good results with comparatively little outlay.

The mineral ground throughout here is of the very best class, and those lodes which have at some time been opened, now, however, lying idle, have not disappointed the expectations their appearance caused in their owners. The most of these desire enterprising capitalists to take hold of them, and would offer fair conditions to a snob. Among such mines I only mention the El Carmén, Santo Nino, San Miguel, San Juan, La Consalacion, Los Hilos, Dulces Nombres, Bichares and Las Papas, all of which have been merely picked at, hardly any over ten to thirty yards in any direction.

The San Francisco.

Owned by Signor Don Gabriel Gomez, includes four or five formal veins, some of which gave very rich metallic silver. Their deepest work hardly reaches forty yards. So far as I have convinced myself, its prospects are very flattering.

La Trinidad.

Composed of two lodes running near together from southeast to northwest, with a west dip of 18 degrees, which have at various times produced fine deposits of very solid native silver and chlorides. The fourth class ores are reputed to be very rich in sulphurates, and the quality of the metal produced the richer the deeper developed. Considerable calcspar seems to enter the matrix of the lode, and all the distinctive features of this mine appear highly flattering. Its owner, Sr. Don Benito Diaz, not being able to work it properly for lack of funds, would wish to enter into negotiations about it on liberal terms. The work on the veins nowhere exceeds 45 yards in depth. West of the San Francisco is found the great

San Joaquin Mine.

At the time of its discovery in the first quarter of the century, so celebrated by its great bonanza, that from it dates the still existing small mining village San Joaquin de los Arrieros. No precise records are now existing as to its actual production, it is only known that it gave many millions, a great part of which in the very richest kind of native, and even large masses of perfectly solid silver. Don Juan Escudero, in his "Estadística del estado de Chihuahua," speaking of it says, that he personally was present on the 9th of May, 1826, when the owners caused a blast to be made in one of the works, to throw a part of the vein down, not over 1½ yards long, by 1½ wide and 1½ yards high, which resulted in over \$7,000 in silver, of which they sold to him one single piece in native silver, of 73 pounds weight, at the rate of \$16 per pound. The depth of the mine is not much over 100 yards, and wherever accessible, the large saloon-like cavities show plainly where the deposits of metal were taken out. The upper workings being partly filled up with rubbish, only the lower ones can be entered; where by later owners a short tunnel was run, resulting also in rich returns, yet for some reason, unknown to me, not followed up. In this latter work a very rich cross-vein, containing a great deal of iron, was cut.

The lode runs along the top of a very narrow spur from east to west, dipping south, and shows from ¾ to 1½ yards wide, with a good deal of calcspar in its matrix. The prevailing country rock is diorite. On both sides of the spur run also a number of other formal lodes parallel to the San Joaquin, all now included in one claim known as the

El Carmen.

Owned by an American, Mr. B. J. Jones and parties represented by him. Some of them have been opened and prospected to an insignificant extent, all have given rich chlorides and good deposits of native silver. Quite a number of good sized cross lodes traverse them from southwest to northeast in almost regular short distances, while many threads carry also metal in them. The Carmen vein is, however, the only one being worked at present with a small force, the means for larger exploration being wanting. It has never, from the surface down to its lowest workings, about 40 yards, failed to pay expenses, occasionally giving deposits of very rich native silver. Seldom, indeed, might a claim be found in any mining region which offers finer facilities for exploration by means of a tunnel than this one. Such a one, started at a point on the south side of the hill, would cut, in sufficient depth, all the principal veins in about 100 yards length, and more than likely soon open up a new bonanza. Right in front of the Carmen, a few hundred yards distant, crops out and mounts on another hill, an immense vein of quartz, called El Promontorio, from 6 to 9 yards wide, which it is said may be traced for many miles, and shows traces of silver, gold and copper, yet has never been opened sufficiently to prove its value, and is still without an owner. The mill pertaining to this Carmen mine, called Charcos, and provided with American machinery, lies about one hour's ride to the east of it on the Tenorihua river. Leaving this mine and passing further westward, a deep ravine known as La Corcoyada, we come to a mountain system which, cutting through the former one in a southwest direction, offers many striking peculiarities in its geological features, differing considerably from those which accompany the lodes already spoken of. Its principal class of rock is granite, with occasional

patches of syenite, greens'ane and diorite; also porphyry. Here lies the

El Socorro Mine.

A comparatively new one, first discovered about 15 years ago, by Don Juan Avila, who found rich chlorides cropping out in various spots, but was satisfied in taking out what there was on and near the surface, without caring to follow it up any deeper than four to six yards anywhere. Similarly to this worked at a later day Don Beaino Diaz, who took from a small shaft of five yards about \$4,000, a part of it in massive, sanorous silver.

Finally, about a year ago, the claim got into the hands of foreign gentlemen, partly residing in San Francisco, Cal., who determined to open it in a regular way, and are at present engaged in doing so, with very flattering prospects of being well compensated for their enterprise, although the depth of the works pass as yet in no place 30 feet.

Included in the same claim, about 400 yards to the northeast, on another spur of the same hill, runs

La Ascension

Vein, in a southeast to northwest direction, and somewhat parallel to the former, only opened so far by a shaft of about 11 yards, and a short gallery driven on a thread, 28 yards below. The prospects are similar to those in the Socorro; in both mines the workings must first reach a greater depth before more constant stretches of ore than those met with near the surface, may reasonably be expected.

Some seven yards south of the above shaft a very wide lode, never touched yet, crosses the Ascension from east to west, and between this end the Socorro various others crop out, likewise a number of threads, some of which carry native silver (white and black) even on their surface, and having, where picked at, given deposits of very solid metal. The expectation of a bonanza, or larger deposits, when they do strike the main vein in greater depth, seems therefore well justified.

The mineral country on this hill looks everywhere splendid; and more so still on the yet unexplored western portion of it, where all these lodes cross over to and others besides abound. The Socorro claim may therefore be looked upon as one of the most promising ones, if the granite formation should prove to favor the carrying of the native silver in equal rate with the diorite, in which they have heretofore been exclusively worked.

Besides these Mins

Already mentioned, there are yet, as I said before, a large number of such which hardly deserve that name, being rather mere holes and pickings on lodes; yet there can be no doubt that many of them would prove remunerative, if some capital should be spent upon them in a judicious way. Even if held at present by individuals, the most of this latter class could be acquired for a trifle.

Leaving now this native silver region, we find to the east of the town of Morelos, in a different geological formation, belonging under the same jurisdiction, in more or less distance from the center, a very large number of lodes, whose ores consist in argentiferous lead, fahl and copper ores, whose ley runs sometimes very high indeed.

Some of them, as for instance the mines of Zapote, were worked over a century ago, as the remains of large reduction works show, yet all knowledge of them has been lost. The same may be said of the old, abandoned mines of Loreto, to the north of Morelos, where the *gambuzinos* have extracted ores from some pillars and the rubbish piles that gave \$70 per ton. Very ancient mines we find to the west of Los Tajos, which have left very remarkable traces (even large cakes of very rich silver bullion in some of the tumbled-down furnaces) the mine of El Roserio, whose ore gives from \$300 to \$400 per ton, and to the southward the mines of La Higuera, with very rich fahl and copper ores.

In fact, wherever foot and eye turns to, we find the mountains full of rich metallic veins, yet neither enterprise nor capital to work them.

Australian Notes.

[From our Australian Correspondent.]

EDITORS PRESS:—The statistics in my first letter will have shown you that in Australasia, the colony of New South Wales is second in importance to Victoria only, and the head of its recent government has frequently declared his intention of placing it in its original position as the principal colony of the group by wise and judicious legislation, his opinion being that the protective proclivities of the people of Victoria will throw them behind in the race. However this may be it is quite certain that there is ample material for the fulfillment of his intention. The area of that colony being nearly four times as great as that of Victoria, and most of it of a valuable character. Large tracts of it make admirable pasturage. Equally large tracts are especially suitable for agricultural purposes, whilst minerals of all kinds abound from gold to iron, and from splendid coal to poor oil shale. Its climate, too, is salubrious, especially on the eastern coast, the delightful sea breezes from which, come up every afternoon after the hottest day. On this coast at the head of a magnificent harbor is its capital city, Sydney. Of the city itself I cannot speak very highly as its streets are for the

most part comparatively narrow and crooked. The houses, however, bear a more substantial appearance than those at Melbourne, being built of a free-tone which abounds in the vicinity, instead of the woad which is to be still found in the older and poorer buildings of the latter city.

The pastoral interest at present predominates, there being according to the latest statistics no fewer than 328,014 horses in that colony, besides 2,710,374 cattle, 19,228,590 sheep and 238,342 pigs, whilst there are only about 300,000 acres under cereal crops, and 155,000 acres under hay, potatoes, vines, etc. This, in conjunction with the gold, tin, and coal mining interests indicates a large amount of material prosperity for a population of but little over half a million.

The most exciting event in this colony since my last letter has been the downfall of one of the most popular governments that ever held office, and the unusual course pursued by the Governor afterwards—matters which have, I presume, no interest for your readers except to know that it has all taken place over the release of a notorious hushhanger named Gerdiner. The Governor, it appears, pardoned this murderous cutthroat on his own mere motion, on condition that he left the colony to pursue his pleasant avocation elsewhere. Against this proceeding the neighboring colonies, as well as a large section of the people of New South Wales, raised their voice, but in vain; and the Governor now has the chagrin to find his conduct publicly condemned by the colonial parliament, and obliged to send forth a mover of the hostile resolution to form a government.

Since last I wrote, a machine for reaping, gathering and binding has been patented in Victoria, the most noticeable feature in which is the automatic binding of the sheaf with string or cord. One end of the string is sown to a narrow strip of canvas (which the inventor calls a pad), and then straitened across the entrance of a sheaf box. The cut grain is then forced against the string into the box, and when full the other end of the band is sown to the pad, which is cut off the end of the canvas strip and the sheaf is allowed to fall gently on to the ground. The machine has not yet been tried in the field, but the inventor, a Mr. Thos. Harvey, of Preston, expresses himself as being confident of its success. When it is tried, I will let you know the result. E. W.

Melbourne, Feb. 8th.

Montana Mines—Miners Wanted More than Capitalists.

EDITORS PRESS:—The general topic of conversation in this section is concentrators, mills, smelters, and the long expected coming of those capitalists who are to pay immense sums of money for locations, and put up the necessary works for the reduction of the ores in the big bonanza. I believe our territorial papers, or at least the majority of them, Montana contains more wealth than any other Territory or State on the continent, and everything is going ahead ship-shape. About all the mines are showing well, rich ore is plenty and has been, the different companies all have very able superintendents, old and experienced miners. All the works for the reduction of ores are a perfect success, and nearly all are in the charge of Judge so-and-so, or Captain somebody, or Colonel somebody else (and by the way it is astonishing what a large number of those worthies emigrated to Montana); but, strange to say, the billion product don't tally with the accounts, and those capitalists seem to think there is a screw loose somewhere.

My opinion is that our papers unintentionally do the country great harm by publishing such glowing accounts. Outside capitalists would naturally suppose that experienced men, like those generally mentioned, working rich ore, would certainly make a better showing than has been made, they therefore conclude that the lodes are not what they are represented to be. I think Montana is more in want of miners than anything else.

The next success made by any mill or smelter as near as I can learn has been by a little four-stamp mill on the Big Prickly Pear. It started up under new management last spring; it was generally expected to do wonders. I went to see the proprietor in regard to the working of some ore, he said that he would not work anything but free milling ore, and that he would work none unless it would assay \$100 per ton, and in fact, he did not wish to work any unless it went \$150 per ton. A few bricks were turned out from this establishment during the summer, and it was forthwith proclaimed a grand success. Smelter after smelter has been built, but shortly closed down for repairs, but failed to start again, as the large number of ruins in the neighborhood of Jefferson City, Belleville and Clancy Creek attest, and the sad fate of the big Helena smelter.

When our people come to the conclusion to do more work, and talk less, things will change for the better (I don't mean a drive at everybody for there are exceptions), something will be developed worth the attention of capitalists, for I have good faith in the value of the mines.

Now, unquestionably, if our concentrator is put up that will concentrate, others will follow, and a new era will be entailed, for from as reliable information as can be gained and personal knowledge there is a large number of lodes that show quite large quantities of low grade ore near the surface. The work that has been done can only be classed as surface work.

SEABRO.

Unionville, Montana, Feb. 19th, 1875.

SCIENTIFIC PROGRESS.

What are Bacteria?

The great question of the origin of life seems to depend on the answer to the above question. Four answers, says the *Scientific American*, have been given to this question: Ehrenberg's, that they are animal organisms of the lowest grade having an individuality of their own; Hallier's, that they are of the nature of spores, produced from and destined to develop into some of the simpler microscopic fungi; Cohn's, that they represent the free-swimming stage in the existence of certain algae; Bastian's, that they are the first and most common developmental phase of newly evolved living matter, capable, either singly or in combination, of developing into many different kinds of living things.

Ehrenberg's view is quite obsolete. They are not animals, nor are all agreed that they are vegetables. For these and other doubtful organisms of the lowest rank, Haeckel has proposed a new kingdom—the *protista*, intermediate between connecting the animal and vegetable kingdoms, and from the modification of which both animals and plants have been derived. Barring the last clause, the proposition bids fair to be generally adopted, as it relates to a sort of no-man's land—a group of organisms in which animal and vegetable characteristics are so united that they cannot be classed with either animals or vegetables.

All that is positively known of the origin of these organisms is that they speedily make their appearance in all infusions of organic substances exposed to light and air, and under other conditions not so clearly understood. The smallest—usually globular—specks, ranging between a one-hundredth-thousandth and a one-twenty-thousandth of an inch in diameter, have been variously denominated monads, microzymes, and plastid particles. According to Bastian, who adopts the last name, they are merely temporary and initial forms of many organizations which may afterward present distinct characteristics of their own; though some of them, through default of necessary conditions, may never actually develop into higher modes of being. From those which do continue their development, he holds, bacteria and other forms, which others have thought specific, are produced by a direct process of growth and development. In size and character, these bacteria and others differ according to the degree of putrescibility of the solution in which they appear, the amount of heat to which it has been exposed and other modifying conditions. From this point of view a rigid specific classification is uncalled for and impossible.

According to Hallier's view the smallest living specks of living matter—he calls them micrococci—are minute particles of plasma or naked matter, produced by the repeated subdivision of the nuclei of fungus spores, or by the breaking up of the protoplasmic contents of the larger reproductive cells of certain fungi. When introduced into a fluid capable of undergoing alcoholic fermentation, these micrococci, he says, develop into cryptococci, bodies resembling ordinary yeast cells; in an acid fluid, or one which becomes acid through fermentation, the micrococci assume the elongated forms commonly called bacteria, but which he calls anthrocoeci. The first and the last named multiply by fission, while the cryptococci increase by a process of budding. By an elongated growth the anthrocoeci are described as developing into distinct fungi of the oidium type.

Thus, determined by the nature of the fluid in which they grow, micrococci are said to develop either at once into *torula* cells, from which a perfect fungus may result, or into *bacteria*, which develop into segmented filaments, and then into distinct fungi of a different type. The various fungi so developed are supposed by Hallier to be capable of reproducing micrococci, as already described, and so completing the circle of life; an hypothesis which seems to have no other foundation than a desire to escape the necessity of admitting the origin of micrococci *de novo*.

These minute organisms are thought by many to be the cause of those contagious diseases which are "endemic," or peculiar to peoples or locations. Whether they are really responsible for the various maladies attributed to them is a question which involves too many considerations to be discussed in this connection.

SULPHUR AS A FIRE EXTINGUISHER.—M. Teller suggests the use of sulphur as a means of extinguishing fire on board ship. The material when burning in the air, as is well known, generates sulphurous acid, in which flame is not sustained. M. Teller proposes to cover wicks with the sulphur, and to let them down into the burning portion of the vessel through holes in the deck. Sixty-six pounds of sulphur ignited will entirely absorb the oxygen in 3,360 cubic feet of air; but as only half the oxygen need be removed in order to render the atmosphere unfit to support the combustion, thirty-three pounds are sufficient for the volume mentioned.

NATURE is the only workman to whom no material is worthless, the only chemist in whose laboratory there are no waste products, and the only artist whose compositions are infinitely varied, and whose fertility of invention is inexhaustible.

THE WISDOM OF THE EGYPTIANS.—Philologists, astronomers, chemists, painters, architects, and physicians must return to Egypt to learn the origin of writing—a knowledge of the calendar and the solar motion—of the art of cutting granite with a copper chisel, and of giving elasticity to a copper sword—of making glass of the variegated hues of the rainbow—of moving single blocks of polished granite 900 tons in weight, for any distance by land or water—of building arches round and pointed, with masonic precision unsurpassed at the present day, and antedated by two thousand years to the Cloaca Magna of Rome—of sculpturing a Doric column one thousand years before the Dorians are known in history—of fresco painting in imperishable colors—and of practical knowledge in masonry. And it is no less clear that every craftsman can behold on Egyptian monuments the progress of his art four thousand years ago, whether it be a wheelwright building his chariot, a shoemaker drawing his twine, a leather-cutter using that selfsame form of knife which is considered the best form now, or a weaver throwing the same hand shuttle.

A New Re-Action of Essence of Mint.

Dr. Roncher has observed that when essence of mint is added to twenty times its weight of acetic acid, and the two agitated, a blue coloration gradually increasing in intensity begins to develop in about half an hour. As the color deepens, a very marked dichroism is noticed, the liquid appearing pure blue by transmitted light, and a beautiful cinnabar red color by reflected light. This appearance is comparable to that of alcoholic solutions of certain aniline compounds.

The coloration thus produced is not permanent. Under the influence of light it changes first to green, afterwards to yellow. The addition of water is followed by the separation of a very pale blue scintillating liquid. On filtering, part of the blue coloring matter remains on the paper; this speedily changes to red, and is finally decolorized by the air. Caustic potash causes instant decolorization.

The essence of mint employed was that usually met with in commerce. Dr. Roncher has examined other essences of known and diverse origin with a view to ascertain if they reacted in the same manner and to the same degree. He found that pure menthol dissolved in acetic acid without production of color. Essence of turpentine, camphor and essence of citron do not give rise to this appearance. —*Chemist and Druggist*.

OXYGEN IN HYDROGEN.—Hydrogen gas, whether prepared by electrolysis, or by the decomposition of water with the aid of zinc and sulphuric acid, contains an appreciable amount of oxygen. In fact, it would appear that it is almost impossible to free it entirely from this admixture, such is the eagerness with which hydrogen seizes upon oxygen, whether atmospheric or contained in solution in water. No definite compound is formed, but simply a mechanical mixture, in which the properties of both constituents remain unmasked. Professor Grove first noticed this peculiar property of hydrogen while experimenting on the contraction sustained by different gases after ignition and subsequent cooling. He found that the contraction, in the case of hydrogen, sometimes amounted to one-tenth of the original volume. He found, on examination, that this was due to the oxygen held in suspension by the hydrogen, and which the latter obtained by passing through water.

NEW MICROSCOPIC TELESCOPE.—Mr. C. B. Boyle recently exhibited before the photographic section of the American Institute, in this city, a new optical instrument, which he called the microscopic telescope. It consisted of two parallel telescopes, about three feet in length and two inches in aperture, connected with hinges and separated to the distance of the eyes by an adjusting screw. In order to produce the effect of the microscope, he places before the object glass prismatic lenses of about three feet focus, so that when these lenses are in position, an object three feet in front of the object glass will be seen with both eyes distinctly, and magnified according to the power of the eye piece.

AN EXPERIMENT WITH SILVER.—Böttger offers the following experiment to show the formation of binoxide of silver and metallic silver by electrolysis. A concentrated solution of nitrate of silver is put in a wide glass cylinder, and two platinum wires, forming the poles of a galvanic battery, are placed in the solution in a vertical position, about three inches apart. Beneath the anode is placed a small watch-glass, and the current from two Bunsen cells started. In a few minutes brilliant needles of binoxide of silver appear on the anode, and becoming too heavy to remain unsupported, fall on the watch-glass beneath. On the cathode an equivalent quantity of pure metallic silver collects in snow-white dendritic ramifications.

CLOUD OBSERVATIONS.—The Signal Service observer, on the summit of Pike's Peak reports that the local storms there experienced originated over the parks to the westward on hot afternoons. On one occasion he was favored with an excellent view of the exterior structure of the clouds of a tornado, when he observed that while the cloud-bearing currents of air float toward the center they had a decided downward movement, but that masses of smoke-like vapor rapidly ascended through the interior funnel.

MECHANICAL PROGRESS.

Aluminum—Its Use and Preparation.

It is now about seventeen years since Deville first produced aluminum on a commercial scale; but thus far the cost and not the lack of desirable qualities seems to have prevented it from obtaining any very extensive application to useful purposes. The cost of its preparation, however, has been gradually reduced, until there is now a reasonable expectation that it will soon be placed at so moderate a price as to greatly increase the demand for it.

It Possesses Many Advantages

Over brass, silver, nickel and steel, and combines all their qualities without their objectionable weight, and a simple statement of its various recommendations to instrument makers will be all that is needed to make it known as theoretically the metal for the purpose.

Its lustre is bluish white.

It is non-magnetic and therefore will not deflect a needle by its presence.

It can be electro-deposited.

It neither rusts nor tarnishes so readily as brass, unless when in very thin sheets.

It is not acted upon by the air or water at common temperatures, damp air slowly tarnishing it. When intensely heated in a current of air it suffers only slight oxidation, heated to redness in an atmosphere of steam it slowly oxidizes.

It is readily acted upon by hydrochloric acid which evolves hydrogen and forms chloride of aluminum. Sulphuric and nitric acids do not affect it at common temperatures, but when boiled in the latter oxidizes as long as heat is maintained. Boiling in acetic acid does not affect it. Concentrated alkaline solutions slowly oxidize it and hydrogen is liberated. It is not affected by sulphur or sulphuretted hydrogen, or by solution of the alkaline sulphides.

The alloys with other metals are too brittle to be made use of for the purpose of this article.

Atomic weight 27.5; specific gravity 2.67 when rolled, when cast, 2.56.

It is more malleable than tin, platinum, lead, zinc or iron, being next to copper, and less malleable than gold or silver.

Next to copper it is more ductile than zinc, tin and lead, and less ductile than gold, silver, iron and platinum. Its fusibility is at a point little less than that of silver.

It can be worked into any shape, and there are no deleterious effects arising from working in it, or using it when manufactured into vessels for cooking purposes.

We are conversant with facts of poisoning by cooking vessels made of copper, by glazings containing lead, and the formation of verdigris on spoons of alloyed silver; but if people were only determined to produce these utensils from aluminum, all danger from poisoning would be removed, and we would have vessels, the appearance and durability of which would leave scarcely anything to desire. They would be more convenient to handle than our light crockery ware, for they can be made as light, and what is important, cannot be broken.

Splendid pitchers, plates, lamps, goblets, etc., might be manufactured from deaened and embossed aluminum; and the lightness of spoons of this metal would make them more convenient than those of silver now in use. In this case it is not the price, but only prejudice, which presents itself as a drawback, for the price is only half of that of good silver; besides, the difference in the specific weight of both metals and the consequent cheapness in the use of aluminum are so great that, for the value of one silver spoon, at least seven equally large aluminum spoons might be bought.

True, aluminum is neither a rare nor a noble metal, but it possesses, nevertheless, advantages over alloyed silver which gives it a much finer appearance; it does not get black, nor does it form verdigris, and what it lacks in brilliancy and appearance is well compensated for in its agreeable lightness. But, unfortunately, it has been found impossible to plate aluminum, either by the electro-galvanic or the foil method.

It is largely manufactured in England and France, there being a large factory at Newcastle. New methods are being discovered for obtaining it from kaolin or clay, inexpensively, and considering that it combines the ductility and malleability of copper, with vastly more than the strength of steel (it is placed by some as thirteen times stronger) with the lightness of chalk, it certainly should take the place of metals less adapted to purposes where strength, lightness and bulk are desiderata, as is indisputably the case in the manufacture of fine instruments for engineering field use, where weight is an objection and increased size within certain limits desirable.

The ordinary transit, weighing eleven pounds, may be made of aluminum to weigh three pounds without decreasing its size or increasing its cost, or the arcs may be made five times as large under the same weight.

The latest new phase in its manufacture is that employed by Gernesi, of London, who prepares this metal by placing a mixture of 100 parts of alumina, obtained in the usual way from kaolin, etc., with 40 parts of charcoal, heated to redness, in retorts at a dark red heat, and leading chlorine into them from

an iron gasometer lined with lead, and closed with gas tar covered with hydrochloric acid. The volatilized chloride of aluminum formed is condensed in vessels of sheet iron, glazed internally, and is decomposed by an electrical current produced by a magneto-electric machine. The liberated chloride is returned to the gasometer.

The present cost of aluminum is a little less than one-half that of silver.

To Form Perfect Squares.

Squares can be tested with the dividers by drawing two circles, one within the other, from the same center, of 16 and 12 inches diameter respectively; then set the dividers to 10 inches, insert one point in any part of the outer circle, and mark the point exactly where a circle (drawn with the dividers in this position) would intersect the inner circle; now draw a straight line through the center of the circles and through the point marked in the inner circle; and through the outer one, another line starting from the point where the dividers were inserted in the outer circle through the center of the circles, until the outer circle is reached. If this is done exactly, the points where these lines intersect the outer circle will form the corners of a perfect square whose side is 11.337 inches. If the square is correct, it will fit the square thus formed and also the lines in the center, which divide the circle into four equal parts, and the angles must be 90 degrees. This is based on the rule for finding the hypotenuse of a right angled triangle, thus 6 square=36 and 8 square=64, sum 100, the square root of which is 10. This is sometimes called the 6, 8 and 10 rule for squaring buildings.—*Ex.*

IRON AND ITS USES IN BUILDING.—The use of iron as a building material has, of late years, increased so rapidly, especially in works of magnitude and importance, in consequence of the many facilities and plans by which it can be manufactured into almost any required form, and the almost unlimited strength it possesses if wisely treated and properly applied. Yet, notwithstanding the enormous amount of iron construction that architects see constantly employed in all directions by engineers, it would appear that very few of them deem it worth while to learn much about its capabilities, usefulness and qualities as a building material. Architects occasionally use iron in columns and girders, but they make but little effort to extend its use so that it might take the place of such material as have been used from time immemorial, and with which they are better acquainted, such as brick, stone or wood. Whenever any very large building is erected, the whole credit of the design and execution is carried off by an engineer, although perhaps an architect may be called in to assist in the decorative features. This state of things will continue so long as architects are contented to take all their knowledge of iron construction at second hand from the engineers. It is, however, a matter of serious consideration whether the architectural profession should be satisfied by simply endeavoring to imitate the styles and modes of building employed in former ages, rather than attempt to keep up with the rapid advance of the present age, and meet its requirements by adopting the use of a material of which our ancestors had but very limited knowledge.—*Ex.*

DISTRIBUTION OF STEAM.—M. A. Van Waeyenbergh has invented a new arrangement for preventing the dangerous irregularities which occur in steam cylinders; he adopts two or more escapes and sets of slides, placed on different sides of the cylinder, and so arranged that they are all connected with the extremity of the cylinder by the same passage. He admits the steam and governs its introduction directly by the regulator according to the work to be done. With this object the arbor of the levers which command the valve slides forms part of a sliding sector which is furnished with clickwork, rendering it at any determined moment independent of the slides and transmission rods. When this occurs, the steamway, which was open, closes instantaneously, and the inlet being suppressed, the steam acts by expansion in the cylinder until the piston has reached the end of its stroke. The discharge port then opens and the steam passes into another cylinder, into the condenser, or into the air, according to the circumstances of the case.—*London Engineering Times*.

CONDENSATION IN STEAM CYLINDERS.—By the use of lead facings to pistons and cylinder lids, a considerable economy in the use of steam may be effected. An iron lid and piston will, other things being equal, condense more than three times as much steam as a lead faced piston and lid. The thickness of metal heated and cooled at each stroke is not considerable, and not far into the metal a zone of constant temperature, lower than that of steam, will be found. The distance from the zone to the inside of the cylinder will depend upon the conducting power of the metal, and will be about 9 for lead to 12 for iron. It may be shown that, in any case, the thickness of lead facing may be kept within very moderate limits. Other materials may be used for the same purpose, as for instance, tin, the specific heat of which is 0.562, its specific weight being less than that of iron. Its conducting power, however, is in excess of that of iron, being as 15 to 12.—*Engineer*.

A SALT LAKE mechanic is perfecting a fast printing machine, which he claims will surpass in speed any press yet invented, and work a revolution in the printing business.

Industrial Items.

ABOUT two years ago a steamer was constructed at Stockton for Russian merchants doing business at Nicolaefski, who desired her for use on the Amoor river. The steamer gave such satisfaction that orders for two more steamers of the stern wheel style were received by her builders. The new steamers have been built in sections for convenience in transportation. Each is 135 feet long, 70 feet beam and 5 feet depth of hold.

MARBLE from the Tuolumne quarries is attracting considerable attention. A Stockton paper mentions having seen four large slabs at the depot there a few days since, which weighed about ten tons, en route to San Francisco. The quality of the marble seemed as pure white as the Venetian, with a small speck or fluke of black throughout.

A CORRESPONDENT of the *Tulare Times* advocates the building of a canal for irrigation and transportation on the west side of the San Joaquin river, and furthermore that it should be done at the expense of and owned and controlled by the State, or if that is not feasible then incorporate a company and seek State or National aid.

SHIP building on the Pacific Coast promises to take a new impetus from this recent action of the Board of Underwriters, who propose to rate vessels built of Puget Sound fir, under certain specifications, as A. 1. The specifications in detail are being prepared, and will be made public in a few days.

Of the exports from San Diego during the past year we note, from the report of the President of Chamber of Commerce, the following: wool, 1,000,000 lbs., honey, 400,000 lbs., wheat (raised), 200,000 lbs., of which latter product the first cargo was recently shipped direct to Europe.

Two French gentlemen, from San Francisco, have been examining a large tract of land above the junction of the Gila and Colorado rivers, with a view of settling a French colony thereon. They expect 100 families to arrive soon and make a commencement.

Four coal banks are in operation near Empire City. Each mine employs about 75 men. Fifty tons are daily taken out of each mine. The coal is extensive and of good quality; most of it is shipped to San Francisco.

THE two foundries and two planing mills in Santa Cruz are busy turning out machinery and doing work for the two railroads now being constructed into town.

THE *Lukenport Bee* says: "Such is the increase of our incoming population that it is utterly out of the question to find a dwelling to rent."

THE *Stockton Independent* urges the erection of suitable buildings for storing, and the establishment of a wool-grading institution in that city.

THEY are at work upon a number of threshing machine engine at the Vallejo foundry.

MR. DALTON, of Pacheco, intends moving his foundry to Oakland.

THREE good sized sailing vessels will be built at Coos Bay this season.

A grist mill is being erected at Westminster, Los Angeles county.

A NEW saw mill has been started in Tehachepi.

Sales at the S. F. Stock Exchange.

Last Week. This Week.

THURSDAY, MARCH 18. THURSDAY, MARCH 25.

MORNING SESSION. MORNING SESSION.

100 Alameda.....	117 1/2	210 Alpha.....	19
100 Best & Belcher.....	51 1/2	210 Best & Belcher.....	51 1/2
100 B. C. H. Co.....	34	100 B. C. H. Co.....	34
75 Baltimore.....	34	75 Baltimore.....	34
270 B. N. Co.....	35 1/2	270 B. N. Co.....	35 1/2
1270 California.....	52 1/2	1270 California.....	52 1/2
100 Calaveras.....	34	100 Calaveras.....	34
250 Chollar.....	51 1/2	250 Chollar.....	51 1/2
363 Crown Point.....	23 1/2	363 Crown Point.....	23 1/2
100 C. P. Co.....	15 1/2	100 C. P. Co.....	15 1/2
140 Con Virginia.....	42 1/2	140 Con Virginia.....	42 1/2
125 D. N. Co.....	14	125 D. N. Co.....	14
765 Dayton.....	2 1/2	765 Dayton.....	2 1/2
100 Empire Mill.....	5 1/2	100 Empire Mill.....	5 1/2
250 Exchequer.....	34	250 Exchequer.....	34
200 Globe.....	14 1/2	200 Globe.....	14 1/2
80 Gould & Curry.....	12 1/2	80 Gould & Curry.....	12 1/2
25 Hale & Norcross.....	34	25 Hale & Norcross.....	34
1340 Imperial.....	12 1/2	1340 Imperial.....	12 1/2
170 Justice.....	6 1/2	170 Justice.....	6 1/2
240 Julia.....	6 1/2	240 Julia.....	6 1/2
150 Kentuck.....	12 1/2	150 Kentuck.....	12 1/2
120 Knickerbocker.....	12 1/2	120 Knickerbocker.....	12 1/2
500 Lady Bryan.....	6 1/2	500 Lady Bryan.....	6 1/2
225 Mexican.....	24 1/2	225 Mexican.....	24 1/2
415 Uphr.....	4 1/2	415 Uphr.....	4 1/2
200 Overman.....	34 1/2	200 Overman.....	34 1/2
1500 Rock Island.....	34	1500 Rock Island.....	34
515 Silver Hill.....	6 1/2	515 Silver Hill.....	6 1/2
1875 Sierra Nevada.....	11 1/2	1875 Sierra Nevada.....	11 1/2
20 Savage.....	11 1/2	20 Savage.....	11 1/2
853 Union Con.....	16 1/2	853 Union Con.....	16 1/2
100 Utah.....	14 1/2	100 Utah.....	14 1/2
425 Yellow Jacket.....	14 1/2	425 Yellow Jacket.....	14 1/2

AFTERNOON SESSION.

225 American Flag.....	34 1/2	225 American Flag.....	34 1/2
400 Andes.....	6 1/2	400 Andes.....	6 1/2
240 Belmont.....	34 1/2	240 Belmont.....	34 1/2
550 Comopolis.....	34 1/2	550 Comopolis.....	34 1/2
50 Dardanelles.....	34 1/2	50 Dardanelles.....	34 1/2
350 Eureka Con.....	14 1/2	350 Eureka Con.....	14 1/2
50 Eureka Y.....	34 1/2	50 Eureka Y.....	34 1/2
100 Golden Ore.....	34 1/2	100 Golden Ore.....	34 1/2
370 Independent.....	34 1/2	370 Independent.....	34 1/2
100 Ind.....	34 1/2	100 Ind.....	34 1/2
90 Kosuth.....	34 1/2	90 Kosuth.....	34 1/2
1250 Meadow Valley.....	34 1/2	1250 Meadow Valley.....	34 1/2
130 Mahogany.....	34 1/2	130 Mahogany.....	34 1/2
200 Niagara.....	34 1/2	200 Niagara.....	34 1/2
855 New York.....	24 1/2	855 New York.....	24 1/2
250 Original Gold Hill.....	14 1/2	250 Original Gold Hill.....	14 1/2
50 Proctor.....	34 1/2	50 Proctor.....	34 1/2
700 Piche.....	34 1/2	700 Piche.....	34 1/2
100 Prussian.....	34 1/2	100 Prussian.....	34 1/2
200 Puerco.....	34 1/2	200 Puerco.....	34 1/2
100 S. Island.....	34 1/2	100 S. Island.....	34 1/2
330 South Charlotte.....	34 1/2	330 South Charlotte.....	34 1/2
50 Rye Patch.....	34 1/2	50 Rye Patch.....	34 1/2
460 War Eagle.....	34 1/2	460 War Eagle.....	34 1/2
800 Woodville.....	34 1/2	800 Woodville.....	34 1/2
200 Wash & Croile.....	34 1/2	200 Wash & Croile.....	34 1/2

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Rate.	Secretary.	Place of Business.
Andes S M Co	Washoe	4 1 50	Feb 25	Mar 29	M Lenders	507 Montgomery st
Adams Hill Cone M Co	Eureka Nev	6 5 15	Feb 16	Mar 21	W W Taylor	408 California st
Alpine S M Co	Ely District	8 7 5	Feb 12	Mar 12	C D Quire	Cor 10 California st
Alpine Flat M Co	Washoe	5 2 00	Feb 8	Mar 15	O A Sankey	231 Montgomery st
Atlantic & Pacific Cone M Co	Cal	10 5 5	Mar 9	Apr 14	A Noel	419 California st
Bacon M & M Co	Washoe	3 50	Mar 9	Apr 12	Edward May	419 California st
Bellevue M Co	Cal	1 50	Feb 17	Mar 23	D F Verdenal	409 California st
Buckeye G & S M Co	Washoe	13 50	Mar 4	Apr 10	O H Sankey	231 Montgomery st
Caledonia S M Co	Washoe	11 3 00	Mar 9	Apr 13	K Wegener	414 California st
Chariot Mill & M Co	San Diego Cal	2 30	Feb 17	Mar 22	F Swift	419 California st
Cherry Creek M & M Co	Nevada	2 35	Feb 17	Mar 22	D F Verdenal	409 California st
Cooper Bay Iron Coal Co	Oregon	1 1 00	Feb 5	Mar 10	T P Beach	424 Montgomery st
Crown Point R G & S M Co	Washoe	2 50	Mar 12	Apr 12	J M Buffington	Merchants' Ex
Danney G & S M Co	Washoe	13 50	Mar 22	Apr 28	Geo R Spinoey	302 California st
Danville M Co	Washoe	1 1 00	Feb 17	Mar 22	W E Duval	402 Montgomery st
Dayton G & S M Co	Washoe	2 1 00	Feb 16	Mar 23	W E Dean	419 California st
El Dorado Water & D G M Co	Cal	8 10 00	Feb 16	Mar 19	H Elias	416 Montgomery st
Globe Cons M Co	Washoe	5 5 00	Feb 18	Mar 22	J Maguire	419 California st
Golden Chariot M Co	Idaho	13 2 00	Mar 3	Apr 12	E P Stern	41 Market st
Ida Elmore M Co	Idaho	16 1 00	Feb 1	Mar 8	W Willis	419 California st
Imperial S M Co	Washoe	21 1 00	Feb 10	Mar 17	W E Dean	419 California st
Independent G M Co	Cal	1 50	Feb 10	Mar 19	Geo Wirmes	240 Montgomery st
Julia G & S M Co	Washoe	21 2 00	Feb 12	Mar 13	A Noel	419 California st
Justice M Co	Washoe	14 3 00	Mar 18	Apr 20	J S Kennedy	Merchants' Ex
Kosuth M Co	Washoe	3 50	Mar 18	Apr 21	T D Derby	419 California st
Knickerbocker M Co	Washoe	8 50	Mar 18	Apr 19	Frank Swift	419 California st
Mammoth Silver M Co	Nevada	18 1 00	Feb 25	Apr 13	D A Jennings	401 California st
Meadow Valley M Co	Ely District	8 1 00	Feb 11	Mar 22	J W Colburn	419 California st
Mexico S M Co	Nevada	1 50	Mar 16	Apr 13	W R Hopkins	419 California st
Monitor Belmont M Co	Nevada	18 1 00	Feb 25	Apr 13	W Willis	419 California st
Newark S M Co	Ely District	18 1 00	Feb 10	Mar 20	H C Kibbe	419 California st
New York M Co	Washoe	3 50	Feb 16	Mar 23	T D Derby	419 California st
North Bloomfield G M Co	Cal	1 50	Feb 3	Mar 12	Geo D Edwards	414 California st
Orman S M Co	Washoe	31 3 00	Mar 16	Apr 20	W R Townsend	330 Pine st
Phil Sheridan G & S M Co	Washoe	2 75	Jan 21	Mar 20	S Phillips	408 California st
Pitoe M Co	Washoe	7 25	Mar 2	Apr 3	T L Vengall	419 California st
Star King M Co	Idaho	6 50	Feb 1	Mar 9	W Willis	419 California st
Red Jacket M Co	Idaho	6 50	Feb 1	Mar 9	J W Clark	419 California st
Rock Island G & S M Co	Washoe	7 1 00	Mar 11	Apr 15	E B Holme	18 Stevedore Bldg
Savage M Co	Washoe	17 5 00	Feb 19	Mar 24	J F Stern	419 California st
Silver Hill M Co	Idaho	8 5 00	Mar 27	Apr 1	Frank Swift	419 California st
Silver Cord M Co	Idaho	8 5 00	Mar 27	Apr 1	W E Dean	419 California st
Silver Hill M Co	Washoe	5 2 00	Feb 16	Mar 19	D F Verdenal	409 California st
St Patrick G M Co	Cal	10 5 00	Feb 2	Mar 8	W R King	431 California st
Starr King M Co	Washoe	10 25	Feb 15	Mar 12	Wm H Watson	302 Montgomery st
Spruce M Co	Washoe	10 25	Feb 15	Mar 12	D A Jennings	401 California st
Victoria & Imperial T & M Co	Utah	4 15	Feb 26	Apr 27	F D Cleary	Merchants' Ex
Ward Beecher Cons M & M Co	Nevada	4 30	Feb 27	Apr 8	C A Sankey	331 Montgomery st
Ward Elsie S M Co	Nevada	4 30	Feb 27	Apr 8		
Washington & Croile M Co	Ely District	14 1 00	Feb 18	Mar 23		
Wells Fargo M Co	Washoe	1 1 00	Mar 17	Apr 21		

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Alhambra G M Co	Cal	1 5	Mar 21	Apr 26	R Von Pfister	Merchants' Ex
Alpine G M & M Co	Cal	1 25	Feb 11	Mar 12	J F Lighner	431 California st
Arizona & Utah M Co	Washoe	12 75	Mar 18	Apr 22	J Maguire	419 California st
Cascade Blue Gravel M Co	Cal	2 10	Mar 8	Apr 13	J M Buffington	Merchants' Ex
Cedarberg G M Co	Cal	3 50	Mar 8	Apr 13	D M Bokes	215 Sansome st
Cheney F M Co	Mexico	3 50	Mar 5	Apr 10	W R Townsend	330 Pine st
Cincinnati G & S M Co	Cal	4 10	Mar 10	Apr 25	Wm Small	531 California st
Edith Q M Co	Cal	3 30	Mar 10	Apr 22	Wm Stuart	113 Liedesdorff et
El Dorado State Co	Cal	1 15	Mar 10	Apr 22	Hugh Elias	416 Montgomery st
Empire Hill Cons M Co	Cal	1 15	Mar 10	Apr 22	G J Cole	302 Montgomery st
Enterprise Cons M Co	Cal	1 25	Mar 10	Apr 22	F J Hermann	418 Kearny st
Excelsior Q M Co	Cal	1 25	Mar 10	Apr 22	R Von Pfister	Merchants' Ex
Excelsior S M Co	Cal	1 25	Mar 10	Apr 22	R Von Pfister	Merchants' Ex
Geneva Cons S M Co	Nevada	6 25	Jan 2	Mar 3	I T Miliken	302 Montgomery st
Geyser Q S M Co	Cal	1 50	Mar 15	Apr 23	Ford H Rogers	Academy Bldg
Gold Mountain G M Co	Bear valley Cal	4 1 00	Jan 25	Mar 6	J B Waller	518 California st
Golden Crown M Co	Idaho	1 10	Feb 1	Mar 1	Dani Elmer	14 Stevedore Bldg
Home G M Co	Nevada Cal	1 50	Feb 13	Mar 24	E J Hermann	418 Kearny st
Imperial S M Co	Washoe	21 1 00	Feb 10	Mar 17	W E Dean	419 California st
Independence Cons M Co	Cal	2 50	Feb 4	Mar 18	F J Hermann	418 Kearny st
International Gold M Co	Cal	1 25	Mar 2	Apr 6	J M Buffington	Merchants' Ex
Kentucky G & S M Co	Washoe	8 15	Mar 18	Apr 23	R Oldsmith	101 Sansome st
Kincaid Flat M Co	Cal	5 60	Feb 4	Mar 19	R J Cornhill	210 Battery st
Lead County Q S M Co	Cal	5 10	Mar 5	Apr 15	A Baird	316 California st
Lead County M Co	Cal	2 50	Mar 6	Apr 12	S H Smith	Non-Commer
Mariposa L & M Co	Cal	1 1 00	Mar 10	Apr 14	L Leavitt	401 California st
North Fork M Co	Cal	8 25	Jan 23	Mar 12	A Martin	520 Washington st
North Fork Cons M Co	Washoe	12 50	Feb 16	Mar 23	H O Kibbe	419 California st
Occidental M Co	Cal	3 50	Feb 2	Mar 9	A C Deubrow	Merchants' Ex
Orleans M Co	Cal	3 1 00	Mar 16	Apr 21	J F Nesmith	315 California st
Pauper M Co	Idaho	4 75	Mar 4	Apr 10	W F Bryant	402 Montgomery st
Phoenix Tunnel & M Co	Utah	1 10	Mar 3	Apr 14	Archibald	Merchants' Ex
Rocky Bar M Co	Cal	1 10	Mar 3	Apr 14	J P Cavallier	613 California st
San Jose M Co	Exan Canon	6 5 00	Jan 27	Mar 8	A Carrigan	109 Front st
Silver Cloud G & S M Co	Cal	25	Feb 8	Mar 15	A Enghart	71 New Monty st
Silver Spring M Co	Cal	5 1 00	Feb 7	Mar 12	John Winger	218 California st
Table Mt Alpha M Co	Cal	6 1 10	Feb 5	Mar 15	T F Croise	433 California st
Therava M Co	Cal	20	Feb 13	Mar 14	B F H Keon	408 California st
Tuolumne Hydraulic M Co	Cal	2 40	Mar 19	Apr 17	I T Miliken	302 Montgomery st
Utah S M Co	Washoe	2 40	Mar 19	Apr 17	E J Deane	419 California st
Weaverville D & H M Co	Cal	50	Feb 28	Mar 29	F H Rogers	330 Pine st
Webfoot M Co	Elko Co Nev	25	Jan 23	Mar 3	D A Jennings	401 California st

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Andes S M Co		Called by Trustees	507 Montgomery st	Special	Apr 5
Baltimore Cons M Co		Called by Trustees	330 Montgomery st	Special	Apr 6
Belcher Hill Q M Co		Called by Trustees	18 First st	Special	Apr 6
Franklin M Co	Washoe	Wm H Watson	302 Montgomery st	Annual	Mar 28
Globe Cons M Co	Washoe	Called by Trustees	419 California st	Special	Apr 8
Golden Chariot M Co	Idaho	Called by Trustees	Merchants' Ex	Special	Apr 20
Justice M Co	Washoe	W R Townsend	Academy Bldg	Annual	Apr 6
Lady Washington M Co	Washoe	H O Kibbe	419 California st	Annual	Apr 5
Mint G & S M Co	Washoe	A H Jennings	401 California st	Annual	Mar 30
Woodside M & M Co	Washoe	J Glassman	335 Montgomery st	Annual	Mar 31

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M. Co.	Washoe.	H. C. Kibbe.	419 California st	3 00	Jan 11
Black Bear Quartz	Cal	W. H. Oliver	419 California st	25	Mar 17
Chariot M. & M. Co.	Cal	Frank Swift	419 California st	40	Nov 16
Cons Virginia M Co	Washoe	Charles R. Fieh	401 California st	10 00	Mar 11
Crown Point M Co	Washoe	C E Elliott	414 California st	20	Jan 11
Diana M. Co	Nev	N. L. Pascoe	229 Clay St	1 00	Jan 21
Eureka Consolidated M Co	Nev	W W Traylor	419 California st	50	Mar 11
Rye Patch M Co	Nevada	D F Verdenal	409 California st	50	Mar 11

flasks, and the clean-up of this week will give at least twenty-five. Ores have been found along the entire length of the claim—3,200 ft—and it is said by mining experts to be one of the richest and largest mines in the State. The Buckeye is not turning out as much as the Abbott, but it is a good mine. There are other mines in the neighborhood that would have been worked this spring, had the price of quicksilver remained where it was six weeks ago; but the bottom has seemed to drop out of the market, and there will be but little work done on new mines.

EL DORADO.

FINE YIELD.—*Mountain Democrat*, March 20: Gross has made a run at his quartz mill on Big Canyon. It is a five-stamp mill and requires but one man to attend. It crushes six tons per day of twenty-four hours. Their late run consisted of twenty-five tons. It yielded within a small fraction of \$2,000, or \$80 per ton. Not had for a beginning, certainly.

INYO.

RAPID PROGRESS.—*Panamint News*, March 18: The work on the S. V. M. & W. Co.'s 20-stamp mill is progressing very rapidly. The frame for the boiler and engine room, which is built from the best of sawed timbers banded here from Spadra is already erected, and carpenters are now putting on the siding. Capt. Bell has a good force of men at work, and he thinks in four weeks time he can have all the buildings completed and a large portion of the machinery in position. He has sent for more carpenters and millwrights to hurry the work along. Good mechanics can find employment for some time to come at good wages—\$6 a day. There will not be any demand for men on the mines until the mill is about completed, as the company have already a large amount of ore on their dumps.

NAPA.

OAT HILL DISTRICT.—*St. Helena Star*, March 18: We hear very favorable accounts from the mining claims situated in the Oat Hill mining district, being a little north of the Phoenix mine, and judging from the information we received are sure that some of them are certain to become very valuable shortly. The Mercury, owned by Roberts & Co., still keeps up its reputation as one of the best claims in the district; as an evidence of the richness of the ore extracted from this mine, we are assured on good authority that one man with three quicksilver flasks for reducing apparatus, has extracted one hundred and fifty-five pounds of quicksilver during the last two weeks; they are putting up a small retort and expect to commence reducing during the present week. They have plenty of metal on hand, and plenty more in sight in all their workings. The Enreka company are hard at work developing their property, they have fifteen or twenty tons of good ore on hand and have good metal showing in four of their workings; they propose commencing to reduce their ore shortly, but at present are running a tunnel to cut a seam discovered in their upper workings; they have already run about 100 ft and have found encouraging indications of the proximity of a large body of metals as in the bottom of their tunnel; they cut what appeared to be the crown of the ledge twelve ft in width, every inch of which was good paying ore. The Berryessa company are running a tunnel to tap their ledge, and from time to time cut through small seams or stringers of exceedingly rich ore. The Edna Mabel Consolidated, Oak Knoll, Oceola and several other companies are hard at work with encouraging prospects of reaping a rich reward for their labors.

NEVADA.

WHEEL BETSEY.—*Foothill Tidings*, March 20: This mine is being steadily worked, six men making good progress in the shaft, now down over 100 ft. The hoisting machinery has been at work some time and the pump will be started as soon as the shaft gets below the old drain tunnel. The present owners of Wheel Betsey, under Superintendent Smith, seem determined to retrieve her ancient reputation as a paying mine.

THE GOLD TRAP.—*Nevada Transcript*, March 23: We yesterday saw a ball of amalgam taken from the "gold trap" which has been in operation at the Gold Tunnel mine for the past week or more, and the size of it proves the amount of gold that annually goes to waste, notwithstanding the improved machinery in use. The owner of the trap will also put one up on the flume of the Manzanita mine, and demonstrate the amount that escapes there. We shall, the next time a clean up is made on the trap, give the particulars. From the present clean up it is impossible to tell exactly what has been accomplished, because the whole machine had to become charged, and the amalgam consequently had more or less copper in it. The next time something definite can be given. Enough is already shown to prove that gold is wasted with present machinery, and that the "gold trap" will save it if used.

PITTSBURG MINE.—We learn from Treasurer Sanford that the Pittsburg mine, located at Deadman's Flat, is looking splendidly. New hoisting works have been erected and are now in operation. The shaft is now 104 feet deep. The ledge in the bottom of the drift is three feet wide. Ten loads of quartz were crashed about a week ago at Larimer's mill, which paid \$63 in free gold, and there was a ton of sulphurets saved, which is supposed to be worth \$140 to \$170. The mine has paid all the labor expended upon it by way of development, and has paid dividends regularly besides. The mine is owned by the Cook brothers and E. P. Sanford.

SANTA CRUZ.

QUICKSILVER.—*Santa Cruz Sentinel*, March 20: Santa Cruz and San Lorenzo Quicksilver Mining Co., located in San Benito and Merced counties have bonded their mine to J. H. Remell of San Francisco for one year, for the sum of \$30,000, to develop the mine. As over two-thirds of the stock of those mines is owned in Santa Cruz, it brings a handsome little capital into our midst, and there can certainly be no longer a plea here of a scarcity of money or hard times. We shall have miners in our midst instead of wideawake energetic business men, especially if we hear many more complaints about the indifference to and want of public spirit in those who are able to assist every good word and work towards the advancement of the city and county in needed improvements.

SONOMA.

MINTO TREMS.—*Russian River Flag*, March 18th: The Abe Lincoln silver mine, eight miles northwest of Healdsburg, is applying for a patent.

The Yosemite, owned by John F. Grater and John Collins, located near Collins' store in Alexander valley, is now being worked. The surface croppings are good. The tunnel has advanced 50 ft.

The new furnace for the American works well. The Annie Belcher furnace is now reducing ore from the Socrates.

The Quaker tunnel near Pine Flat is now in to a depth of 110 ft. Silver ore continues to be found, and the prospects of the mine are good. The Geyser furnace is kept running steadily, yielding from 10 to 12 flasks a week. About 50 men are employed.

A 30-ton furnace will be erected as speedily as possible by the Mercury company, near Mercurville.

Stuart & Elder have sold all their interest in the Goyer.

In Guerneville District, the Great Eastern is looking very well. It has 30 men at work on the three main tunnels. At least 400 tons of ore are on the dump. Parrott & Co. will ship the Walbridge furnace material back to San Francisco and will speedily erect a furnace of another pattern.

The Mt. Jackson is also looking very well. Fifteen men employed. The lower main tunnel is 200 ft. long. From it an east drift extends 75 ft., about 40 running through good milling ore.

Mr. Canan spent a portion of this week at the New Almaden mines, with a view to the improvement of the furnace of the company over which he presides.

The Cloverdale mine shipped 18 flasks of mercury last week.

SAN BENITO

NEW MINE.—The genial face of E. C. Tully has not been seen at his office for several days past. We learn that the honorable gentleman has, in connection with Mr. Cody, been working with great success upon a quicksilver lode discovered near Tully's home, in Bitter Water valley. A small furnace has been placed upon the ground, and quicksilver worth \$1,000 a week is being distilled and shipped to market. If this yield continues Hollister will lose a lawyer.

TUOLUMNE.

STAA MINE.—*Tuolumne Independent*, March 20: This mine, owned by Jones & Woodman, located in American Camp district, above Columbia, is considered by an old and experienced quartz miner, who has recently examined the mine thoroughly, to be "the best show for opening a big mine in the county." They are now done 200 feet from the surface, (being 70 feet deeper than the old working,) and have cut into the vein 6 1/2 feet, and are not through it yet. A sample of rock from this spot, sent below for assay, goes \$1295 29 per ton, and a piece of rock from the same place, which we have in our office, assays \$2,000 per ton. This is supposed to be a spur of the main or mother vein, which crops out some 60 feet further up the mountain, and which, traced for 200 feet, prospects well the entire distance. In one place, five or six feet down, it shows a width of five feet, with appearance of increasing. At this point rock sent below for assay returns \$993.34 per ton, and at a point 200 feet distant croppings show an assay of \$59.19 per ton.

YOLO.

MINTO.—*Yolo Mail*, March 20: The mining excitement in the Coast range in Yolo county still keeps up, and since we have interviewed some of the principal leaders in the matter, we begin to believe that they at least are firmly convinced that they have discovered something rich. They are satisfied, at all events, and are about organizing companies to work the mines. Good indications of quicksilver, silver and iron are found, and many tolerably rich specimens have been exhibited. Should the mines prove fruitful in Capay valley; it will only add to the many other inducements to prompt the managers of the narrow-gauge railroad to hurry up.

Nevada.

WASHOE DISTRICT.

OPHIA.—*Gold Hill News*, March 18th: Daily yield, 150 tons of ore. The ore stops on the 1300 and 1465-ft levels, are looking splendid. The ore-house is full, and the ore is being piled up for future use at the mills, it being impossible to obtain a sufficient amount of milling capacity to consume the supply as fast as it is extracted from the mine. The north drift, on the 1465-ft level, shows a marked improvement during the last few days. The northeast drift, from the 1600-ft station of the north winze, is in 47 ft, the entire distance in rich ore.

CALIFORNIA.—Cross-cut No. 2, east, on the 1500-ft level, is again being steadily driven ahead, the face in excellent ore. The north drift from this cross-cut to connect with cross-cut No. 3, is being steadily advanced, the face in rich ore. It is now in 50 feet. The face of cross-cut No. 3, east, on the 1500-ft level, is still in fair grade ore. Cross-cut No. 4, on the same level, is steadily advancing toward the ledge, the face in very encouraging vein matter.

CONSOLIDATED VIRGINIA.—Daily yield, 450 tons of ore, keeping the mills running up to their full working capacity. The returns from the mills up to the present time indicate a yield of about \$200,000 more than that of last month, which will make up the returns of the present month upwards of \$1,400,000. The ore stops throughout the entire mine are yielding well, and show no signs whatever of giving out.

SERRA NEVADA.—Sinking the old shaft is making better progress, the rock in the bottom being firmer and blasting much better. The old drifts on the 700-ft level of the old shaft have been cleaned out and repaired and a northeast drift started to prospect the ledge and connect with the new shaft.

SOUTH COMSTOCK.—The new shaft is now down a little over 100 ft. The ground works well, water does not interfere, and the indications are that the ledge is not far distant.

WELLS FAROO.—Work being pushed ahead vigorously day and night, with three eight-hour shifts of men. The bottom of the shaft is now in porphyry and quartz, and the steam hoisting works are of sufficient power to sink to a depth of 1000 ft or more.

LADY BRYAN.—The west drift, at the 380-ft level, has struck a solid body of quartz and low grade ore, spots of which give very encouraging assays. The south drift, on the 80-ft level, is in 50 ft, the face still in ore that assays from \$80 to \$90 per ton. Sinking a winze on this ore body is commenced, the bottom of which is in ore of increasing richness.

NIAGARA.—The ore body at the bottom of the main incline is showing stronger and better as greater depth is attained. Machinery for the erection of new and first-class hoisting works, capable of working the mine to a depth of 1200 ft, is now on the way from San Francisco.

SENATOR.—Still driving the main north and south drifts on the 400-ft level vigorously ahead. The south drift has developed a vein of darkly stained quartz, two feet in width, of a very favorable character. Assays from this vein shows gold and silver both in encouraging quantities.

BELCHER.—Daily yield, 400 tons of ore, keeping the mills steadily running. Sinking the winzes from the 1400 to the 1500-ft level, has shown no particular change.

IOWA.—The new hoisting machinery has arrived at the depot of the Virginia and Truckee railroad, and will be transported to the mine and put in active operation at the earliest possible moment.

YELLOW JACKET.—A flow of water, encountered in the east cross-cut of the 1840-ft level, has stopped all works in that portion of the mine for the present.

UTAH.—All of the new pumping machinery is on the ground, and its erection is being accomplished as fast as the nature of the work will permit.

JACOB LITTLE CONSOLIDATED.—The developments of this mine are now in a very encouraging stage of successful advancement, the drifts showing considerable quantities of good milling ore.

JUSTICE.—Sinking the main incline below the 800-ft level progresses well, but somewhat slower, owing to the hard character of the rock encountered and the increase of water. The main drift south, opening the 800-ft level, is now in 44 ft from the incline, with the face in porphyry. Considerable water is met with thus far, which, however, may decrease as the drift passes into the main ledge.

EUROPA.—Since last week's report the face of the east drift or cross-cut, from the winze, 115 ft below the main adit level, has run through a very fine stringer of metal-bearing quartz, six inches wide, giving fair assays. It is a strong feeder of the main ledge, but the angle of its inclination shows the ledge is probably a little further distant than has heretofore been supposed.

SAVAGE.—The erection of the new and powerful incline machinery, is making steady headway. Prospecting on the 2000-ft level shows no change of interest for the week.

LEO.—Very favorable progress is being made in driving the main tunnel ahead, the ledge containing well defined and large, and carrying a promising character of vein matter.

IMPERIAL EMPIRE.—The clay seams and quartz in the face of the main east cross-cut on the 2000-ft level, have considerably increased during the week. The rock in the bottom of the main incline is much harder, and blasts badly.

AMERICAN FLAT.—The ore prospects on both the 750 and 850-ft levels are growing more encouraging as the work progresses. The ledge formation on the 750-ft level, is showing much more compact and better defined than on the levels above.

OVERMAN.—The flow of water at the bottom of the shaft shows no diminution since our last report.

ORIGINAL GOLD HILL.—Since our last report, the cross-cut from the main south drift to run beneath or intersect the valuable ore development found in the upraise above that level, has progressed well and will be in where it ought to be in a few days.

JULIA.—Sinking the main shaft is making

good progress. It is now down 1240 ft. The rock in the bottom is working much softer.

CAWDM POINT.—The prospecting and cross-cutting on the 1600-ft level goes on as usual with no important changes to chronicle. Opening the 1700-ft station is making rapid progress. The old ore breasts and stopes show but little change. Daily yield 400 tons of ore.

MEXICAN.—The north drift on the 1465-ft level of the Ophir is showing considerable of an improvement, the quartz is rapidly improving in looks and the assays gradually on the increase.

SILVER HILL.—Nearly all the new pumping machinery is on the ground ready to place in position for the future operations. Its erection is being pressed with all the vigor possible.

BULLION.—The ledge continues to show a steady improvement on the 800-ft level. Driving the main north drift on the 1700-ft level of the Imperial is making rapid progress still.

WOONVILLE.—The ore stopes on the 300-ft level continues to show finely. The winze below the 300-ft level is down 30 ft still in ore.

KNICKENOCKER.—The new pumping machinery is working splendidly. Cross-cutting the east clay wall on both the 600 and 700-ft levels has been commenced, and some excellent results may now soon be looked for.

FLORIDA.—The heavy new hoisting and pumping machinery has about all arrived, and as soon as practicable will be put in working position.

BEST AND BELCHER.—Driving the south drift from the bottom of the 1700-ft winze is making steady progress, the face still in vein material.

Idaho.

GOLDEN CHARIOT AND MINNESOTA.—*Oreghes Avalanche*, March 10.—These two favorite mines are owned and worked by the Golden Chariot mining company, under the efficient and able management of Col. Jas. H. Keown, superintendent. Work in both mines is being pushed ahead with all possible dispatch. The 10th 11th and 12th levels of the Golden Chariot will soon be opened up ready for taking out ore. The Minnesota shaft will in a short time be down a sufficient depth to admit of the running of drifts to connect with the lower levels of the Chariot. When these connections are made, it will afford the largest body of ore ready for stoping ever before opened in these mines. We expect soon to hear the company's mill pounding away on rich ore, which will give such results in bullion as to equal, if not surpass, any shipments heretofore made from these two mines.

WAB EAGLE.—Stoping and raising ore has been commenced in good earnest at this mine, and preparations are being made to commence hauling ore to the mill. Twenty-five tons is now the average daily yield of ore from this mine. Additional hoisting facilities will soon be added, the machinery for which is now on the way from San Francisco, and when put in place, Wab Eagle will produce double the quantity of good milling ore that it now does per day. Early and good shipments will be made from this mine the coming spring, and we predict regular dividends to stockholders next summer.

RED JACKET.—Work in the prospecting drifts and winzes of the Red Jacket is being pushed ahead vigorously by Superintendent C. S. Miller, and we understand that the prospects are very flattering for striking ore soon. This mine has produced as rich ore as any in camp, and the finding of ore at the depth now reached would be a guarantee of an extensive and permanent mine.

Utah.

LITTLE COTTONWOOD.—*Steven's Utah Record*, March 5: The principal mines in this district have been vigorously worked, and the outlook for next summer is very promising. The weather was fine during the whole of the month and shipments of ore continued daily. A new and extensive development is reported in the Flagstaff. Work on the Victoria and Imperial tunnel is being pushed forward and fine ore reached. The damage done in building and tramway of the Vallejo, by the snow slide in January, has been all repaired, and the extraction of ore and shipments resumed.

BIO COTTONWOOD DISTRICT.—Everything is going forward without interruption. The principal mines are being worked and continue to ship ore and improve in appearance. The Dolly Varden mine has struck it again in the lowest workings and indications are most favorable. The Richmond and Teresa are involved in a law suit in regard to title of property, and this has induced the owners of the Richmond to suspend the shipments of ore, though the portion that is richest in mineral is not involved. The Evergreen is said to be looking well, and very favorable for a good yield of ore the coming season. The snows have been severe, still, the fall of snow during the winter is at least thirty per cent. less than last season.

BINGHAM CANYON DISTRICT.—There has been no diminution in work on the Spanish mine, the yield continuing as large and the quality of ore the same. The deepest level is 430 feet. The ore is being purchased by the Flagstaff Smelting Co. The Winnamok main tunnel is down 700 feet; from ten to twelve tons of ore are being taken out of the mine daily.

The Neptune and Kempton are reported to be in a very flourishing condition and yielding largely. The mines have been connected at the third level, exposing a fine body of ore. The district, from all accounts, seems to be steadily improving and the mines generally yielding satisfactorily.

New Combination Shafts.

Mining shafts far east of the present workings on the Comstock ledge seem to be the order of the day. The ledge pitches in that direction, and the advantage of sinking directly over an ore body is apparent. The original mining works were directly upon the outcroppings above B street. Ten years ago the Gould & Curry, Savage, Chollar, Hale & Norcross, Mexican, Ophir and several other companies, had splendid hoisting works and elegant offices on the side of Mount Davidson. The same was true with the Imperial, Empire, Confidence and other mines on the west side of Gold Hill. As time advanced tunnels were run in lower down on the hillside. The famous Gould & Curry tunnel required over two years in its construction, as it passed the greater part of the way through hard rock. At that time a great portion of the business of the city was done on B street, as the large brick fire-proof buildings between Union street and Sutton avenue still bear witness.

Change of Base.

After a few years it was found necessary to move the hoisting works further east. The original shafts were abandoned, new ones were sunk and buildings erected on their present location. The companies, which were combined into the Consolidated Virginia, profited by the example of their neighbors and opened their shaft between E and F streets. The advantage of a change of base all along the line has been obvious, both in new discoveries and in easier and less expensive workings. The ledge has now, however, been developed to so great a depth that a still further advance toward the east has become necessary. The Imperial and Empire companies combined and jumped across the road in Gold Hill and sunk a joint shaft. The California and Consolidated Virginia entered into a similar arrangement and are rapidly driving ahead the O. and C. shaft several hundred feet east of the present works of the latter.

A New Enterprise.

The Chollar, Hale & Norcross and Savage companies contemplate sinking a joint shaft in the vicinity of the County Hospital, and are making preparations to begin active operations. The shaft when completed will be over 3,000 feet in depth. In order to transport the timbers and machinery a branch railroad is necessary which must cross a deep ravine in its course. A large force of men are at present engaged in filling in this ravine and in grading for the track. The new road commences near the short railroad tunnel south of the round-house, and after crossing the ravine, the track will wind around the side of the hill, east of the Mint mine, until it reaches the site of the new shaft. The grade is not steep at any point, but the construction of the road bed will involve considerable expense. We learn that other leading companies intend sinking shafts farther east. When these new works are completed, the lower portion of the Comstock will be thoroughly explored in search of

New Bonanzas.

Which may be struck at any time. It is this expectation that leads companies, at present out of ore, to levy assessments and continue prospecting, as experience has shown that a good body of ore will soon repay all previous outlays and send the stock up to a high figure. From the bonanza of the Belcher and Crown Point, \$50,000,000 were extracted in three years, and \$25,500,000 paid in dividends. The ore at present in sight along the line of the Comstock assures the prosperity of Virginia for many years to come, and in the meantime it is almost certain that other discoveries equally as valuable will be made.—*Virginia Chronicle*.

Hardness of wood.

It is a great convenience to know the comparative value of different kinds of wood for fuel. Taking shell bark hickory as the highest standard of our forest trees, and calling that one hundred; other trees will compare with it for real value as follows:

Shellbark Hickory.....	100	Yellow Oak.....	60
Pignut Hickory.....	85	Hard Maple.....	58
White Oak.....	84	White Elm.....	58
White Ash.....	77	Red Cedar.....	55
Dogwood.....	75	Wild Cherry.....	55
Scrub Oak.....	73	Yellow Pine.....	54
White Hazel.....	72	Chestnut.....	53
Apple Tree.....	70	White Poplar.....	51
Red Oak.....	69	Butternut.....	49
White Birch.....	65	White Birch.....	49
Black Walnut.....	65	White Pine.....	30
Black Birch.....	62		

But it is worth bearing in mind that there is a very considerable difference in the woods of the same species, according to the manner and the soil on which they grow. A maple that grows slowly on an upland pasture, standing alone or apart from other trees, will last much longer and give out a greater degree of heat than one that grows in a swamp, or in the midst of a dense forest. A tree that grows in a forest or on a wet, low, rich ground, will be less solid and less durable for fuel, and consequently less valuable than a tree of the same kind that grows on a dry and poorer soil. For sale, to be sure, one would be just as good as the other. To the purchaser, oak is oak, and pine is pine, but for home, the tree grown on dry upland and standing apart from others is worth a great deal more. All these rules hold good as regards timber.

The people in and around French Corral, Nevada county, complain of the great scarcity of water for mining purposes.

Trinity County Quicksilver Mines.

From an article in the *Trinity Journal* on the mines in Cinnabar district we extract the following:

Worland & Butler's shaft was visited and shows very rich indeed in cinnabar, being literally striped with vermilion stringers. Mr. Butler showed us a small hole—probably six cubic feet in extent—in the side of the shaft, from which three tanks of quicksilver had been taken. At the present time they are not getting out any ore, but are running a tunnel to strike the body uncovered in the shaft. They have made arrangements for the transportation of a four ton furnace from San Francisco and by the time it can be got there and placed in position they will have plenty of ore to run it with. Mr. Butler informed us that one lead on the mine had been prospected for seventy feet in width and found to be good furnace ore for all that distance. From what we saw, we are satisfied that the mine of Worland & Butler is one of the richest in the district.

Hawsett & Lytle have commenced at the back end of their tunnel and are stopping to the front, everything back of them being covered so that nothing could be seen. The ore pile at their dump is sufficient, however, to show the richness and extent of their mine—being a small fortune in itself. They have three large retorts at Hawsett's camp which will soon be in position ready for operation. The firm have just contracted with James Mullins for the transportation of ore, from the mine to the retorts. Both of the companies just mentioned will turn out large quantities of quicksilver during the summer.

The Trinity Q. M. Co. continue work on their tunnel, being in a distance of 215 feet without any exciting developments as yet, although they are not far enough into the hill to strike any extensive deposit. From rock indications it is thought they will soon reach the vein on which Hawsett & Lytle are at work. Rumlert & Loring, B. C. Wattles, Jes. E. Carr and others have men at work prospecting their little work, but owing to bad weather of late but little work has been done and no developments made beyond the striking of an occasional stringer. H. C. Wilt has found excellent surface prospects on this mine, north of Worland & Butler—getting a pound and over of pure cinnabar to the pan. It is estimated that he can rock out 100 pounds per day. Hank is erecting a cabin on his ground and expects to strike it big when he gets to work in earnest. S. J. Dickinson is building a cabin on the claims of the Bonanza company and after getting comfortably domiciled will begin prospecting. The new Bonanza is favorably located, and, being interested, we hope it will at least equal its Nevada namesake. Several old locations have been relocated and many others will be served likewise unless work is soon commenced on them. No ground will be allowed to lie idle in that district this summer. About forty men are there now and the number is continually increasing. A hotel and stable are badly needed there, and the men who get a fair start in that business will have as good a thing as the best of the mines.

Fearing more storm, our party, with the exception of the Judge, left Cinnabar Thursday afternoon at 2 o'clock and arrived at the Center before 7 that evening. Next day we made home well pleased with our trip and treatment and resolved to visit Cinnabar again when good weather comes and make a full report on the mines there. Rich developments may be expected now that much prospecting will be done, but enough is already in sight in the Hawsett & Lytle and Worland & Butler mines to insure a large settlement and lively times at Cinnabar. For a distance of eight miles cinnabar has been found, so that the field for prospecting is large and as favorable as it is extensive.

WINE AMONG THE ANCIENTS.—The Greeks and Romans had their favorite wines; the Roman Ferien was one of the most celebrated. This was grown near Naples, a locality which is still celebrated for its wines. The Romans were accustomed to apeak of the wine of a particular year, as, for instance, of that of the Optimum year, or the year of Rome 632, when Optimus was consul, much in the same way as we now speak of the wine of 1866, or any other year in which it has been of exceptional good quality. Those of the Romans were all still wines, and as they do not seem to have understood the art of bottling, it was preserved by pouring a little oil into the neck of the flask. Pliny states that there were fifty-four Italian and ninety-six foreign wines held in esteem in his time. Horace states that the Greek wines were imitated, so we see that imixing is no new trade. The Romans, not understanding the use of sugar, in order to make their wines thick, boiled down the must. They used skins for the purpose of holding it, as well as amphorae made of clay. The saying in the Bible, that new wine is put in new bottles, most likely has reference to the use of these skins, which would become weak in the course of time. The Arabs still use these skins for the same purpose, and the poorer classes in Spain also make use of them. One of the most laughable scenes in Don Quixote, is the account of his attack on the wine skins. Of the manner in which the ancients made their wines we can only conjecture, but the press in some form was early known.—*Jour. of App. Chemistry*.

It is rumored that the Central Pacific folks contemplate moving their machine shops at Truckee to Reno, and those at Wadsworth to Humboldt.

Progress in Tin Manufacture.

Working in tin ware, simple as it appears at first sight to be, has become in these days of modern improvements, quite an intricate art, involving, whenever conducted on a large scale, much complicated and expensive machinery. At the commencement of the present century, the manufacture of tin goods, even in England, was carried on by small makers, scattered all through the kingdom. The trade was also conducted in a manner quite as primitive on this side of the Atlantic. A few large manufacturing had been established in both this country and in Europe, but even then but little machinery was used, and the men employed in Great Britain were but little better than wandering gypsies. A more intelligent and permanent set of workmen were engaged in the business in this country.

At that time and for many years afterwards, so little progress had been made in the art, that even so small an article as a patty pan was cut out in several pieces and soldered together—the art of pressing out even such a small article, from a single piece of metal had never been conceived of. Such a thing, in fact, was not successfully accomplished until the year 1830—and was then considered quite an event.

The success which attended the experiment on so small a scale, soon, however, led to those vast subsequent improvements which now enable the tinware manufacturer to turn out, by that process the largest dishes, covers and basins. Even a good sized tub may now be "pressed" out of a single piece of metal.

Although hollow ware, such as tea-pots, etc., have long been made from tin plate; such goods commended but a limited market from the fact of their necessary disfigurement by the inevitable seams and joinings. Lack of facilities for turning out such articles from block tin, especially of being still farther beautified by the electro-plating art, at a small cost, was also a great drawback to their general introduction. Of late years, however, machinery has been devised whereby articles of this description are made by the combined action of stamping and "spinning," by which a firm, smooth and brightly polished surface is produced, equal to those made of block tin and electro-plated.

Stamped from one piece of iron, tinned, wheeled, planished and polished by improved methods, the bright silvery color, beautiful outlines and artistic finish of wares made by this process, render them formidable rivals to the more expensive and less durable electro-plated Britannia goods. Their not requiring to be cleaned more than once where plated articles require five or six polishings, is also a matter greatly in their favor.

Wrought hollow ware now forms a large and constantly increasing department of tin plate manufacture. These articles now include sauce-pans, stew-pens, frying-pans, and even tea and coffee cups, and have largely increased this field of manufacture, and being made of wrought, rather than cast iron, are at once lighter and less liable to fracture. The above gives some faint outline of the great strides of improvement which have been made in what was but recently considered a very simple business, and of comparatively limited application.

Cabinet Making a Fine Art.

The cabinet maker is one who manufactures fine articles of wood furniture. Such a worker is really an artist, and his field of usefulness is wide and varied. The cabinet maker is distinguished from the joiner, mainly from the fact that he is supposed to apply himself to his work more artistically. Both join wood together, which is the primary occupation of the joiner—who joins more in the rough, as in house-building or in the manufacture of the coarser descriptions of furniture.

A cabinet maker, and indeed every other modern artisan ought to be able to design as well as construct. It is not sufficient at this day that a person should be able to simply copy the works of others—they should be able to design original articles in their line. Public taste in matters of furniture has come to be very exacting and quite aesthetic in its character. The beautiful in art is now sought for largely in household adornment, and new and beautiful designs are difficult of attainment.

A successful cabinet-maker must be able to design, and should seek to cut loose as far as possible from the habit of imitating others. Originality is essential to success. If one wishes to carve a medalion let him take a living or else an ideal subject—don't copy. If a leaf, or vine, or fruit is desired, place the leaf or vine or fruit before you for a copy, and not the work of some one else who has already produced the same. If one desires that his work should be admired and live after him he must put his soul into it—breathe into it as it were, a living spirit, as did the sculptors, and painters, and architects of old, whose works have come down to us through the centuries.

Born at the Ophir and California they are prospecting in advance on their lower levels with diamond drills. The California is said not to be working very satisfactorily; but the Ophir drill is now working very well.

DARWIN, the new settlement in Coso district, Inyo county, contains about sixty houses, and in the opinion of some will before long be the largest town in the county. The mines are very promising.

Amateur Engine Building.

It is one of the first desires of most young men when they go to learn a machinist trade, to build for themselves a small working model of a steam engine. As soon as the young mechanic has learned the use of tools he is very apt to apply much of his leisure time to constructing the parts of a steam engine and fitting them together. Being unprovided with castings he has to commence with his patterns and make the castings himself, something quite foreign to the trade which he is learning. Either this has to be done or the various parts have to be worked out by the file. Either process is very tedious; but the interest felt in finishing the job holds on to the last—until the machinery is completed, and the young mechanic has the pleasure of turning on the steam and seeing, for the first time, a steam engine of his own make working away under a full head of steam! The pleasure of that moment more than makes amends for all the trouble, toil and patience which has been bestowed upon his pet.

We have often wondered why some one has not got up one or two different sized sets of patterns for small engines, of a something more than toy size, for sale to such as might be desirous to exercise their mechanical ingenuity in the way of finishing up and putting together the pieces which is all of engine building that properly belongs to the machinist. There are no doubt many young men, who are not engaged in learning trades, and who do not even contemplate doing so, who would be pleased to provide themselves with tools necessary for such work, and spend their leisure hours as amateur mechanics, if such results could be so readily realized. The cost of such a set of castings would be small, in the rough, and would be within the reach of almost every one, and their possession and finishing up would no doubt be the means of developing many a mechanical genius which might otherwise lie dormant forever.

Such a set of castings should be represented by a cylinder, say 2 inches in diameter, with a stroke of 4 inches, and a 10 or 12 inch balance wheel. Other sets, a size smaller and a size larger, might also be provided, for such as might prefer a smaller or larger engine.

Such a set would comprise 14 pieces, as follows:—Bed-plate, balance wheel, crank, pillow block, eccentric, eccentric bands, slides, cross beads, cylinder heads, piston, steam chest, stuffing boxes and slide valve, and the inevitable whistle might be added, if desired. These might be furnished simply as iron and brass castings in the rough, to be finished up, polished and put together by the amateur. Here is a chance for somebody—some of our brass foundries for instance—to make a small, and, we think, a profitable addition to their stock of castings. Who will furnish them?

Underground.

At the Geological Society of Glasgow annual meeting the President (Sir William Thomson) delivered an interesting address, which was greatly appreciated by the members. The subject dealt with was "Underground Temperature." Sir William explained at the outset that the mathematical theory of underground temperature involved phenomena which might be divided into two classes—periodic and non-periodic. The periodic phenomena occurred over and over again with perfect regularity in successively equal intervals of time; the non-periodic might be approximately periodic, or irregularly periodic, without fulfilling accurately that strict definition. But, on the other hand, the action which had no periodic character whatever might be irregular, or there might be a gradual secular variation. There might be three classes of phenomena—secular variation, irregular variation and periodical variation. He then described the mathematical theory of Fourier, as applied to the periodic, observing, in passing, that it was equally convenient for dealing with all three classes. That theory was one of the most beautiful pieces of application to the mathematical instrument they had in the whole history of science. It had constituted a new branch of mathematics, and Fourier, Sir William mentioned, invented it for the purpose of analysing the phenomena of the conduction of heat through solids. He spoke of the investigations of Peclet, Armstrong, Quetlet, Tait and Forbes into the conductivity of bodies, and he exhibited a diagram showing the results obtained by Forbes from thermometers placed at depths of 3, 6, 12 and 24 feet below the surface in Creigleith quarry, the Experimental Gardens, and the Clifton Hill, Edinburgh. The result of these observations, which Forbes commenced and Sir William continued, showed that the variations were greater near the surface, that a higher temperature was generally indicated at a later period at the greatest depth, and seemed to show that the sandstone of the Creigleith quarries had a greater conductivity than the trap-rock. Sir William concluded by referring to the temperature of the earth as indicating its former condition, and be promised at some future time to give the society another address on a kindred subject.

EUREKA mining district continues to turn out large quantities of ore. Last week the Richmond produced 140,000 pounds, and shipped 60,084 pounds, and the Eureka Consolidated produced 168,260 pounds, and shipped 185,435 pounds, making the total production 308,260 pounds and the shipment 245,519.

USEFUL INFORMATION.

How to Treat a Watch.

A Scientific watchmaker, Mr. Nelthrop, thus advises, with reference to our vest-pocket companion: "A watch is much like a child, requiring uniform treatment, that is to say plainly, not over indulged to-day, neglected to-morrow. Wind-up should be performed regularly, with a steady and uniform motion, not moving both hands, and nearly as possible at the same hour daily. A watch should always be kept at the same temperature, as nearly as possible. Left over-night on a stone mantel-piece, it is sure to gain, or if the oil gets thickened, it may stop, in no started again by the warmth of the pocket. The regulator is too often viewed as an appendage more to be looked at with wonder than to be used, while the persons who can explain the theory of its action are few in the extreme. Yet the task of learning enough about a watch to become capable of talking intelligently about it, and exercising the control over a 'jobber' which that knowledge is certain to give, is but slight, and it ought to be reckoned as blameworthy to be ignorant about one's watch as to know nothing of the merits of one's boots or clothing." Mr. Nelthrop gives to the uninitiated a few hints as to the purchase of a watch, which are worth reproducing. The case, be it gold or silver, should be correctly made and of fair thickness; the hinges close and smooth; the glass well fitted; the dial of clear, bright enamel, the seconds snail, the whole of good weight when held in the hand. When the dome is opened—for it is better that a watch-case should be so made, though more expensive—the brass work should look well finished, the edges smoothed off, the jewels pale in color, but of a fine, clear lustre; the action of the spiral spring should be even, when the watch is set going.

SECURING SAFETY IN THE USE OF STEAM BOILERS.—The case of a boiler has much to do with its safety and working age, and the cases of neglected boilers show how important, reliable and intelligent engineering talent is. There are many who are ever ready to put forth all sorts of theories and causes of steam boiler accidents. But as a general thing they are not persons who are familiar with boilers in daily use, or if they own boilers, their experience is confined to their own practice. It will be readily admitted by every thinking person that as an experience gained from examining boilers in different parts of the country, of all types and under all the varying conditions of use to which boilers are subjected, will be more valuable than any experiments with one, two or three boilers, or with the practical use of the number in any one of the large manufactories in the country. The views obtained from a large collection of facts resulting from actual experience, and from a close and careful examination of facts connected with steam boiler explosions, continued through a series of years, will be likely to lead to much more important and valuable conclusions than could any reasonable number of experiments made in testing boilers and straining them, under special conditions, to the bursting point, as is done (and that to advantage) with cannon. Such observations are now being made by reliable parties; and reports may be expected, before long, which will no doubt add much to our real knowledge in this important direction.

AN APPROPRIATE EMBLEM.—Bedstead designs might more frequently make use of the lotus in these carvings. It is one of the most appropriate designs which can be taken from the vegetable kingdom. Pliny says of these plants:—"It is reported when the sun goes down, their heads, which are like those of the poppy, close up with the leaves and sink under water, where they remain shut up until the morning, when they appear above the surface and open."

RUBBER JOINTS.—A Scientific American writer says: "In making a rubber joint, take a piece of chalk and rub it on the side of the rubber and flange where the joint is to open, and, when required, they will come apart easily and not break the rubber; although the latter may be burnt and hard. Repeat the chalking before screwing up, and you will have as good a joint as ever, and the rubber can be used a number of times."

GLUE TO RESIST FIRE.—The London *Furniture Gazette* gives this recipe: Mix a handful of quick lime in 4 ozs. of linseed oil; boil to a good thickness, then spread on plates in the shade and it will become exceedingly hard, but may be easily dissolved over the fire, and used as ordinary glue. It resists fire after being used for gluing substances together.

VARNISH FOR METALLIC SURFACES.—A foreign authority says that alcoholic varnish can be made to adhere more firmly to polished metallic surfaces by adding one part of pure crystallized boric acid to two hundred parts of varnish. "Thus prepared, it adheres so firmly to the metal that it can not be scratched off with the finger-nail; it appears, in fact, like a glaze."

To true a corundum wheel, adjust it in the lathe and revolve it very fast, holding a piece of corundum stone against the surface. It is said the piece will melt and unite with the wheel, making the periphery perfectly true,

To prevent rusting.—Boiled linseed oil will keep polished tools from rusting if it is allowed to dry on them. Common sperm oil will prevent from rusting for a short period. A coat of copal is frequently applied to polished tools exposed to the weather. Woolen materials are the best for wrappers for metals. Iron and steel goods of all descriptions are kept free from rust by the following: Dissolve 1/2 oz. of camphor in 1 lb. of hog's lard, take off the scum and mix as much black lead as will give the mixture an iron color. Iron and steel, and machinery of all kinds, rubbed over with this mixture and left with it on for twenty-four hours, and then rubbed with a linen cloth, will keep clean for months. If machinery is for exportation it should be kept thickly coated with this during the voyage.

STEAM-BOILER INSPECTION.—It is notorious how incautious we all are when our life and property are jeopardized. To-morrow, we will attend to that leaky boiler; next week, we will let down our fires for repairs; and thus it goes, until some fine morning we are called to view the utter demolition of our once beautiful and powerful factory, together with the forms of hundreds of innocents perishing in the seething flames and ruins. Let our manufacturers, engineers and superintendents ponder well this question of steam-boiler inspection and insurance, and no longer hesitate as to what course to pursue.—*Coal and Iron Record.*

When steel instruments have been injured by over-heating, they may be restored to their normal condition by heating to a cherry red and covering with the following mixture, or salve: Two parts of horn-slings, 10 parts talow, 1 part sal ammoniac, 1 part pulverized charcoal, 1 part soda. When the steel gets cold, it may be hardened in the usual manner.

A well tempered bar spring will lose much of its elastic strength by filing off a very thin scale from the surface.

GOOD HEALTH.

Take Good Care of your Servants.

[Written for the Press.]

The servants of our bodies (our most valuable servants) are the teeth, the stomach, the liver, etc. They are all very easily and very often abused. In fact we abuse them without being aware of it. The stomach is the subject of the most abuse of all the bodily organs. We don't expect the servants of the farm or the kitchen to work any longer than the number of hours they agreed to work; but we abuse the poor stomach by forcing it to work at all hours in the day and even in the night, when all other organs of the body are at rest. One way of abusing the stomach is to not nasticate the food thoroughly, and then the stomach has to do the work that the teeth and mouth should have done. When food is thoroughly chewed it is well moistened with saliva. But when it is bolted with little or no chewing, then the stomach has to furnish more than its share of gastric juice to wash up what should have been done in the month. The stomach has more muscular exercise to perform in the process of digestion than most people are aware of. It secretes gastric juice from the arterial blood, which is held in a thousand little glands in the mucous membra in, and when food is eaten these glands emit this gastric juice into the chamber of the stomach to moisten the food and at the same time the muscular coats of the stomach contract and dilate, and take the food through a kneading (or churning as some physiologists call it) process, to mix it thoroughly with the gastric juice.

This secreting gastric juice and working process is kept up until every particle of food is thoroughly digested. The time required for digestion in a healthy person is from one to three hours according to the character of the food eaten. When a person eats three times a day, the stomach has the proper amount of rest. But unfortunately very few people do eat but three times a day. Some eat every time they happen to see food. And the stomach will attend to its business as long as it has the vital power to do so, even if it is imposed upon. Thus, however, after a person eats between meals the stomach will commence to digest and do its work as well as its vital power will admit of.

Some call it second nature, when they have acquired an unphysiological habit. A person may live awhile on second nature; but first nature will come at some time and demand settlement, and then second nature will be found bankrupt. Then what happens? Why, if the stomach is burdened with overwork, it is going to fail to do its work well, and then some one of the myriad forms of dyspepsia is sure to follow. Then follows a succession of secondary diseases; and the sufferer will blame the country, the climate, everybody and everything, except his own irregular habits. Sour stomach is one of the most annoying and most disastrous forms of dyspepsia. It is one great cause of so much premature decay of teeth.

Children should be taught regularly in eating from their infancy. It is mistaken kindness to feed children every hour in the day, if they happen to ask for food so often; but most people do it, and the consequence is, that

one half the people are dyspeptics before they arrive at man and womanhood. The other side of the picture—I have had the pleasure of seeing a few families who practice regularity in eating, with other physiological reforms (that only a few are interested in), and the good health they enjoy is worth a hundred times the pains required to take care of the health. Health journals are much cheaper than aches and pains and doctors' bills. N. A. PROCKENS, M. D.

Tincture of Arnica Poisonous to the Skin.

One of the most popular articles in the household materia medica is tincture of arnica. It is used in almost every family as an external application for sprains, bruises, and pains generally. But, according to Dr. J. C. White, it often exerts a poisonous action on the skin. In the *Boston Medical and Surgical Journal* for January 21, 1875, he describes in detail three cases in which it produced acute inflammation or eczema. Arnica, he says, "must therefore be regarded as an irritant poison when applied to the skin of some persons." Even when it is not harmful he believes it to be useless for the purposes for which it is employed. Its properties reside in an acrid resin and a volatile oil. For its reputation as an application for sprains and bruises, "it may thank the alcohol associated with it, for this, beyond doubt, is the only active agent in such application."

When arnica is used so extensively, why are not cases of poisoning by it more common? To this question Dr. White replies:

"I believe that they do occur not infrequently, but that they are not recognized. The appearances which follow its use are no doubt often mistaken for the immediate effect, or the sequelae of the injury or other trouble for which it was applied. Even the physician, there can be little doubt, often fails to recognize the artificial nature of the eczema he is called upon to treat, and to connect it with the prior application of arnica to the skin. The almost universal belief in its harmlessness, too, would prevent in most cases the patient from communicating to the physician the fact of its use before the appearance of the disease."

It is not to be wondered at, however, that physicians are so little acquainted with these poisonous properties, when we see how little mention is made of them in medical literature. The works on materia medica that I have at hand give it a more or less feeble commendation, but make no allusion to its injurious action upon the skin. Very few of the works upon toxicology place arnica among the poisons, and Van Hasselt, who gives the fullest account of its injurious results when administered internally, says nothing of its action upon the skin. Neither do I recall any reports in medical journals of cases of such affection. In a long list of substances enumerated as capable of producing eczema, in his chapter on this disease, Hebra includes arnica without special mention; but in another article he says: "Some medical men suppose that tincture of arnica is a perfectly harmless remedy. But I would give a friendly warning to those who advocate its use; unless, indeed, they propose to employ it homoeopathically and in infinitesimal doses. In the proportion of a drop of the tincture to a pail of water, this substance may certainly be applied without any risk of doing harm."

"I have in practice had abundant occasion to observe that the tincture of arnica, even when much diluted, acts most injuriously upon the skin of some persons. Fox, in his brief remarks on medicinal rasches says: 'Arnica may produce erythema, and swelling of the part to which it is applied, or it may excite a real eczema.'

These facts ought certainly to be known by physicians, and by everybody who has been in the habit of using this popular tincture. The extent to which it is used may be inferred from the fact that there are single houses in Boston that sell several thousand pounds of arnica flowers every year. The herb is employed in veterinary practice, but full one-half of all that is sold goes to supply the demand for the tincture as a household "pain-killer." The alcohol without the poison would be cheaper as well as safer.—*Boston Journal of Chemistry.*

Sleeplessness.

To take a hearty meal just before retiring is, of course, injurious; because it is very likely to disturb one's rest and produce nightmare. However, a little food at this time if one is hungry, is decidedly beneficial. It prevents the gnawing of an empty stomach, with its attendant restlessness and unpleasant dreams, to say nothing of probable headache, or of nervous and other derangements, the next morning. One should no more lie down at night hungry than he should lie down after a very full dinner, the consequence of either being disturbing and harmful. A cracker or two, a bit of bread and butter, or cake, a little fruit—something to relieve the sense of vacuity, and so restore the tone of the system—is all that is necessary.

We have known persons—habitual sufferers from restlessness at night—to experience material benefit, even though they were not hungry, by a very light luncheon before bedtime. In place of tossing about two or three hours as formerly, they would soon grow drowsy, fall asleep and not wake more than once or twice until sunrise. This mode of treating insomnia has recently been recommended by several distinguished physicians, and the prescription generally attended with happy results.—*Scribner's Magazine.*

DOMESTIC ECONOMY.

Salads and Dressings.

"Daisy Eyebright" always writes well and always tells her readers things true and useful, whether her subject be flower gardening, cookery, or domestic economy. She says, for instance, of salads (in the *Country Gentleman*) that if we would use them, as the French do, as an article of daily food, we should not engender so many disorders of the blood as we do by eating so much fat meats, and butter and sugar in its varied forms of cakes, pies, puddings, etc. She offers the following recipes, which we hope our fair housekeepers will try for themselves:

MAYONNAISE DRESSING.—This is for lobster or chicken salad, and is made as follows:

Break the yolks of three raw eggs into a salad bowl, add a little salt and white pepper; stir it with a wooden spoon with the right hand, while with the left you add, very slowly, about half a pint of pure salad oil, poured from the bottle held in the left hand. Beat it for twenty minutes, and add pepper and salt to your taste. Beat the whites of two eggs to a stiff froth, and stir rapidly into the dressing. Now add about two large spoonfuls of vinegar, more or less, according to its strength, and blend all thoroughly together until it is as smooth as glass; if not so, add a few drops of cold water to mingle the whole mixture. Take the lobster from the shell; leave the legs and the "coral" to be used as garnish; cut the remainder into small dice and place in a deep bowl; add to it small heads of coos lettuce (which is the light green variety, and very tender, but the common kinds will do), garnish the dish with capers and lobster claws and "coral," sliced hard-boiled eggs and olives, first, turning the mayonnaise all over the lettuce.

If you desire to make chicken mayonnaise, roast the fowls, basting them frequently with butter dissolved in water; when roasted tender, remove the flesh from the body, wings and legs; cut in small mouthfuls, and add either celery, lettuce, or chopped cabbage—the first, if well blanched is preferable. Garnish with slices of boiled beets, hard-boiled eggs, and olives.

CABBAGE AND HAM SALAD.—Take two small heads of cabbage, well washed, and chop them quite fine; slice off a dozen or more thin slices of tender boiled ham. Mix the two together in a salad bowl. Make a dressing of two raw eggs, mixing the yolks with half a teaspoonful of mustard, stirred up in boiling water; then add three tablespoonfuls of sour cream, just skimmed from the pan, or one small teacupful of salad oil, poured in very slowly, as directed for mayonnaise. Stir for ten minutes, adding a little salt and pepper. Beat the whites of the eggs to a froth, and add to it; also four tablespoonfuls of vinegar. This makes a delicious side dish, or a course at the dinner-table, and the housewife will find it a toothsome substitute for a hot dinner when the mercury mounts high up among the naeties, and there is ironing or washing to attend to. Chopped cold boiled potatoes can also be added; and the dish can be prepared out of cold boiled corned beef chopped fine, or from cold roast veal, beef, or mutton. Lettuce can be substituted for cabbage if preferred, and the mustard can be left out.

BOILED CABBAGE SALAD.—Boil a Savoy cabbage until tender; then drain and chop it. Serve with a salad dressing, made out of two hard boiled eggs mashed very fine, three tablespoonfuls of thick, sour cream, one teaspoonful of mixed mustard, one teaspoonful of salt, two tablespoonfuls of strong vinegar. Stir until perfectly smooth, and turn over the cabbage.

TO TAKE OUT BRUISES IN FURNITURE.—Wet the place well with warm water, then take some brown paper five or six times doubled and well soaked in water, lay it on the place, apply on that a hot flat-iron till the moisture is evaporated, and if the bruise is not gone, repeat the process. You will find after two or three applications that the dent or bruise is raised level with the surface. If the bruise is small, soak it well with warm water, and hold a red-hot poker very near the surface, which is to be kept continually wetted, and you will soon find the indentation vanished.

HOME REPAIRS OF PLASTERED WALLS.—Small holes in white plastered walls can be easily repaired without sending for the mason. Equal parts of plaster of Paris and white sand—such as is used in most families for scouring purposes—mixed with water to a paste, applied immediately, and smoothed with a knife or flat piece of wood, will make the broken place as good as new. The mixture hardens very quickly, so it is best to prepare but a small quantity at a time.

APPLE SNOW.—Pare the apples, halve and core them; put them to boil with a little water and one cupful white sugar. When the apples are cooked, lift them out without breaking; boil down the sirup and pour over. On the top place a few spoonfuls of whites of eggs; beaten to a stiff froth and seasoned with lemon.

WHITE CAKE.—Two eggs, two cups of white sugar, one cup sweet milk, one-half cup butter, beat to a cream; two tablespoonfuls cream tartar, one teaspoonful soda, three and one-half cups flour. When baked, sprinkle the top with white sugar, and place spoonfuls of jelly on the top.

MINING SCIENTIFIC PRESS.

W. B. EWER, SENIOR EDITOR.

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San Francisco:

Saturday Morning, March 27, 1875

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Ourself.

It is not often that we take occasion to speak of ourselves, preferring to let the paper stand on its own merits; but this week we desire to call the attention of our readers to the double sheet edition of this issue. We have had numerous demands from different localities for the mining laws of the United States and accordingly have issued a supplement containing such information in this direction as the miners need. Every miner should carefully study these laws and understand them. The instructions of the Commissioners are given which gives the interpretation put upon the law by the Land Office. Some who read these laws for the first time will doubtless find there information of great value which may make a great difference to them in dollars and cents.

Our columns are so crowded from time to time that we occasionally find it necessary to issue a double sheet to relieve this pressure. As often as we are sufficiently provided with good reading and advertising matter, this double sheet edition will be printed. We have been giving, and will continue to give, a large amount of information to the mining and industrial public, and we hope, our readers will appreciate our endeavors. The Mining and Scientific Press is the recognized leading representative of the mining interests, and as such has been, we hope, a benefit to the coast. We shall continue to do all we can to maintain this position and only need the continued co-operation of the mining public to carry out our endeavors. The paper goes into every mining town and camp on the Pacific coast, and besides the general news of the day, every issue contains information of interest to the mining community, worth far more than the terms of subscription.

A fine prospect for quicksilver has recently been found about three miles southwest of Lower Lake.

The Sonora Process.

Working Rebellious Ores.

The process of working silver ores generally known as the "Sonora Process," was introduced by Mr. E. B. Smith, in Sonora, Mexico, in 1869, and since that time has been in use by that gentleman at the hacienda La Aguja. So marked and uniform has been its success that it has been adopted by every other hacienda in Sonora. The process is especially adapted to the treatment of rebellious ores; that is, all sulphuretted ores that require desulphurization and chlorination to allow the silver to admit of smelting.

The ore is prepared by roasting in a reverberatory furnace, reducing the silver and base metals to a chloride. The ore is then charged into boxes prepared with a false bottom, and is then luxuriated with water until the chlorides of the base metals are dissolved and washed out. A solution of hyposulphite of lime is then turned on the ore, which dissolves the chloride of silver. This silver, in solution, is then drawn off into tanks, and the silver precipitated by sulphide of lime. After the precipitation of the silver the resulting liquor is a hypersulphite, which is drawn off and pumped back into the ore tanks, to serve again as a solvent of the silver.

The precipitated silver is drawn off, strained and pressed, and then roasted in a small reverberatory furnace to burn off the sulphur, then and melted in crucibles with iron, or cupel furnaces with lead.

The advantages gained by this means are: 1st. The greater reduction of cost in the building of reduction works. 2d. The economy of power, as no machinery is used except the stamps for pulverizing the ore. 3d. Economy of crushing, as much coarser screens can be used in the batteries. 4th. Simplicity and certainty of results. 5th. Larger percentage of silver obtained than by any other economical means. 6th. No patent, no royalty, and no machinery.

Much depends upon the proper construction of the furnaces so as to economize fuel and produce the most perfect chlorination, and then on the skill and faithfulness of those in charge of the roasting. The construction of the works should be under the charge of some one thoroughly familiar with the process, so as to arrange all the appliances with a view to convenience and economy in the handling of the ores; but when once so constructed an intelligent worker in ores can soon familiarize himself with all the various manipulations which the ore goes through. It takes from one-quarter to one-half a cord of wood for roasting. The screens used generally are No. 24, so each stamp can crush a great deal more ore per day than when screens from No. 40 to 60 are used. The cost of working by this process of course varies with the locality, price of wood, etc. At Mr. Smith's hacienda, with a ten-stamp mill, if running steadily the cost is from \$10 to \$13 per ton of ore.

This process is now generally used in Sonora, but we do not know that it was ever introduced here. In Sonora they have used the patio, pans, and all other means, but have thrown them out, and now use this process with good results. No chemicals are used except salt and sulphur. Mr. Smith's mill has been a sort of custom mill for some time, and has worked all classes of ores successfully. The silver comes out generally about 900 fine, although it has been produced as high as 960. The process is specially adapted to rebellious silver-bearing ores, and we hope some of our readers may try it here. It appears admirably adapted for miners who do not want to erect large and expensive works. Mr. Smith, who is at present at 439 Bush street, in this city, will give all the desired information should any one feel interested in hearing more details of the matter.

The Patent Office at Fault.

We have entertained a high regard for the present Commissioner of Patents, and sincerely hoped that the patent office would suffer no detriment in his keeping. But circumstances compel us to complain of a portion of his machinery which seems to be terribly out of order. Of course we refer to what is known as the Philosophical Division, a class that is kept constantly in arrears. The simplest case falling within this class is kept under advisement for months, while the examiners in other classes do not require as many weeks to dispose of the most difficult and complicated machinery. In fact many of the cases, we are informed, are kept closely up. Why is this difference? We call the special attention of the honorable Commissioner to the fact that an inventor of electric signals for railroads filed his application in December, and on the 12th March was placed in interference with an application filed September 20th, 1873. Why was this latter case allowed to lie so long in the examiner's room, as a trap to catch unsuspecting parties who subsequently pay their money into the office and file their applications in good faith? We hope Commissioner Thatcher may be able to explain.

The California Water Company.

This company occupy the dividing ridge between the south and middle forks of the American river. The company is incorporated with a capital stock of \$10,000,000; principal place of business, Georgetown, El Dorado county. The officers are as follows: James S. Pierce, President; H. S. Bradley, Superintendent; H. J. McKusick, Superintendent of mining department, and C. H. Jones, Superintendent of water sales department. The company has 235 miles of ditches and iron pipe, covering 300 miles square of mining ground, and embracing the heavy gravel deposits of Mount Gregory, Tipton hill, Mameluque hill, Jones hill, Bottle hill, Fort hill, Buffalo hill, Five Cent hill, Pilot hill, etc., and the seam and surface diggings of Georgetown, Georgia slide, Spanish dry diggings, Greenwood, Johnstown, American Flat, Spanish Flat, Kelsey's, St. Lawrenceburg, and also many quartz mines, including the Clipper, the Woodside, the St. Lawrence, the Taylor, the Cedarberg, the Sliger, etc. The main supply ditch for this extensive region has a capacity of 4,000 inches, and its sources of supply are inexhaustible.

The company are now engaged in mining or selling water in most of the above named localities. For the past three years they have expended large amounts of money in extending and improving their ditches, acquiring mining claims, timber land, etc. But mining and water selling will by no means limit the scope of this company's operations. The main ditch, before arriving at the mineral belt where it is distributed, passes through some 200 square miles of valuable timber. Upon the line of the ditch are numerous falls, affording ample power for manufacturing lumber without a waste of water. A Vume to Sacramento is projected and surveys already commenced. By this means large amounts of lumber can be transported cheaply, and the water which conveys it be applied to irrigation directly in the neighborhood of the city.

It is also proposed to furnish water to Sacramento under pressure. Surveys and estimates for this project are now in progress. Sacramento is situated at the head of tidewater. If furnished with cheap water power the city would soon develop a variety of manufacturing interests. The California water company expect to be able to supply the city with an abundance of water in such a manner that it may be used for power and not be lost, but still supply the city in the same manner as if the power had not been used. The benefit to Sacramento of such an arrangement will of course be incalculable. The American river will never answer for this purpose, because it is too intermittent—in summer it is thick and sluggish, in winter it is unmanageable.

The company also intend to take steps to inaugurate agricultural prosperity on the divide. Notwithstanding all that has been said concerning the advantages and capabilities of the foothills, agriculture in the mountains has not flourished. Notwithstanding the quality of the fruit raised there, its abundance with the aid of a little certain irrigation, established tests concerning profits on fruits, nuts, grapes, berries, wine, there is something wanting which still prevents earnest and capable men of good business capacity from taking hold of agriculture in the mountains. But give men an assurance of water to irrigate from ten to forty acres for every five or six hundred acres of grazing or vineyard or nut tree land owned—the means, in short, of carrying on diversified agriculture, and before many years run by there will be a reflex of farming population instead of the continued depopulation of the mountain countries.

It should be understood that the California water company has only commenced to do that which is in process of execution, the benefits from which cannot be anticipated before the plan on which the organization is based shall have been further carried out. The company's business is already becoming remunerative.

Details of their mining operations, with facts and figures, will soon be published in the Press. The report on the property of this company, by Amos Bowman, recently issued, was the most exhaustive report of the kind ever published on this coast.

COPPER.—We learn from Jas. Lewis & Sons monthly Liverpool report on ores and metals that the market for copper is dull. During February the market for Chile bar copper was even more inanimate than during the previous month. At present the prices in Liverpool do not cover the cost of Chile with even a moderate commission. Quotations on the 1st of March were, bars, £82 to £82 10 s. for good ordinary brands, and £84 10 s. for special brands; ore and regains 16 s. to 16 s. 9d per unit. Stocks of West Coast produce were estimated in 12,838 tons pure against 12,242 tons on 1st ultimo.

The Shasta Courier speaks very hopefully of the future of that county. New mines are being taken up, and the water rights and other means of making the mineral resources available are being rendered and put in shape for future use.

The Black Hills.

The "Black Hills excitement" instead of being on the wane seems to be on the increase at present, and parties are talking of going there from every direction. We notice advertisements in the San Francisco daily papers, by which it seems an expedition is being formed here, and similar expeditions are being organized elsewhere. Reports from the Black Hill country are however very contradictory and unsatisfactory, but this only seems to excite the nomadic miners still more.

Some men have come into Cheyenne bringing rich specimens of placer gold, silver quartz and plumbago, lead and copper, and glowing reports of the country. They report diggings worth 15 cents to \$1 per pan, plenty of water, game, timber, etc. These men propose returning to the hills about the middle of April as well as the company from here.

Notwithstanding the fact that the Government has prohibited miners from entering the reservation there is no doubt that there will be a big rush there this spring. The following is General Sherman's order to General Ord:

The President directs the following to be made public: All expeditions into that portion of Indian territory known as the Black Hills country, must be prevented so long as the present treaty exists. Efforts are now being made to arrange for the extinguishment of the Indian title, and all proper means will be made to accomplish that end. If, however, the steps which are to be taken toward the opening of the country to settlement fail, those persons at present within that Territory must be expelled. By command of General Sherman.

WM. D. WHITTELL, Asst. Adj't-General.

It is now stated, however, that the Sioux are willing to relinquish their claims to the country for a consideration because they know that the whites will eventually get in there anyhow, and the Indians want to make a treaty with the Government before this happens. The Sioux City Journal of March 20th, states it has received information that President Grant has taken decided steps looking to a speedy opening of the Black Hills; that the Secretary of War and other members of the Cabinet are heartily in sympathy with the movement; that the Indians are willing to dispose of their interest in that country, and that Mr. Collins, of Helena, Ill., an old friend of the President, has been commissioned by him to proceed West and take to Washington a number of representative Sioux, to carry out the desired negotiations. This has not been made public, though some allusion to the matter has been telegraphed, so the fact will soon be developed, and it is thought that by the time the companies now organizing are ready to start, the opposition of the Government will be removed.

It is also stated that Secretary Delano has taken steps to bring to Washington a delegation of the Sioux for the purpose of negotiating the extinguishment of their right to the Black Hills country. Another report is that the treaty of the United States with the Sioux Indians was never ratified by Congress, and would not stand if tested. It strikes us however, that if this is so, and the present were insisted on, it would carry on an Indian war with good reason.

The opinion expressed by many, with relation to the whole Black Hill business, is that it is fostered and increased by parties interested in outfitting miners, and carrying on freight and other business. Reports are so very contradictory and vague that it is difficult to judge which are true. It will of course be settled this spring, however, for some will surely go. Those miners who have now paying claims will be foolish to leave them to go on a "wild goose chase" to the Black Hills or any other new country. Still, we do not believe that the Government will be able to keep prospectors out with its whole army. They have been in there already in spite of all orders to the contrary, and if they become convinced that the gold is there, all the proclamations in the world will not keep them out.

RUBBER PAINT.—We gave in our issue of February 13th some details of the manufacture of rubber paint, by the Pacific Rubber Paint company, whose advertisement will be found in another column. As the name indicates the paint is formed by a chemical combination of rubber with oil paints, which is done in such a manner that the resultant compound is so elastic as to preclude the possibility of cracking, and give a gloss, like varnished work. This paint is now being largely introduced on this coast and gives general satisfaction, as numerous testimonials show. An extensive factory has been established here, the facilities of which have lately been increased.

UNITED STATES MINING LAWS.—In accordance with the request of many of our subscribers, we publish in this issue of the Press, the United States mining laws. We give the United States Mining Law of May 10th, 1872, with the instructions of the Commissioner of the Land Office; also those parts of U. S. Mining Law of July 26th, 1866 and July 9th, 1870, that were not repealed by the Act of May 10th, 1872. We have made notes in the body of the law referring to such amendments as have been made since the passage of the Act, and giving briefly the tenor of the amendment.

The Patent Law of the Republic of Chile.

We publish the following law for the benefit of inventors on this coast and the Atlantic States. It becomes of more immediate importance in view of the approaching Industrial Exhibition in Chile, which opens in September next. Further information can be had on application to this office:

"Art. 1. The author or inventor of an art, manufacture, machine, instrument, preparation or any improvement upon any such thing, who may wish to enjoy the exclusive proprietorship of his discovery or invention, granted him by the 152d article of the Constitution, must make application to the Minister of the Interior, soliciting a patent which shall secure him such proprietorship, accompanying his petition with a faithful, clear and accurate description of his invention or discovery, together with an affidavit that it is his his own discovery or invention, and that it is unknown in the country; and he must at the same time present samples, or drawings, or models, according to the requirements of the case, to illustrate his claim."

"Art. 2. The Minister of the Interior will then appoint a commission of one or more experts to inquire into the matter, and to report to him as to the originality of the discovery or invention; requiring such commission to swear, in the presence of the petitioner, to faithfully execute the inquiry, and during all the time allowed patent privileges by this law, to keep religiously secret all information communicated to them during the inquiry."

"Art. 3. Upon the verification of the claims of the petitioner by this commission, the President of the Republic will order a patent issued to him, giving him the exclusive right in the country of the invention or discovery for a period of ten years, the patent being signed by the President and sealed with the seal of the Republic."

"Art. 4. Such patent shall be registered entire in a book kept for the purpose, in the office of the Minister of the Interior."

"Art. 5. Before receiving his patent, the petitioner will be required to present a certificate that he has paid into the Treasury of the Republic the sum of fifty dollars, and another, that he has deposited in the Patent Office of the country, samples, or drawings, or models, illustrative of his discovery or invention, together with a descriptive memorial, signed by every member of the commission as satisfactory to them, which memorial shall contain such a complete, minute and specific account of the invention or discovery as will distinguish it from all other known or need before in the country, and shall indicate the methods and principles of its application so plainly as to be understood by any intelligent person, and serve as a guide to its construction and use, so that the public may be benefited by it after the expiration of the term of duration of the patent."

"He will close and seal this memorial in the presence of the commission, and write upon its envelope the title and object of the patent, affirming that he has faithfully complied with the requirements of this law, and the commissioners will subscribe it. During the period of his patent, the patentee may inspect this sealed envelope whenever he pleases, with a view of seeing that its seals are as he left them."

"Art. 8. Inventions, arts, or discoveries, known or need in other countries, if not known or used in Chile, may obtain patents in the same manner, and under the same conditions, as discoveries or inventions made in the country, though for a time not exceeding eight years, according to the utility and difficulty of the enterprise, at the discretion of the Minister of the Interior. Mere change of form or proportion of a machine is not patentable."

"Art. 9. A patent right may be sold or transferred; but to do so, the patentee must notify the Minister of the Interior of his wish to do so, setting forth the reasons for the same. If those reasons are judged valid, a note of the fact is made in the register of patents; if not, proceedings may be commenced to annul the patent."

"Art. 10. Any person other than the patentee, who shall construct patented articles by the same method which characterizes and constitutes the patent, shall be liable to a fine of not less than one hundred nor more than one thousand dollars, shall forfeit all such articles already made, and all machinery and apparatus used in making them."

"Art. 11. Any patent obtained by false declarations or statements, as by persons pretending to be the inventors who are not, or that it is not known or in use in Chile when it is, shall be immediately annulled, and the patentee charged the costs of the investigation, and fined not less than one hundred nor more than one thousand dollars, or imprisoned not less than three months nor more than one year."

"Art. 13. Patents may be obtained for the whole Republic, or for one or more departments."

"Art. 14. In all cases of granting patents, a reasonable time will be allowed for the establishing and putting in working order of the invention or thing patented, after which the time of the patent privilege will commence."

"Art. 15. If, at the expiration of the time allowed for the establishment of the enterprise, it shall not have been so established and set at work, the patent shall become null and void; and the same, if, after its establishment, it shall be abandoned for one year, or if its pro-

ducts become inferior in quality or different in character from the samples or models deposited in the Patent Office."

"Art. 16. Nothing in this law shall affect the existing laws of the Republic, relative to the rights of miners, or to the copyrights of authors."

As the present interest in this matter is almost entirely due to the prospect which the Exposition offers to inventors and introducers, we call attention to this fact, that, to protect their rights under this law, no copying or taking of drawings of machinery or other article on exhibition will be allowed without authority of its proprietor. Even the Government can only take photographic or similar views of such articles.

Gelatine.

The interesting and singular fact appears that millions of dollars cover the value of the gelatine industry in this country, and this value is said to be still greater in Europe. The purest form of commercial gelatine is known as isinglass, the best being prepared from the air-bladders and sounds of three or four species of sturgeon. These tissues are cleansed, dried



THE "WHOOPIING" OR SAND-HILL CRANE.

and scraped, forming what is termed leaf isinglass, or they are twisted into various forms called long and short staple, or folded into packages called book isinglass.

The Russian isinglass has always held the highest rank in the market, but its manufacture is very simple. The swimming bladders of the fish are first placed in hot water, carefully deprived of adhering blood, cut open longitudinally and exposed to the air, with the inner delicate silvery membrane upward. When dried, this fine membrane is removed by heating and rubbing, and the swimming bladder is then made into the forme desired.

Machinery is employed to cut isinglass into the delicate filaments in which it is usually sold. A solid gelatine, in thin plates and eticage, is manufactured in large quantities in France, to answer the purpose of isinglass. The best is transparent, and is prepared from the gelatine of bones by digestion in dilute hydrochloric acid and long boiling in water. It is much cheaper than the first described article, as well as decidedly inferior. The same may be said of another variety, known as opaque gelatine, which is prepared from the cuttings of skins.

Of all metals known, silver is the best electrical conductor.

Frozen Quicksilver.

According to the *New Northwest* there has been somewhat of cold weather in Montana this winter. A correspondent of that paper writes: "Your favor of the 10th of January is at hand, and inquiries answered herewith. On the evening of January 8th, several persons being in my store, and the spirit thermometer registering '35 degrees below,' the remark was made that quicksilver would congeal at 3 degrees lower. I requested my clerk, Mr. Stolte, to thoroughly cleanse a glass tumbler and partially fill it with quicksilver. We then exposed the glass of mercury and the spirit thermometer on the roof of the fire-proof, on the north side of the store, giving them as nearly equal exposure as possible. An hour after, the thermometer marked 38 degrees below, but the quicksilver still remained unchanged. At 9:20 p. m. the thermometer stood 40 degrees below; still the quicksilver was free, but terribly cold. At 9:40 p. m. the spirit indicated 41 degrees below; the quicksilver was hardening on the outside. A few minutes later the thermometer stood 42 degrees below. I picked up the tumbler of quicksilver, and, to my astonish-

Whooping Crane.

The whooping crane or sand-hill crane, so familiar on this coast, breeds from California northward to the Arctic regions, whence it resumes southward early in autumn, and soon arrives in the regions of the United States, from North Carolina to Texas, and thence westward to the Rocky mountains, and remains throughout the winter. In the Middle States, east of the Alleghanies, it is very rarely seen, and thence eastward to Maine it is unknown, all its migrations being performed far inland. While migrating it travels both by day and night, and in total disregard of the character of the weather, its power of flight enabling it to resist the force of heavy gales. Thirty or forty form a flock, which is sometimes arranged in an acute-angled triangle, sometimes in a long line, and at others with an extended front, and sometimes flying in apparent disorder, each bird sounding his loud note in succession, as upon all occasions of alarm.

The middle of October or beginning of November is the period of the arrival of this species in the United States, and the end of April or beginning of May of its departure for the North. They here frequent the edges of large ponds supplied with rank herbage, on fields or savannas, now in swampy woods, and again on extensive marshes. The interior of the country and the neighborhood of seashores suit them equally well, so long as the temperature is sufficiently high. Both the old and the young may be seen digging through the mud before the rains have begun to cover the shallow ponds. They work assiduously with their bills, and succeed in uncovering the roots of the great water-lily, which often run to a depth of two or three feet. Several cranes operate at the same root and devour it together when obtained. They may then be approached easily and a number killed at a single shot. When this description of food fails they resort to the fields, to devour corn, peas, sweet potatoes and cotton seeds, and in the wet fields, seize on water insects, toads and frogs, and occasionally a mole, a meadow-mouse, or a snake, but not upon fish, as is believed. They feed only during the day.

Though these birds may be easily killed while intent upon exhuming their food, their sense of sight and hearing are so acute, and their wariness is so great, that it requires the practice of much adroitness to approach them. They are on the alert the moment a man appears, though a fourth of a mile distant; and, if not seen, the snapping of a twig beneath his feet, or the closing of a gate behind him, is sufficient to challenge their vigilance. They observe his motions with unerring precision. Mr. Audubon says he would soon undertake to catch a deer by fair running as to shoot one of these cranes which had observed him. When wounded they are capable of inflicting severe injury upon an unwary sportsman. Wilson states that one of them has even been known to drive his bill through a man's hand at such a time. The young are more numerous than the old. They are killed both for their flesh, which many relish, and for their beautiful long feathers, of which fans and fly-brushes are sometimes made.

In some regions, these birds leave their feeding grounds an hour before sunset, and silently repair to the interior of a highland forest, where six or seven of them alight on the branches of a lofty tree to roost. Here, after dressing their feathers for half an hour, they crouch in the manner of wild turkeys, and when there is moonlight may then be shot. In other regions they roost in the midst of tall grasses, cat-tails and other plants, near the marshes, selecting a dry hillock, upon which they stand on one foot, the other being drawn under the body, while the head is thrust beneath the broad feathers of the shoulder. In captivity they become gentle, and feed on grain and other vegetables, though they are occasionally mischievous, and wantonly pick and maim chickens and other poultry. They probably do not attain their full size nor perfect plumage before they are four or five years old.

On the Motive Power of Diatoms.

HERE AND THERE.—In New York city we are told there are thousands of men unemployed, and that so great is the destitution that the gangs of men employed on street work are changed frequently, in order to keep the wolf from the door of starving families. How different this from what is seen in San Francisco and this State. Our banks are plethoric with money, the genuine article of silver and gold. Our mines are turning out gold and bullion in quantities such as were never known before. Our fields are everywhere green and luxuriant with fruit, grass or grain. Our farms and mines afford abundant employment for labor at remunerative prices. The condition of our savings banks indicates a condition of prosperity among depositors which is truly gratifying to record. Our immigration is large and constantly increasing. Altogether, California appears to be entering upon a most prosperous period of her history. Between our valuable export productions of wheat, wool, wine tobacco, cotton and the precious metals, our source of wealth are really fabulous.

Professor Leidy, in some remarks on the moving power of diatoms, desmids, and other algae, stated that, while the cause of motion remains unknown, some of the uses are obvious. The power is considerable, and enables these minute organisms, when mingled with mud, readily to extricate themselves and rise to the surface, where they may receive the influence of light and air. In examining the surface mud of a shallow rain water pool, in a recent excavation in brick clay, he found little else but an abundance of minute diatoms. He was not sufficiently familiar with the diatoms to name the species, but it resembled *navicula radiosa*. The little diatoms were very active, gliding hither and thither, and knocking the quartz and grains about. Noticing the latter, he made some comparative measurements, and found that the naviculae would move grains of sand as much as twenty-five times their own superficial area, and probably fifty times their own bulk and weight, or perhaps more.

U. S. MINING LAWS

—AND—

Instructions Under the same by the Commissioner of the General Land Office.

[The following, together with blank forms and other pertinent information, will soon be printed and sold in pamphlet form, at this office.]

Mining Statute of May 10, 1872.

AN Act to promote the development of the mining resources of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, That all valuable mineral deposits in land belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by the citizens of the United States, and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or rules of miners, in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States.

Sec. 2. That mining claims upon veins or lodes of quartz or other rock in place, bearing gold, silver, iron, lead, tin, copper, or other valuable deposits heretofore located, shall be governed, as to length along the vein or lode, by the customs, regulations, and laws in force at the date of their location. A mining claim located after the passage of this act, whether located by one or more persons, may equal, but shall not exceed, one thousand five hundred feet in length along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. No claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited, by any mining regulation, to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing at the passage of this act shall render such limitation necessary. The end lines of each claim shall be parallel to each other.

Sec. 3. That the locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode, or ledge, situated on the public domain, their heirs and assigns, where no adverse claim exists at the passage of this act, so long as they comply with the laws of the United States and the State, Territorial, and local regulations, not in conflict with said laws of the United States, governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their location; and of all veins, lodes, and ledges, throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side lines of said surface locations: *Provided*, that their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward as aforesaid, through the end-lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of said veins or ledges. *And, provided further*, that nothing in this section shall authorize the locator or possessor of a vein or lode which extends, in its downward course, beyond the vertical lines of his claim, to enter upon the surface of a claim owned or possessed by another.

Sec. 4. That where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel, on the line thereof not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the lines of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid; but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of said tunnel.

[NOTE.—By an Act of Congress approved March 1st, 1873, the 5th section of this Act was amended so that the time for the first annual expenditure on claims located prior to the passage of the Act, was extended to June 10th, 1874. Again on June 6th, 1874, the 5th section of the Act of May 10th, 1872, was amended by Congress so that the time for the first annual expenditure on claims located prior to the passage of said Act, was extended to January 1st, 1875. By this legislation the requirements of the fifth section of the mining Act of May 10, 1872, and the Amendment Act of March 1st, 1873, were changed by extending the time for the first annual expenditure upon claims located prior to May 10th, 1872, to the 1st day of January, 1875. The requirement in regard to expenditures located since May 10th, 1872, were in no way changed by these amendatory acts.—EDMONT.]

Sec. 5. That the miners of each mining district may make rules and regulations, not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims, located by reference to some natural object or permanent monument, as will identify the claim. On each claim located after the passage of this act, and until a patent shall have been issued therefor, not less than one hundred dollars worth of labor shall be performed, or improvements made during each year. On all claims located prior to the passage of this act, ten dollars worth of labor shall be performed or improvements made each year for each one hundred feet in length along the vein, until a patent shall have been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and upon a failure to comply with these conditions, the claim or mine upon which such failure occurred shall be opened to relocation in the same manner as if no location of the same had ever been made: *Provided*, that the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after such failure and before such location. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required by this act the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if, at the expiration of ninety days after such notice in writing or by publication, such delinquent should fail or refuse to contribute his proportion to comply with this act, his interest in the claim shall become the property of his co-owners who have made the required expenditures.

Sec. 6. That a patent for any land claimed and located for valuable deposits, may be obtained in the following manner: Any person, association, or corporation, authorized to locate a claim under this act, having claimed, and located a piece of land for such purposes, who has, or have, complied with the terms of this act, may file in the proper land office an application for a patent, under oath, showing such compliance, together with a plat and field-notes of the claim or claims in common, made by or under the direction of the United States Surveyor-general, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the grounds, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat, previous to the filing of the application for a patent, and shall file an affidavit of at least two persons, that such notice has been duly posted as aforesaid, and shall file a copy of said notice in such land office, and shall thereupon be entitled to a patent for said land in the manner following: The Register of the land office, upon the filing of such application, plat, and field-notes notices, and affidavits, shall publish a notice that such application has been made, for the period of sixty days, in a newspaper to be by him designated as published nearest to said claim; and he shall also post such notice in his office for the same period. The claimant, at the time of filing his application, or at any time thereafter, within the sixty days of publication, shall file with the Register a certificate of the United States Surveyor-general that five hundred dollars worth of labor has been expended, or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description to be incorporated in the patent. At the expiration of the sixty days of publication, the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during said period of publication. If no adverse claim shall have been filed with the Register and the Receiver of the proper land office at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent, upon the payment to the proper officer of five dollars per acre, and that no adverse claim exists, and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with this act.

Sec. 7. That where an adverse claim shall be filed during the period of publication, it shall be upon oath of the person or persons making the same, and shall show the nature, bound-

aries, and extent of such adverse claim; and all proceedings, except the publication of notice, and making and filing of the affidavit thereof, shall be stayed until the controversy shall have been settled or decided by a Court of competent jurisdiction, or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction, to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment; and a failure to do so shall be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment-roll with the Register of the land office, together with the certificate of the Surveyor-general that the requisite amount of labor has been expended, or improvements made thereon, and the description required in other cases, and shall pay to the Receiver five dollars per acre for his claim, together with the proper fees, whereupon the whole proceedings and the judgment-roll shall be certified by the Register to the Commissioner of the General Land Office, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, to rightly possess. If it shall appear, from the decision of the court, that several parties are entitled to separate and different portions of the claim, each party may pay for his portion of the claim, with the proper fees, and file the certificate and description by the Surveyor-general, whereupon the Register shall certify the proceedings and judgment-roll to the Commissioner of the General Land Office, as in the preceding case, and patents shall issue to the several parties according to their respective rights. Proofs of citizenship under this act, or the acts of July twenty-sixth, eighteen hundred and sixty-six, and July ninth, eighteen hundred and seventy, in the case of an individual, may consist of his own affidavit thereof; and, in case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge, or upon information and belief, and in case of a corporation organized under the laws of the United States, or of any State or Territory of the United States, by the filing of a certified copy of their charter or certificate of incorporation; and nothing herein contained shall be construed to prevent the alienation of the title conveyed by a patent for a mining claim to any person whatever.

Sec. 8. That the description of vein or lode claims, upon surveyed lands, shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued as aforesaid, for claims upon unsurveyed lands, the Surveyor-general, in extending the surveys, shall adjust the same to the boundaries of such patented claim, according to the plat or description thereof, but so as in no case to interfere with or change the location of any such patented claim.

Sec. 9. That sections one, two, three, four and six of an act entitled "An Act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July twenty-sixth, eighteen hundred and sixty-six, are hereby repealed, but such repeal shall not affect existing rights. Applications for patents for mining claims now pending may be prosecuted to a final decision in the General Land Office; but in such cases, where adverse rights are not affected thereby, patents may issue in pursuance of the provisions of this act; and all patents for mining claims heretofore issued under the act of July twenty-sixth, eighteen hundred and sixty-six, shall convey all the rights and privileges conferred by this act, where no adverse rights exist at the time of the passage of this act.

Sec. 10. That the act entitled "An Act to amend an act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July ninth, eighteen hundred and seventy, shall be and remain in full force, except as to the proceedings to obtain a patent, which shall be similar to the proceedings prescribed by sections six and seven of this act for obtaining patents to vein or lode claims. But where said placer claims shall be upon surveyed lands, and conform to legal subdivision, no further survey or plat shall be required, and all placer mining claims hereafter located shall conform as near as practicable with the United States system of public land surveys and the rectangular subdivisions of such surveys, and no such location shall include more than twenty acres for each individual claimant; but where placer claims can not be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands; *Provided*, That proceedings now pending may be prosecuted to their final determination under existing laws; but the provisions of this act, when not in conflict with existing laws, shall apply to such cases; *And, provided also*, That where, by the segregation of mineral land in any legal subdivisions, a quantity of agricultural land less than forty acres remains, said fractional portion of agricultural land may be entered by any party qualified by law, for homestead or pre-emption purposes.

Sec. 11. That where the same person, association, or corporation, is in possession of a placer claim, and also a vein or lode included within the boundaries thereof, application shall be made for a patent for the placer claim, with the statement that it includes such vein or lode, and in such case (subject to the provisions of this act and the act entitled "An Act to amend an act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July ninth, eighteen hundred and seventy) a patent shall issue for the placer claim, including such vein or lode, upon the payment of five dollars per acre for such vein or lode claim, and twenty-five feet of surface on each side thereof. The remainder of the placer claim, or any placer claim not embracing any vein or lode claim, shall be paid for at the rate of two dollars and fifty cents per acre, together with all costs of proceeding; and where a vein or lode, such as is described in the second section of this act, is known to exist within the boundaries of a placer claim, an application for a patent for such placer claim, which does not include an application for the vein or lode claim, shall be construed as a conclusive declaration that the claimant of the placer claim has no right of possession of the vein or lode claim; but where the existence of a vein or lode in a placer claim is not known, a patent for the placer claim shall convey all valuable mineral and other deposits within the boundaries thereof.

Sec. 12. That the Surveyor-general of the United States may appoint, in each land district containing mineral lands, as many competent surveyors as shall apply for appointment to survey mining claims. The expenses of the survey of vein or lode claims, and the survey and subdivision of placer claims into smaller quantities than one hundred and sixty acres, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any United States Deputy Surveyor to make the survey. The Commissioner of the General Land Office shall also have power to establish the maximum charges for surveys and publication of notices under this act; and, in case of excessive charges for publication, he may designate any newspaper published in a land district where mines are situated, for the publication of mining notices in such district, and fix the rates to be charged by such paper; and to the end that the Commissioner may be fully informed on the subject, each applicant shall file with the Register a sworn statement of all charges and the fees paid by said applicant for publication and survey, together with all fees and money paid the Register and the Receiver of the Land office, which statement shall be transmitted, with the other papers in the case, to the Commissioner of the General Land Office. The fees of the Register and the Receiver shall be five dollars each for filing and acting upon each application for patent or adverse claim filed, and they shall be allowed the amount fixed by law for reducing testimony to writing—when done in the Land Office, such fees and allowances to be paid by the respective parties—and no other fees shall be charged by them in such cases. Nothing in this act shall be construed to enlarge or affect the rights of either party in regard to any property in controversy at the time of the passage of this act, or of the act entitled "An Act granting the right of way to ditch and canal owners over the public lands, and for other purposes," approved July twenty-sixth, eighteen hundred and sixty-six; nor shall this act affect any right acquired under said act; and nothing in this act shall be construed to repeal, impair, or in any way affect the provisions of the act entitled "An Act granting to A. S. Sutor the right of way and other privileges to aid in the construction of a draining and exploring tunnel to the Comstock lode, in the State of Nevada," approved July twenty-fifth, eighteen hundred and sixty-six.

Sec. 13. That all affidavits required to be made under this act, or the act of which it amendatory, may be verified before any officer authorized to administer oaths within the land district where the claims may be situated, and all testimony and proofs may be taken before any such officer, and, when duly certified by the officer taking the same, shall have the same force and effect as if taken before the Register and Receiver of the Land Office. In cases of contest as to the mineral or agricultural character of land, the testimony and proofs may be taken as herein provided, on personal notice of at least ten days, to the opposing party; or if said party cannot be found, then by publication of at least once a week for thirty days in a newspaper, to be designated by the Register of the Land Office as published nearest to the location of such land; and the Register shall require proof that such notice has been given.

Sec. 14. That where two or more veins intersect or cross each other, priority of title shall govern, and such prior location shall be entitled to all ore or mineral contained within the space of intersection; *Provided, however*, That the subsequent location shall have the right of way through said space of intersection for the purpose of the convenient working of the said mine; *And, provided also*, That where two or more veins unite, the oldest or prior location shall take the vein below the point of union including all the space of intersection.

Sec. 15. That where non-mineral land, not contiguous to the vein or lode, is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such non-adjacent surface-ground may be embraced and included in an application for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notices as are applicable under this act to veins or lodes; *Provided*, That no location hereafter made of such non-adjacent land shall exceed five acres, and payment for the same

not be made at the same rate as fixed by this act for the superficies of the lode. The owner of quartz mill or reduction works, not owning a mine in connection therewith, may also receive patent for his mill-site as provided in this section.

Sec. 16. That all acts and parts of acts inconsistent herewith are hereby repealed; *Provided*, that nothing contained in this act shall be construed to impair, in any way, rights or interests in mining property acquired under existing laws.

Approved May 10, 1872.

Instructions of the Commissioner.

Mineral Lands Open to Exploration, Occupation, and Purchase.

First. It will be perceived that the first section of said act leaves the mineral lands in the public domain, surveyed or unsurveyed, open to exploration, occupation, and purchase, by all citizens of the United States, and all those who have declared their intention to become such.

Status of Lode Claims Previously Located.

Second. By an examination of the several sections of the foregoing act, it will be seen that the status of lode claims located previous to the date thereof, is not changed with regard to their extent along the lode or width of surface, such claims being restricted and governed both as to their lateral and linear extent, by the State, Territorial, or local laws, customs, or regulations, which were in force in the respective districts at the date of such locations, in so far as the same did not conflict with the limitations fixed by the mining statute of July 26, 1866. (14 Stat., 251.)

Third. Mining rights acquired under such previous locations, are, however, enlarged by the act of May 10, 1872, in the following respect, viz: The locators of all such previously taken vein or lodes, their heirs or assigns, so long as they comply with the laws of Congress and the State, Territorial, or local regulations not in conflict therewith, governing mining claims, are invested by said act with the exclusive possessory right of all the surface included within the lines of their locations, and of all veins, lodes, or ledges, throughout their entire depth, the top or apex of which lies inside of such surface lines extended downward vertically, although such veins, lodes, or ledges, may so far depart from a perpendicular in their course upward as to extend outside the vertical side lines of such locations at the surface, it being expressly provided, however, that the right of possession to such outside parts of said veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward from the end-lines of their locations, so continued in their own direction that such planes will intersect such exterior parts of such veins, lodes, or ledges; no right being granted, however, to the claimant of such outside portion of a vein or ledge, to enter upon the surface location of another claimant.

Fourth. It is to be distinctly understood, however, that the law limits the possessory right to veins, lodes, or ledges, other than the one named in the original location, to such as are not adversely claimed at the date of said act of May 10, 1872, and that where such other vein or ledge was so adversely claimed at that date, the right of the party so adversely claiming in no way impaired by said act.

Fifth. From and after the date of said act of Congress, in order to hold the possessory right to a mining claim previously located and for which a patent has not been issued, the law requires that ten dollars shall be expended annually in labor or improvements, on each side of one hundred feet on the course of the vein or lode, until a patent shall have been issued therefor; but where a number of such claims are held in common upon the same vein or lode, the aggregate expenditure that would be necessary to hold all the claims, at the rate of ten dollars per hundred feet, may be made upon any one claim; a failure to comply with this requirement in any one year, subjecting the claim upon which such failure occurred to relocation by other parties, the same as if no previous location thereof had ever been made, unless the claimants under the original location shall have resumed work thereon, after such failure and before such relocation.

Sixth. Upon the failure of any one of several co-owners of a vein, lode, or ledge, which has not been patented, to contribute his proportion of the expenditures necessary to hold the claim or claims so held in ownership in common, the co-owners who have performed the labor, and made the improvements as required by said act, may at the expiration of the year, give such delinquent co-owner personal notice in writing or by notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days; and if, upon the expiration of ninety days after such notice in writing, or upon the expiration of one hundred and eighty days after the first newspaper publication of notice, the delinquent co-owner shall have failed to contribute his proportion to meet such expenditure or improvements, his interest in the claim by law passes to his co-owners, who have made the expenditures or improvements as aforesaid.

Patents for Veins or Lodes Heretofore Issued.

Seventh. Rights under patents for veins or lodes heretofore granted under previous legislation of Congress, are enlarged by this act, so as to invest the patentee, his heirs or assigns, with title to all veins, lodes, or ledges throughout their entire depth, the top or apex of which is within the end and side boundary lines of his claim on the surface as patented, extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side-lines of the claim at the surface. The right of possession to such outside parts of such veins or ledges to be confined to such portions thereof as lie between vertical planes drawn downward through the end-lines of the claim at the surface, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges, it being expressly provided, however, that all veins, lodes, or ledges, the top or apex of which lies inside such surface locations, other than the one named in the patent, which were adversely claimed at the date of said act, are excluded from such conveyance by patent.

Eighth. Applications for patents for mining claims pending at the date of the act of May 10, 1872, may be prosecuted to final decision in the General Land office, and where no adverse claims are affected thereby, patents will be issued, in pursuance of the provisions of said acts.

Manner of Locating Claims on Veins or Lodes After the Passage of the Act of May 10, 1872.

Ninth. From and after date of said act, any person who is a citizen of the United States, who has declared his intention to become a citizen may locate, record and hold a mining claim of fifteen hundred linear feet along the course of any mineral vein or lode subject to location; or an association of persons, severally qualified as above, may make joint location of such claim of fifteen hundred feet, but in no event can a location of a vein or lode made subsequent to the act exceed fifteen hundred feet along the course thereof whatever may be the number of persons composing the association.

Tenth. With regard to the extent of surface ground adjoining a vein or lode, and claimed as the convenient working thereof, the act provides that the lateral extent of locations of veins or lodes made after its passage shall in no case exceed three hundred feet on each side of the middle of the vein at the surface, and that no such surface rights shall be limited by any mining regulations to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing at the date of said act may render such limitation necessary, the end-lines of such claims to be in all cases parallel to each other.

Eleventh. By the foregoing it will be perceived that no lode claim located after the date of said act can exceed a parallelogram fifteen hundred feet in length by six hundred feet in width, and whether surface ground of that width can be taken, depends upon the local regulations or State or Territorial laws in force in the several mining districts; and that no such local regulations shall limit a vein or lode claim to less than fifteen hundred feet along the course thereof, whether the location is made by one or more persons, nor can surface rights be limited to less than fifty feet in width, unless adverse claims existing on the tenth day of May, 1872, render such lateral limitation necessary.

Twelfth. It is provided in said act that the miners of each district may make rules and regulations not in conflict with the laws of the United States, or of the State or Territory in

which such districts are respectively situated, governing the location, manner of recording, and amount of work necessary to hold possession of a claim. It likewise requires that the location must be so distinctly marked on the ground that its boundaries may be readily traced. This is a very important matter, and locators cannot exercise too much care in defining their locations at the outset, inasmuch as the law requires that all records of mining locations made subsequent to its passage, shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located, by reference to some natural object or permanent monument, as will identify the claim.

Thirteenth. The said act requires that no lode-claim can be recorded until after the discovery of a vein or lode within the limits of the ground claimed; the object of which provision is evidently to prevent the encumbering of the district mining records with useless locations before sufficient work has been done thereon to determine whether a vein or lode has really been discovered or not.

Fourteenth. The claimant should therefore, prior to recording his claim, unless the vein can be traced upon the surface, sink a shaft, or run a tunnel or drift, to a sufficient depth therein to discover and develop a mineral-bearing vein, lode, or crevice; should determine, if possible, the general course of such vein in either direction from the point of discovery, by which direction he will be governed in making the boundaries of his claim on the surface, and should give the course and distance as nearly as practicable from the discovery-shaft on the claim, to some permanent well-known points or objects, such, for instance, as stone monuments, blazed trees, the confluence of streams, point of intersection of well-known gulches, ravines, or roads, prominent buttes, hills, &c., which may be in the immediate vicinity, and which will serve to perpetuate and fix the locus of the claim and render it susceptible of identification from the description thereof given in the record of locations in the district.

Fifteenth. In addition to the foregoing data, the claimant should state the names of adjoining claims, or if none adjoin, the relative positions of the nearest claims; should drive a post or erect a monument of stones at each corner of his surface-ground, and at the point of discovery or discovery-shaft, should fix a post, stake, or board, upon which should be designated the name of the lode, the name or names of the locators, the number of feet claimed, and in which direction from the point of discovery; it being essential that the location notice filed for record, in addition to the foregoing description, should state whether the entire claim of fifteen hundred feet is taken on one side of the point of discovery, or whether it is partly upon one and partly upon the other side thereof, and in the latter case, how many feet are claimed upon each side of such discovery-point.

Sixteenth. Within a reasonable time, say twenty days after the location shall have been marked on the ground, notice thereof, accurately describing the claim in manner aforesaid, should be filed for record with the proper Recorder of the district, who will thereupon issue the usual certificate of location.

Seventeenth. In order to hold the possessory right to a claim of fifteen hundred feet of a vein or lode located as aforesaid, the act requires that until a patent shall have been issued therefor, not less than one hundred dollars worth of labor shall be performed or improvements made thereon during each year, in default of which the claim will be subject to relocation by any other party having the necessary qualifications, unless the original locator or his heirs, assigns, or legal representatives, have resumed work thereon after such failure and before such relocation.

Eighteenth. The importance of attending to these details in the matter of location, labor, and expenditure will be the more readily perceived when it is understood that a failure to give the subject proper attention, may invalidate the claim.

Tunnel Rights.

Nineteenth. The fourth section of the act provides that where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the line of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid, but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins or lodes on the line of said tunnel.

Twentieth. The effect of this section is simply to give the proprietors of a mining tunnel, run in good faith, the possessory right to fifteen hundred feet of any blind lodes cut, discovered, or intersected by such tunnel, which were not previously known to exist, within three thousand feet from the face or point of commencement of such tunnel, and to prohibit other parties, after the commencement of the tunnel, from prospecting for and making location of lodes on the line thereof, and within said distance of three thousand feet, unless such lodes appear upon the surface, or were previously known to exist.

Twenty-first. The term "face," as used in said section, is construed and held to mean the first working face formed in the tunnel, and to signify the point at which the tunnel actually enters cover, it being from this point that the three thousand feet are to be counted, upon which prospecting is prohibited as aforesaid.

Twenty-second. To avail themselves of the benefits of this provision of law, the proprietors of a mining tunnel will be required, at the time they enter cover as aforesaid, to give proper notice of their tunnel location, by erecting a substantial post, board, or monument, at the face or point of commencement thereof, upon which there should be posted a good and sufficient notice, giving the names of the parties or company claiming the tunnel right; the actual or proposed course or direction of the tunnel; the height and width thereof, and the course and distance from such face or point of commencement to some permanent well-known objects in the vicinity by which to fix and determine the locus in manner heretofore set forth applicable to locations of veins or lodes, and at the time of posting such notice they shall, in order that miners or prospectors may be enabled to determine whether or not they are within the lines of the tunnel, establish the boundary lines thereof by stakes or monuments placed along such lines at proper intervals, to the terminus of the three thousand feet from the face or point of commencement of the tunnel; and the lines so marked will define and govern as to the specific boundaries within which prospecting for lodes not previously known to exist, is prohibited while work on the tunnel is being prosecuted with reasonable diligence.

Twenty-third. At the time of posting notice and marking out the lines of the tunnel as aforesaid, a full and correct copy of such notice of location, defining the tunnel claim, must be filed for record with the Mining Recorder of the district, to which notice must be attached the sworn statement or declaration of the owners, claimants, or projectors of such tunnel, setting forth the facts in the case; stating the amount expended by themselves and their predecessors in interest in prosecuting work thereon; the extent of the work performed, and that it is bona fide their intention to prosecute work on the tunnel so located and described with reasonable diligence, for the development of a vein or lode, or for the discovery of mines, or both, as the case may be.

Twenty-fourth. This notice of location must be duly recorded, and with the said sworn statement attached, kept on the recorder's files for future reference.

Twenty-fifth. By a compliance with the foregoing, much needless difficulty will be avoided, and the way for the adjustment of legal rights acquired in virtue of said fourth section of the act will be made much more easy and certain.

Twenty-sixth. This office will take particular care that no improper advantage is taken of this provision of law by parties making, or professing to make tunnel locations, ostensibly for the purposes named in the statute, but really for the purpose of monopolizing the lands lying in front of their tunnels to the detriment of the mining interests, and to the exclusion of bona fide prospectors or miners; but will hold such tunnel claimants to a strict compliance with the terms of the act; and as reasonable diligence on their part in prosecuting the work is one of the essential conditions of their implied contract, negligence or want of due diligence will be construed as working a forfeiture of their right to all undiscovered veins on the line of such tunnel.

Manner of Proceeding to Obtain Government Title to Vein or Lode Claim.

Twenty-seventh. By the sixth section of said act, authority is given for granting title for mines by patent from the government, to any person, association, or corporation having the necessary qualifications as to citizenship and holding the right of possession to a claim in compliance with law.

Twenty-eighth. The claimant is required in the first place to have a correct survey of his claim made under authority of the Surveyor-general of the State or Territory in which the claim lies; such survey to show with accuracy the exterior surface boundaries of the claim, which boundaries are required to be distinctly marked by monuments on the ground.

Twenty-ninth. The claimant is then required to post a copy of the plat of such survey in a conspicuous place upon the claim, together with notice of his intention to apply for a patent therefor, which notice will give the date of posting, the name of the claimant, the name of the claim, mine, or lode; the mining district and county; whether the location is of record, and if so where the record may be found; the number of feet claimed along the vein, and the presumed direction thereof; the number of feet claimed on the lode in each direction from the point of discovery, or other well-defined place on the claim; the name or names of adjoining claimants on the same or other lodes; or if none adjoin, the names of the nearest claims, etc.

Thirtieth. After posting the said plat and notice upon the premises, the claimant will file with the proper Register and Receiver a copy of such plat, and the field notes of survey of the claim, accompanied by the affidavit of at least two credible witnesses, that such plat and notice are posted conspicuously upon the claim, giving the date and place of such posting; a copy of the notice so posted to be attached to, and form a part of, said affidavit.

Thirty-first. Attached to the field notes so filed must be the sworn statement of the claimant that he has the possessory right to the premises therein described, in virtue of a compliance by himself (and by his grantors, if he claims by purchase) with the mining rules, regulations, and customs of the mining district, State, or Territory, in which the claim lies, and with the mining laws of Congress; such sworn statement to narrate briefly, but as clearly as possible, the facts constituting such compliance, the origin of his possession, and the basis of his claim to a patent.

Thirty-second. This affidavit should be supported by appropriate evidence from the Mining Recorder's office, as to his possessory right, as follows, viz: Where he claims to be a locator, a full, true, and correct copy of such location should be furnished, as the same appears upon the mining records; such copy to be attested by the seal of the Recorder, or if he has no seal, then he should make oath to the same being correct, as shown by his records; where the applicant claims as a locator in company with others, who have since conveyed their interests in the lode to him, a copy of the original record of location should be filed, together with an abstract of title from the proper Recorder, under seal or oath as aforesaid, tracing the co-locator's possessory rights in the claim to such applicant for patent; where the applicant claims only as a purchaser for valuable consideration, a copy of the location record must be filed, under seal or upon oath as aforesaid, with an abstract of title certified as above by the proper Recorder, tracing the right of possession by a continuous chain of conveyances from the original locutors to the applicant.

Thirty-third. In the event of the mining records in any case having been destroyed by fire, or otherwise lost, affidavit of the fact should be made, and secondary evidence of possessory title will be received, which may consist of the affidavit of the claimant, supported by those of any other parties cognizant of the facts relative to his location, occupancy, possession, improvements, etc.; and in such case of lost records, any deeds, certificates of location or purchase, or other evidence which may be in the claimant's possession, and tend to establish his claim, should be filed.

Thirty-fourth. Upon the receipt of these papers, the Register will at the expense of the claimant, publish a notice of such application for the period of sixty days, in a newspaper published nearest to the claim, and will post a copy of such notice in his office for the same period.

Thirty-fifth. The notices so published and posted must be as full and complete as possible, and embrace all the data given in the notice posted upon the claim.

Thirty-sixth. Too much care cannot be exercised in the preparation of these notices, inasmuch as upon their accuracy and completeness, will depend, in a great measure, the regularity and validity of the whole proceeding.

Thirty-seventh. The claimant, either at the time of filing these papers with the Register, or at any time during the sixty days publication, is required to file a certificate of the Surveyor-general that not less than five hundred dollars worth of labor has been expended or improvements made upon the claim by the applicant or his grantors; that the plat filed by the claimant is correct; that the field notes of the survey, as filed, furnish such an accurate description of the claim, as will, if incorporated into a patent, serve to fully identify the premises, and that such reference is made therein to natural objects or permanent monuments, as will perpetuate and fix the locus thereof.

Thirty-eighth. It will be the more convenient way to have this certificate indorsed by the Surveyor-general, both upon the plat and field notes of survey filed by the claimant as aforesaid.

Thirty-ninth. After the sixty days period of newspaper publication has expired the claimant will file his affidavit, showing that the plat and notice aforesaid remained conspicuously posted upon the claim sought to be patented during said sixty days publication.

Fortieth. Upon the filing of this affidavit the Register will, if no adverse claim was filed in his office during the period of publication, permit the claimant to pay for the land according to the area given in the plat and field notes of survey aforesaid, at the rate of five dollars for each acre and five dollars for each fractional part of an acre, the receiver issuing the usual duplicate receipt therefor; after which the whole matter will be forwarded to the Commissioner of the General Land Office and a patent issued thereon if found regular.

Forty-first. In sending up the papers in the case the Register must not omit certifying to the fact that the notice was posted in his office for the full period of sixty days, such certificate to state distinctly when such posting was done and how long continued.

Forty-second. The consecutive series of numbers of mineral entries must be continued, whether the same are of lode or placer claims.

Forty-third. The Surveyor-general must continue to designate all surveyed mineral claims as heretofore by a progressive series of numbers, beginning with lot No. 37 in each township; the claim to be so designated at date of filing the plat, field notes, etc., in addition to the local designation of the claim; it being required in all cases that the plat and field notes of the survey of a claim must, in addition to the reference to permanent objects in the neighborhood, describe the locus of the claim with reference to the lines of public surveys by a line connecting a corner of the claim with the nearest public corner of the United States surveys, unless such claim be on unsurveyed lands at a remote distance from such public corner; in which latter case the reference by course and distance to permanent objects in the neighborhood will be a sufficient designation by which to fix the locus until the public surveys shall have been closed upon its boundaries.

Adverse Claims.

Forty-fourth. The seventh section of the act provides for adverse claims; fixes the time within which they shall be filed to have legal effect, and prescribes the manner of their adjustment.

Forty-fifth. Said section requires that the adverse claim shall be filed during the period of publication of notice; that it must be on the oath of the adverse claimant; and that it must show the "nature," the "boundaries" and the "extent" of the adverse claim.

Forty-sixth. In order that this section of law may be properly carried into effect, the following is communicated for the information of all concerned.

Forty-seventh. An adverse mining claim must be filed with the Register of the same land office with whom the application for patent was filed, or in his absence with the Receiver, and within the sixty days' period of newspaper publication of notice.

Forty-eighth. The adverse notice must be duly sworn to before an officer authorized to administer oaths within the land district, or before the Register and Receiver; it will fully set forth the nature and extent of the interference or conflict; whether the adverse party claims as a purchaser for valuable consideration or as a locator; if the former, the original conveyance, or a duly certified copy thereof, should be furnished, or if the transaction was a mere verbal one he will narrate the circumstances attending the purchase, the date thereof and the amount paid, which facts should be supported by the affidavit of one or more witnesses, if any were present at the time, and if he claims as a locator he must file a duly certified copy of the location from the office of the proper recorder.

Forty-ninth. In order that the "boundaries" and "extent" of the claim may be shown, it will be incumbent upon the adverse claimant to file a plat showing his claim and its relative situation or position with the one against which he claims, so that the extent of the conflict may be the better understood. This plat must be made from an actual survey by a United States deputy surveyor, who will officially certify thereon to its correctness; and in addition there must be attached to such plat of survey a certificate or sworn statement by the surveyor as to the approximate value of the labor performed, or improvements made upon the claim of the adverse party, and the plat must indicate the position of any shafts, tunnels, or other improvements, if any such exist upon the claim of the party opposing the application.

Fiftieth. Upon the foregoing being filed within the sixty days as aforesaid, the Register, or in his absence the Receiver, will give notice in writing to both parties to the contest that such adverse claim has been filed, informing them that the party who filed the adverse claim will be required within thirty days from the date of such filing to commence proceedings in a court of competent jurisdiction, to determine the question of right of possession, and to prosecute the same with reasonable diligence to final judgment; and that should such adverse claimant fail to do so, his adverse claim will be considered waived, and the application for patent will be allowed to proceed upon its merits.

Fifty-one. When an adverse claim is filed as aforesaid, the Register or Receiver will indorse upon the same the precise date of filing, and preserve a record of the date of notifications issued thereon; and thereafter all proceedings upon the application for patent will be suspended, with the exception of the completion of the publication and posting of notices and plat, and the filing of the necessary proof thereof, until the controversy shall have been adjudicated in court, or the adverse claim waived or withdrawn.

Fifty-second. The proceedings after rendition of judgment by the court in such case are so clearly defined by the act itself as to render it unnecessary to enlarge thereon in this place.

Placer Claims.

Fifty-third. The tenth section of the act under consideration provides "that the act entitled 'An act to amend an act granting the right of way to ditch and canal owners over the pub-

lic lands, and for other purposes,' approved July 9, 1870, shall be and remain in full force, except as to the proceedings to obtain a patent, which shall be similar to the proceedings prescribed by sections six and seven of this act for obtaining patents for vein or lode claims, but where said placer claims shall be upon surveyed lands and conform to legal subdivisions, no further survey or plat shall be required, and all placer mining claims hereafter located shall conform, as nearly as practicable, with the United States system of public land surveys and the rectangular subdivisions of such surveys, and no such locations shall include more than twenty acres for each individual claimant; but where placer claims cannot be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands," etc.

Fifty-fourth. The proceedings for obtaining patents for veins or lodes having already been fully given, it will not be necessary to repeat them here; it being thought that careful attention thereto by applicants and the local officers will enable them to act understandingly in the matter, and make such slight modifications in the notice, or otherwise, as may be necessary in view of the different nature of the two classes of claims, placer claims being fixed, however, at two dollars and fifty cents per acre, or fractional part of an acre.

Fifty-fifth. The twelfth and thirteenth sections of said act of July 9, 1870, read as follows:

Sec. 12. *And be it further enacted*, That claims, usually called "placers," including all forms of deposit, excepting veins of quartz, or other rock in place, shall be subject to entry and patent under this act, under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims: *Provided*, That where the lands have been previously surveyed by the United States, the entry in its exterior limits shall conform to the legal subdivisions of the public lands, no further survey or plat in such case being required, and the lands may be paid for at the rate of two dollars and fifty cents per acre: *Provided, further*, That legal subdivisions of forty acres may be subdivided into ten-acre tracts; and that two or more persons, or association of persons, having contiguous claims of any size, although such claims may be less than ten acres each, may make joint entry thereof: *And, provided further*, That no location of a placer claim, hereafter made, shall exceed one hundred and sixty acres for any one person or association of persons, which location shall conform to the United States surveys; and nothing in this section contained shall defeat or impair any bona fide pre-emption or homestead claim upon agricultural lands, or authorize the sale of the improvements of any bona fide settler to any purchaser.

Sec. 13. *And be it further enacted*, That where said person or association, they and their grantors, shall have held and worked their said claims for a period equal to the time prescribed by the statute of limitations for mining claims of the State or Territory where the same may be situated, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this act, in the absence of any adverse claim: *Provided, however*, That nothing in this act shall be deemed to impair any lien which may have attached, in any way whatever, to any mining claim or property thereto attached prior to the issuance of a patent.

Fifty-sixth. It will be observed that that portion of the first proviso to said twelfth section, which requires placer claims upon surveyed lands to conform to legal subdivisions, is repealed by the present statute with regard to claims heretofore located, but that where such claims are located previous to survey, and do not conform to legal subdivisions, survey, plat, and entry thereof, may be made according to the boundaries fixed by local rules, but that where such claims do conform to legal subdivisions, the entry may be effected according to such legal subdivisions, without the necessity of further survey or plat.

Fifty-seventh. In the second proviso to said twelfth section, authority is given for the subdivision of forty-acre legal subdivisions into ten-acre lots, which is intended for the greater convenience of miners in segregating their claims, both from one another and from intervening agricultural land.

Fifty-eighth. It is held, therefore, that under a proper construction of the law, these ten-acre lots in mining districts, should be considered and dealt with, to all intents and purposes, as legal subdivisions, and that an applicant having a legal claim which conforms to one or more of these ten-acre lots, either adjoining or cornering, may make entry thereof, after the usual proceedings, without further survey or plat.

Fifty-ninth. In cases of this kind, however, the notice given of the application must be very specific and accurate in description, and as the forty-acre tracts may be subdivided into ten-acre lots, either in the form of squares of ten by ten chains, or of parallelograms five by twenty chains, so long as the lines are parallel and at right angles with the lines of the public surveys, it will be necessary that the notice and application state specifically what ten-acre lots are sought to be patented, in addition to the other data required in the notice.

Sixtieth. Where the ten-acre subdivision is in the form of a square, it may be described, for instance, as the "S. E. $\frac{1}{4}$ of the S. W. $\frac{1}{4}$ of N. W. $\frac{1}{4}$," or, if in the form of a parallelogram as aforesaid, it may be described as the "W. $\frac{1}{2}$ of the W. $\frac{1}{2}$ of the S. W. $\frac{1}{4}$ of the N. W. $\frac{1}{4}$ (or the N. $\frac{1}{2}$ of the S. $\frac{1}{4}$ of the N. E. $\frac{1}{4}$ of the S. E. $\frac{1}{4}$) of section —, township —, range —," as the case may be; but, in addition to this description of the land, the notice must give all the other data that is required in a mineral application, by which parties may be put on inquiry as to the premises sought to be patented.

Sixty-first. The proceedings necessary for the adjustment of rights where a known vein or lode is embraced by a placer claim, are so clearly defined in the eleventh section of the act, as to render any particular instructions upon that point at this time unnecessary.

Sixty-second. When an adverse claim is filed to a placer application, the proceedings are the same as in the case of vein or lode claims, already described.

Quantity of Placer Ground Subject to Location.

Sixty-third. By the twelfth section of the said amendatory act of July 9, 1870 (third proviso), it is declared "that no location of a placer claim hereafter made shall exceed one hundred and sixty acres for any one person, or association of persons, which location shall conform to the United States surveys," etc.

Sixty-fourth. The tenth section of the act of May 10, 1872, provides that "all placer mining claims hereafter located shall conform as near as practicable with the United States system of public land surveys, and the rectangular subdivisions of such surveys, and no such locations shall include more than twenty acres for each individual claimant."

Sixty-fifth. The foregoing provisions of law are construed to mean that after the ninth day of July, 1870, no location of a placer claim can be made to exceed one hundred and sixty acres, whatever may be the number of locators associated together, or whatever the local regulations of the district may allow; and that from and after the passage of said act of May 10, 1872, no location made by an individual can exceed twenty acres, and no location made by an association of individuals can exceed one hundred and sixty acres, which location of one hundred and sixty acres cannot be made by a less number than eight bona fide locators, but that whether as much as twenty acres can be located by an individual, or one hundred and sixty acres by an association, depends entirely upon the mining regulations in force in the respective districts at the date of the location; it being held that such mining regulations are in no way enlarged by said acts of Congress, but remain intact and in full force with regard to the size of locations, in so far as they do not permit locations in excess of the limits fixed by Congress, but that where such regulations permit locations in excess of the maximums fixed by Congress as aforesaid, they are restricted accordingly.

Sixty-sixth. The regulations hereinbefore given as to the manner of marking locations on the ground, and placing the same on record, must be observed in the case of placer locations, so far as the same are applicable; the law requiring, however, that where placer claims are upon surveyed public lands, the locations must hereafter be made to conform to legal subdivisions thereof.

Sixty-seventh. With regard to the proofs necessary to establish the possessory right to a placer claim, the said thirteenth section of the act of July 9, 1870, provides that "where said person or association, they and their grantors, shall have held and worked their said claims for a period equal to the time prescribed by the statute of limitations for mining claims for the State or Territory where the same may be situated, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this act in the absence of any adverse claim."

Sixty-eighth. This provision of law will greatly lessen the burden of proof, more especially in the case of old claims located many years since, the records of which, in many cases, have been destroyed by fire, or lost in other ways during the lapse of time, but concerning the possessory right to which all controversy or litigation has long been settled.

Sixty-ninth. When an applicant desires to make his proof of possessory right in accordance with this provision of law, you will not require him to produce evidence of location, copies of conveyances, or abstracts of title, as in other cases, but will require him to furnish a duly certified copy of the sworn statement of limitations of mining claims for the State or Territory, together with his sworn statement giving a clear and accurate narration of the facts as to the origin of his title, and likewise as to the continuation of his possession of the mining ground covered by his application; the area thereof, the nature and extent of the mining that has been done thereon; whether there has been any opposition to his possession or litigation with regard to his claim; and if so, when the same ceased; whether such cessation was caused by compromise or by judicial decree, and any additional facts within the claimant's knowledge, having a direct bearing upon his possession and bona fides which he may desire to submit in support of his claim.

Seventieth. There should likewise be filed a certificate under seal of the court having jurisdiction of mining cases within the judicial district embracing the claim, that no suit or action of any character whatever involving the right of possession to any portion of the claim applied for is pending, and that there has been no litigation before said court affecting the title to said claim or any part thereof for a period equal to the time fixed by the statute of limitations for mining claims in the State or Territory as aforesaid, other than that which has been finally decided in favor of the claimant.

Seventy-first. The claimant should support his narrative of facts relative to his possession, occupancy, and improvements by corroborative testimony of any disinterested person or persons

of credibility who may be cognizant of the facts in the case and are capable of testifying understandingly in the premises.

Seventy-second. It will be to the advantage of claimants to make their proofs as full and complete as practicable.

Appointment of Deputy Surveyors of Mineral Claims—Charges for Surveys and Publications—Fees of Registers and Receivers, Etc.

Seventy-third. The twelfth section of the said act of May 10, 1872, provides for the appointment of surveyors of mineral claims, authorizes the Commissioner of the General Land Office to establish the rates to be charged for surveys and for newspaper publications, prescribes the fees allowed to the local officers for receiving and acting upon applications for mining patents and for adverse claims thereto, &c.

Seventy-fourth. The Surveyor-general of the several districts will, in pursuance of said law, appoint in each land district as many competent deputies for the survey of mining claims as may seek such appointment; it being distinctly understood that all expenses of these notices and surveys are to be borne by the mining claimants and not by the United States; the system of making deposits for mineral surveys, as required by previous instructions, being hereby revoked as regards field-work; the claimant having the option of employing any deputy surveyor within such district to do his work in the field.

Seventy-fifth. With regard to the platting of the claim and other office work in the Surveyor-general's office, that officer will make an estimate of the cost thereof; which amount the claimant will deposit with any assistant United States Treasurer, or designated depository in favor of the United States Treasurer, to be passed to the credit of the fund created by "individual depositors for surveys of the public lands," and file with the Surveyor-general duplicate certificates of such deposit, in the usual manner.

Seventy-sixth. The Surveyor-general will endeavor to appoint mineral deputy surveyors, as rapidly as possible, so that one or more may be located in each mining district for the greater convenience of miners.

Seventy-seventh. The usual oaths will be required of these deputies and their assistants as to the correctness of each survey executed by them.

Seventy-eighth. The law requires that each applicant shall file with the Register and Receiver a sworn statement of all charges and fees paid by him for publication of notice and for survey; together with all fees and money paid the Register and Receiver, which sworn statement is required to be transmitted to this office, for the information of the Commissioner.

Seventy-ninth. Should it appear that excessive or exorbitant charges have been made by any surveyor or any publisher, prompt action will be taken with the view of correcting the abuse.

Eightieth. The fees payable to the Register and Receiver, for filing and acting upon applications for mineral land patents, made under said act of May 10, 1872, are five dollars to each officer, to be paid by the applicant for patent at the time of filing, and the like sum of five dollars is payable to each officer by an adverse claimant at the time of filing his adverse claim.

Eighty-first. All fees or charges under this act, or the act of which it is amendatory, may be paid in United States currency.

Eighty-second. The Register and Receiver will, at the close of each month, forward to this office an abstract of mining applications filed, and a register of receipts, accompanied with an abstract of mineral lands sold.

Eighty-third. The fees and purchase money received by Registers and Receivers must be placed to the credit of the United States in the Receiver's monthly and quarterly account, charging up in the disbursing account the sums to which the Register and Receiver may be respectively entitled as fees and commissions, with limitations in regard to the legal maximum.

Eighty-fourth. The thirteenth section of the said act of May 10, 1872, provides that all affidavits required under said act, or the act of which it is amendatory, may be verified before any officer authorized to administer oaths within the land district where the claims may be situated, in which case they will have the same force and effect as if taken before the Register or Receiver, and that in cases of contest as to the mineral or agricultural character of land, the testimony and proofs may be taken before any such officer on personal notice of at least ten days to the opposing party, or if said party cannot be found, then, after publication of notice for at least once a week for thirty days, in a newspaper, to be designated by the Register as published nearest to the location of such land, proof of which notice must be made to the Register.

Eighty-fifth. The instructions heretofore issued with regard to disproving the mineral character of lands are accordingly modified so as to allow proof upon that point to be taken before any officer authorized to administer oaths within the land district, and that where the residence of the parties who claim the land to be mineral is known, such evidence may be taken without publication, ten days after the mineral claimants or affiants shall have been personally notified of the time and place of such hearing; but in cases where such affiants or claimants cannot be served with personal notice, or where the land applied for is returned as mineral upon the township plat, or where the same is now or may hereafter be suspended for non-mineral proof, by order of this office, then the party who claims the right to enter the land as agricultural will be required, at his own expense, to publish a notice once each week for five consecutive weeks in the newspaper of largest circulation published in the county within which said land is situated, or if no newspaper is published within such county, then in a newspaper published in an adjoining county; the newspaper in either case to be designated by the Register; which notice must be clear and specific, embracing the points required in notices under instructions from this office of March 20, 1872, and must name a day after the last day of publication of such notice, upon testimony as to the character of the land will be taken, stating before what magistrate or other officer such hearing will be had, and the place of such hearing.

Mill-Sites.

Eighty-sixth. The fifteenth section of said acts provides, "That where non-mineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such non-adjacent surface ground may be embraced and included in an application for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notice, as are applicable under this act to veins or lodges; *Provided*, That no location hereafter made of such non-adjacent land shall exceed five acres, and payment for the same must be made at the same rate as fixed by this act for the superficies of the lode. The owner of a quartz mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his mill-site as provided in this section."

Eighty-seventh. To avail themselves of this provision of law, parties holding the possessory right to a vein or lode, and to a piece of land not contiguous thereto, for mining or milling purposes, not exceeding the quantity allowed for such purpose by the local rules, regulations, or customs, the proprietors of such vein or lode may file in the proper land office their application for a patent, under oath, in manner already set forth herein, which application, together with the plat and field notes, may include, embrace, and describe in addition to the vein or lode, such non-contiguous mill-site, and after due proceedings as to notice, etc., a patent will be issued conveying the same as one claim.

Eighty-eighth. In making the survey in a case of this kind, the lode claim should be described in the plat and field notes as "Lot No. 37, A," and the mill-site as "Lot No. 37, B," or whatever may be its appropriate numerical designation; the course and distance from a corner of the mill-site to a corner of the lode claim to be invariably given in such plat and field notes, and a copy of the plat and notice of application for patent must be conspicuously posted upon the mill-site as well as upon the vein or lode for the statutory period of sixty days. In making the entry, no separate receipt or certificate need be issued for the mill-site, but the whole area of both lode and mill-site will be embraced in one entry, the price being five dollars for each acre and fractional part of an acre embraced by such lode and mill-site claim.

Eighty-ninth. In case the owner of a quartz mill or reduction works is not the owner or claimant of a vein or lode, the law permits him to make application therefor in the same manner prescribed herein for mining claims, and after due notice and proceedings, in the absence of a valid adverse filing, to enter and receive a patent for his mill-site, at said price per acre.

Ninetieth. In every case there must be satisfactory proof that the land claimed as a mill-site is not mineral in character, which proof may, where the matter is unquestioned, consist of the sworn statement of the claimant, supported by that of one or more disinterested persons, capable from acquaintance with the land to testify understandingly.

Ninety-first. The law expressly limits mill-site locations made from and after its passage to five acres, but whether so much as that can be located, depends upon the local customs, rules, or regulations.

Ninety-second. The Registers and Receivers will preserve an unbroken consecutive series of numbers for all mineral entries.

Proofs of Citizenship of Mining Claimants.

Ninety-third. The proof necessary to establish the citizenship of applicants for mining patents, whether under the present or past enactments, it will be seen by reference to the sev-

enth section of the act under consideration, may consist, in the case of an individual claimant, of his own affidavit of the fact; in the case of an association of persons not incorporated, of the affidavit of their authorized agent, made on his own knowledge or upon information and belief, that the several members of such association are citizens; and in the case of an incorporated company, organized under the laws of the United States, or the laws of any State or Territory of the United States, by the filing of a certified copy of their charter or certificate of incorporation.

Ninety-fourth. These affidavits of citizenship may be taken before the Register or Receiver, or any other officer authorized to administer oaths within the district.

Ninety-fifth. Copies of the previous mining statutes of Congress, dated respectively July 26, 1866, and July 9, 1870, are hereto attached. Sections one, two, three, four and six of the former being expressly repealed by the ninth section of the act of May 10, 1872, aforesaid, which in its sixteenth section also repeals all acts and parts of acts inconsistent with its provisions.

Ninety-sixth. The foregoing will be followed in due time by such further instructions as actual experience in the administration of the statute may render necessary.

Very respectfully,

Your obedient servant,

WILLIS DROMMOND, Commissioner.

To Registers and Receivers and Surveyors-general.

Mining Statute of July 26, 1866.

AN ACT granting the right of way to ditch and canal owners over the public lands, and for other purposes.

[NOTE.—Sections 1, 2, 3, 4 and 6 of this act have been repealed, so they are not given here.—ED.]

SECTION 5. *And be it further enacted*, That as a further condition of sale, in the absence of necessary legislation by Congress, the local Legislature of any State or Territory may provide rules for working mines, involving easements, drainage, or other necessary means to their complete development; and those conditions shall be fully expressed in the patent.

Sec. 7. *And be it further enacted*, That the President of the United States be, and is hereby, authorized to establish additional land districts, and to appoint the necessary officers under existing laws, whenever he may deem the same necessary for the public convenience in executing the provisions of this act.

Sec. 8. *And be it further enacted*, That the right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted.

Sec. 9. *And be it further enacted*, That whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes aforesaid is hereby acknowledged and confirmed; *Provided*, however, that whenever, after the passage of this act, any person or persons shall, in the construction of any ditch or canal, injure or damage the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

Sec. 10. *And be it further enacted*, That whenever, prior to the passage of this act, upon the lands heretofore designated as mineral lands, which have been excluded from survey and sale, there have been homesteads made by citizens of the United States, or persons who have declared their intention to become citizens, which homesteads have been made, improved, and used for agricultural purposes, and upon which there have been no valuable mines of gold, silver, copper, or other minerals discovered, and which are properly agricultural lands, the said settlers or owners of such homesteads shall have a right of pre-emption thereto, and shall be entitled to purchase the same at the price of one dollar and twenty-five cents per acre, and in quantity not to exceed one hundred and sixty acres; or said parties may avail themselves of the provisions of the Act of Congress, approved May twenty, eighteen hundred and sixty-two, entitled "An act to secure homesteads to actual settlers on the public domain," and acts amendatory thereof.

Sec. 11. *And be it further enacted*, That upon the survey of the lands aforesaid, the Secretary of the Interior may designate and set apart such portions of the said lands as are clearly agricultural lands, which lands shall thereafter be subject to pre-emption and sale as other public lands of the United States, and subject to all the laws and regulations applicable to the same. Approved, July 26, 1866.

Mining Statute of July 9, 1870.

AN ACT to amend "An Act granting the right of way to ditch and canal owners over the public lands, and for other purposes."

[NOTE.—All that part of the law from section one to eleven inclusive has been repealed, and is not given here.—ED.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the act granting the right of way to ditch and canal owners over the public lands, and for other purposes, approved July twenty-six, eighteen hundred and sixty-six, be, and the same is hereby amended, by adding thereto the following additional sections, numbered twelve, thirteen, fourteen, fifteen, sixteen, and seventeen, respectively, which shall hereafter constitute and form a part of the aforesaid act.

Sec. 12. *And be it further enacted*, That claims usually called "placers," including all forms of deposit, excepting veins of quartz, or other rock in place, shall be subject to entry and patent under this act, under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims; *Provided*, that where the lands have been previously surveyed by the United States, the entry, in its exterior limits, shall conform to the legal subdivisions of the public lands, no further survey or plot in such case being required, and the lands may be paid for at the rate of two dollars and fifty cents per acre; *Provided*, further, that legal subdivisions of forty acres may be subdivided into ten-acre tracts; and that two or more persons, or associations of persons, having contiguous claims of any size, although such claims may be less than ten acres each, may make joint entry thereof; *And, provided further*, that no location of a placer claim, hereafter made, shall exceed one hundred and sixty acres for any one person or association of persons, which location shall conform to the United States surveys; and nothing in this section contained shall defeat or impair any bona fide pre-emption or homestead claim upon agricultural lands, or authorize the sale of the improvements of any bona fide settler to any purchaser.

Sec. 13. *And be it further enacted*, That where said person or association, they and their grantors, shall have held and worked their said claims for a period equal to the time prescribed by the statute of limitations for mining claims of the State or Territory where the same may be situated, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereto under this act, in the absence of any adverse claim; *Provided*, however, that nothing in this act shall be deemed to impair any lien which may have attached in any way whatever to any mining claim or property thereto attached prior to the issuance of a patent.

Sec. 14. *And be it further enacted*, That all ex parte affidavits required to be made under this act, or the act of which it is amendatory, may be verified before any officer authorized to administer oaths within the land district where the claims may be situated.

Sec. 15. *And be it further enacted*, That Registers and Receivers shall receive the same fees for services under this act as are provided by law for like services under other acts of Congress; and that effect shall be given to the foregoing act according to such regulations as may be prescribed by the Commissioner of the General Land Office.

Sec. 16. *And be it further enacted*, That so much of the act of March third, eighteen hundred and fifty-three, entitled "An Act to provide for the survey of the public lands of California, the granting of pre-emption rights, and for other purposes," as provides that none other than township lines shall be surveyed where the lands are mineral, is hereby repealed. And the public surveys are hereby extended over all such lands; *Provided*, that all subdividing of the surveyed lands into lots of less than one hundred and sixty acres may be done by county and local surveyors at the expense of the claimants; *And, provided further*, that nothing herein contained shall require the survey of waste or useless land.

Sec. 17. *And be it further enacted*, That none of the rights conferred by sections five, eight, and nine of the act of which this is amendatory shall be abrogated by this act; and the same are hereby extended to all public lands affected by this act; and all patents granted, or pre-emption or homesteads allowed, shall be subject to any vested and accrued water rights, or rights to ditches and reservoirs used in connection with such water rights as may have been acquired under or recognized by the ninth section of the act of which this act is amendatory. But nothing in this act shall be construed to repeal, impair, or in any way affect the provisions of the "Act granting to A. S. the right of way and other privileges to aid in the construction of a draining and exploring tunnel to the Comstock lode, in the State of Nevada," approved July twenty-fifth, eighteen hundred and sixty-six. Approved July 9, 1870.

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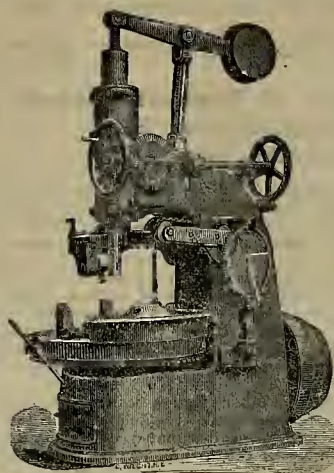
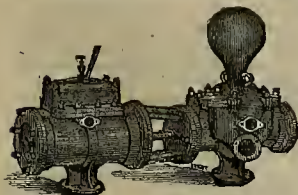
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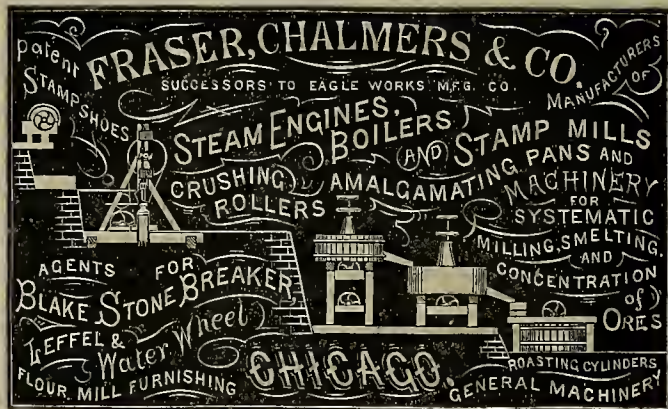
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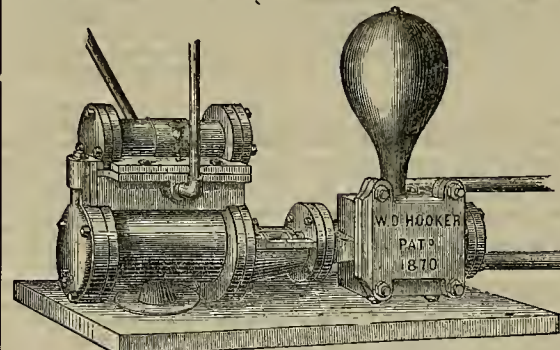
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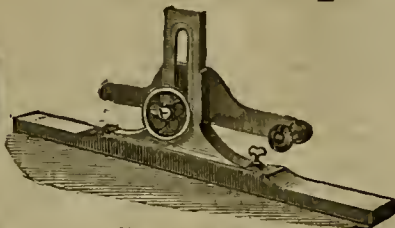


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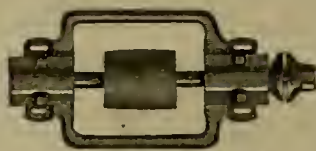
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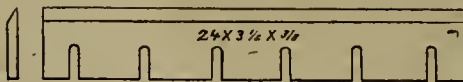
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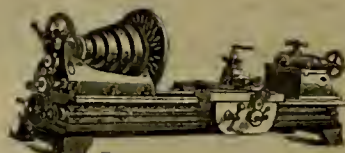
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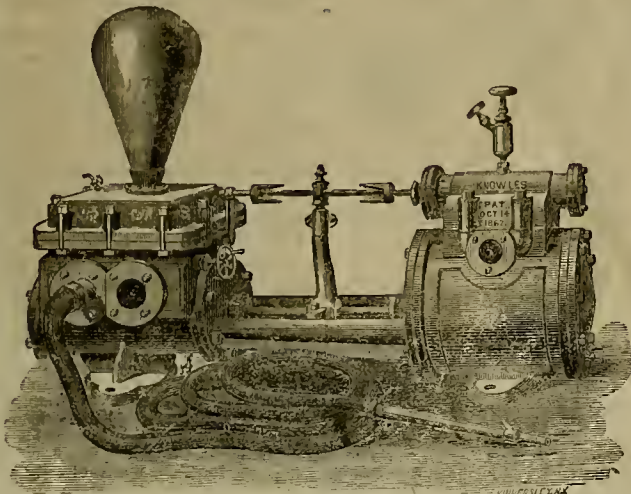


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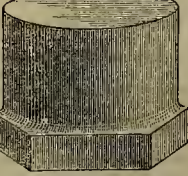
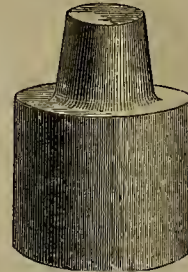
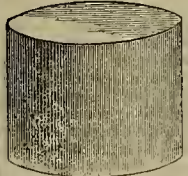
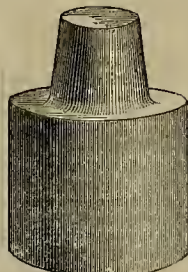
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POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Eighth Lecture Delivered before the University of California College of Agriculture, on Thursday, January 28th, by PROF. C. E. BRADY.

Spurgeworts, Laurets and Olives.

The topic to-day is, first, the Spurgeworts, the plants belonging to the order *Euphorbiaceae*. The order is to some extent represented here, so that probably you are somewhat familiar with its characteristics. It is one of the most extensive orders we have, numbering fully three thousand species, distributed in all climates. In the temperate countries they are herbaceous, in many cases very small plants growing to a height of four or five inches. In South and East Africa they have leafless, succulent stems, often rising to the height of trees, being very much in shape like the cactus, while in tropical and South America they become very large trees. Throughout the whole order there is a continuous milkiness in the juice. This juice is in many cases exceedingly poisonous, so that we may put down the order as a poisonous one. The plant of greatest importance is the one from which we derive our supply of India rubber or caoutchouc. It is a large tree, *Siphonia elastica*, growing to a height of eighty or one hundred feet; found in Brazil, Guiana and Central America. It abounds very largely in the islands found in the Amazon river. You know the Amazon river spreads out so that a wide portion of its islands and banks are at times covered with water. In obtaining the rubber, the natives begin just after the water has subsided. They cut into the tree, making great incisions into the sides of the stems, and from these there flows abundance of milky sap. This is collected in large vessels and dried. The usual method is to collect it on some large surface and dry it. The natives found it useful in making all sorts of articles, and so they would make moulds for that purpose. Suppose they wanted to make a bottle; they would make a mould representing the inside of the bottle; they would then dip this mould in the liquid material at intervals, thus forming layer after layer, until the desired thickness is obtained; they would then break the mould and shake it out. Shoes were made in the same way. Even now, the rubber is brought to America very largely in shape of such things. Its black color is largely due to hanging in the smoke. If it was carefully prepared, it would be

Much Lighter Colored.

It is brought here to the United States, also to Great Britain, and manufactured in various forms. The first knowledge Europeans had of it was obtained at the time Columbus first discovered the continent. He found the natives used rubber balls, and various utensils of different kinds; but, until 1820, they made very little use of it but for erasing; from that time it got the name of India rubber. Priestly made the observation that it was useful. In 1820, India rubber clothing was manufactured from it. In 1842, it was hardened by vulcanizing it. Since that, all sorts of uses have been found for it, indeed there is scarcely an industry, scarcely an art, but that has very much to do with this vulcanized rubber. In your chemical works, you find it impossible to get on a day without this, in its vulcanized form. The fear is, it will

Become Extinct.

These natives go in there and cut and slash away at the trees; they take no pains to grow them, so that there is very great danger of their being entirely destroyed. Probably the best way to remedy this is to call the attention of governments to the subject. Great Britain has been memorialized. Our Government ought to be also. It could be grown on any of the islands lying within the tropics.

The box tree, *Buxus sempervirens*, is a native of Europe and also of Asia. It grows to the height of twenty to thirty feet, and attains a diameter of four, six, eight or ten inches. It very seldom grows larger than this. Its use is for manufacturing the finer mathematical instruments, and also bushing and works of the smaller kinds of machinery, also in engraving, because of the hardness and fineness of its wood. In engraving it is very much used, as it is fitted especially for this. Our supply comes almost entirely from the Mediterranean basin and from the region lying in the vicinity of the Black sea.

It Can Be Grown Here

Very readily, can be grown throughout almost all parts of the Southern United States. Its growth is slow; however, it should be introduced here. It is the same thing as the English box.

English box is only the dwarf variety, and as this grows very readily—being cultivated as a border plant—it is probable that the tree would do well here. In fact, our climate is very much like the climate in which the tree grows. The castor oil plant, *ricinus communis*. A large, herbaceous plant, native of the East Indies, now grown in almost all of the warmer climates; grown as far north as 38° to 40° in the United States; is grown now in portions of Missouri and also in portions of Illinois, and States being southward. From its seed castor oil used largely in medicine) is obtained by

pressure. In Central Europe it is grown for feeding silk-worms. The leaves are very large and there are a great many on each plant, so that a great deal of food is provided in this way for the worms.

There are a great many other plants belonging to this order which are of a good deal of importance, but I have selected some of the most value. I might have mentioned the *croton tiglium* of India, from which croton oil is obtained.

African teak is the product of *Oldfieldia Africana*, and is a very heavy, hard wood. It is found that it is best to use in constructing steamships, in building up the woodwork near the fires and near the boilers. It seems to stand a

High Degree of Heat

Without catching fire. Ought to be more largely used. It, however, comes from Africa, so that we probably cannot grow it here.

The laurel group, *Lauraceae*, is not a large family, numbering only about five hundred species. These are mostly evergreen trees, and are found in the temperate and tropical climates. Throughout the whole order there runs a sort of aromatic principle which in some cases is sufficiently concentrated to become medicinally valuable.

The order derives its name from the bay tree, or the laurel tree, as it is sometimes called; *Laurus nobilis*, a native of Europe. This is the bay, or the laurel that we read so much about in literature. It is a tree about forty or fifty feet in height, and has beautiful leaves, to some extent resembling the leaves of trees here. In olden times these leaves were used to crown heroes—now-a-days they are put to other uses. The testimony runs this way: They are used for flavoring custards and puddings, and for imparting a

Fictitious Flavor to Figs

When packed for shipping. Bay rum is not from that tree, but from one allied to it.

Cinnamon, *Cinnamomum Zeylanicum*, is a native evergreen tree of Ceylon, and is extensively cultivated on that island, also on the Malabar coast, and in Java and Cayenne, for the sake of the aromatic bark of its young branches.

It is a shrub tree; that is, it is very much inclined to send up a great many reed-like little stems, and they are selected for peeling when they are about three years old, and one-half inch to an inch in size. Workmen go along, run their knives down the sides of these stems, and the whole bark is stripped off. In a day or two the epidermis—corky and green layers—can be removed, so that only the older inner fibers of the bark remain. This takes on a brown color, and is brought to market in the quill-like form in which it is arranged. In selecting, the outer bark is rejected in the true cinnamon. True cinnamon should be of a rich brown color; should be very thin, about as thick as four or five sheets of paper, not much thicker than that, and should be exceedingly fragrant.

Now, allied to this tree from which true cinnamon is obtained, we have two others—C.



Fig. 1. The Olive Branch.

aromaticum and *C. cassia*, natives of Ceylon, from which, as well as from the older branches of the species already noticed, cassia bark—may be considered as a kind of inferior cinnamon—is obtained. This bark is thicker and has more of a bitterness and a pungency than the true cinnamon. Instead of occurring in long, quill-like pieces, it is in the form of thick chips; as, instead of taking that great pains which they do with true cinnamon, they simply cut and slash away at it in about the same way we would take a drawing-knife and peel off the bark of an ordinary tree. It is used as a substitute for, and also to mix with, the true cinnamon. You go to any of the ordinary shops and call for cinnamon, you will find what is properly called *cassia bark* in it and some places it is found without any cinnamon at all. I have seen many specimens that seemed to be

Nothing but Cassia Bark.

Whenever you find cinnamon occurring in chip-like masses you may be sure it is not true cinnamon at all, but it is really cassia bark. Taking the British statistics, the amount annually consumed in England is some thirty to forty tons true cinnamon and about two hundred tons of this cassia bark which might be called false cinnamon. Cassia buds are derived from the last named species.

The camphor tree, *Camphora officinarum*, be-

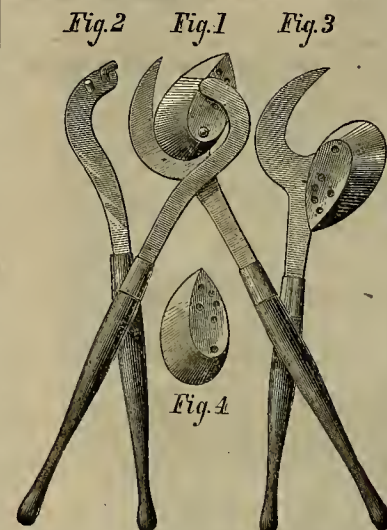
longs to this order; is a native of China and Japan and is now grown very much on the island of Formosa. The wood is of considerable value. It is used in the manufacture of trunks, chests and other things where the fragrance is of some importance, and from the wood is also obtained the camphor that is found in the shops.

In order to obtain this, the wood is chopped up, thrown into water and subjected to heat; camphor being volatile, passes over and is condensed. It is then brought to this country and used for medicine. Clothes put into a trunk or chest made of camphor-wood, are almost always preserved from moths, as these insects seem not to like it.

The California laurel, *Oreodaphne Californica*, is our only representative of this order. It is possible, another representative one—a little shrubby one—may be found here. But this, I understand, the only one giving value to the order here. The wood of this laurel is, as you know,

Quite Valuable.

I find that it has not been used as much as it might have been, or as much as it should be. It is considered sufficiently ornamental in England to be used in the gardens there quite considerably, and there they have introduced it



Broadbros' Excelsior Pruning Shears.

under a different name, and I have little doubt but that you will find it before many years brought back from there and sold under that name to our people for a new plant. Of course it will do very well. It will do just as well to use the wild plant, however.

In the United States, east of the Rocky mountains, another tree, the *Sassafras*, (*Sassafras officinalis*), is of some importance, as furnishing a very spicy bark which is supposed to be very valuable in medicine; it is used somewhat.

The last family that I call your attention to, is the

Olive Family.

Oleaceae, (see fig. 1). It is smaller than the preceding, numbering but a hundred and fifty species. They are all trees; or, if they are not trees, they are shrubs. We might say they are trees, or shrubs more or less inclined to be tree-like, natives of the temperate, northern hemisphere, and to a limited extent of the southern. The order is of importance, as furnishing us some valuable woods. First or probably most important is the European ash, (*Fraxinus Excelsior*), a large tree extensively planted in Europe. The wood is used wherever strength, lightness and hardness are desirable. Without any question this could be very profitably introduced into California. It would grow without any doubt, and as we are somewhat short of wood of that character, it would be well to see what could be done by way of introducing it. In the eastern United States, *Fraxinus Americana* seems to take its place. It is there called white ash, and is somewhat related to the European one. Its wood is equally valuable, and it is largely used for the insides of railroad and street cars. For any use where lightness and toughness are necessary, it is valuable. It is used very largely in the manufacture of useful agricultural implements, and when kept reasonably dry the wood is very durable also. This American species grows somewhat larger than the *Excelsior*, preferring the rich soils lying midway between the lowlands and uplands, and

Might be Introduced Here with Advantage. But probably it could not be as well grown as the European, so I would advise the introduction of the *Excelsior* rather than the *Americana*. In some parts of California occurs what is called Oregon ash, (*F. Oregona*). It is a tree attaining a diameter of from twelve inches upwards, found in Oregon and probably the northern portions of this State. I don't know whether it grows as far south as this or not.

I have here specimens from a small tree of it, also the curly form which seems to have been taken from a knot or something like that. I could not find any of the straight-grained timber in the collection. This is very largely used here in the city of San Francisco. I find that our manufacturers use it very extensively. They use it along with the *Americana* which they import from the Eastern States.

The name of the order is derived from the olive, *Olea Europea*. It is a native probably of

Western Asia. Its name would lead one to suppose it was a native of Europe, but that is not the case. It is, I think, grown to a limited extent in the southern portion of this State, somewhat in the Southern U. S., in the West India Islands, but more extensively in the basin of the Mediterranean. From its fruit, which is a small, blue black, cherry-like fruit, is obtained the sweet olive oil. This fruit is gathered ripe, subjected to pressure for the purpose of extracting the oil. The wood of the tree is very hard, of a yellowish white color and is exceedingly durable. It is used in the manufacture of small implements and utensils in very nearly the same way that box-wood is used and can be used for very nearly the same purposes.

Manna, found in the shops, is the product of a species of ash, *Fraxinus arnus*, found in Southern Europe. Calling for manna at any of the druggists, you will be shown a very peculiar, waxy material which is the product of *Fraxinus arnus*. Upon making incisions into the tree the juice exudes and hardens, producing manna.

The order is of some little importance for its ornamental representatives. Of these we need only mention the fringe tree, grown extensively in Quebec; the lilac and the jessamine. Having gone over three groups, although I have not used up the hour by any means, I perhaps have given you material enough to work up for this time.

Broadbros' Excelsior Pruning Shears.

We illustrate herewith a novel pruning shears, the feature of which is a cam-shaped blade, for giving a very powerful drawing cut.

Fig. 1 represents the shears partially open, showing how the drawing cut is secured. Fig. 2 is the wrench or lever, provided with a hook and stud that drop in perforations on the blade, Fig. 4. Fig. 3 is the other handle, with the blade turned back against the shank, forming, when used singly or without the lever wrench, a hatchet, or knife, for trimming small limbs, sprouts or shrubbery. The cam-shaped knife-blade is provided with a series of perforations to receive the hook and stud of the lever wrench. When the handles, Fig. 1, are brought toward each other, as is evident, the drawing cut is produced. The point of contact of the knife edge with the limb, where the power is to be applied to do the cutting, is inside the pivot or bolt that holds the blade. The shape of the hook, Fig. 3, is such as to bring the limb to be cut directly under the fulcrum or pivot on which the blade operates. When the knife blade is applied it holds the limb firmly until cut, and prevents its slipping on the hook. Injury to the bark is prevented, also any crushing of the limbs, the ends being left smooth enough for grafting. In other pruning shears, where the power is applied outside of, and at a distance from the fulcrum or pivot which holds the two jaws together, slipping of the limb often occurs, thereby mangling the bark. The very long handles also employed frequently crush the branches. The handles of the shears represented in the engraving are only eighteen inches in length, so that the power is in the shears itself instead of in long handles.

The efficiency of the device is very remarkable, judging from specimens of its operation forwarded to us. Two fragments of boughs are before us—one 1½ inches, and the other 2½ inches in diameter, each of which has been divided with a clean, smooth cut, apparently at a single stroke. The wood is hard maple and the length of the cut is greater than the above diameters, owing to its being made at an angle.

For information relative to the additional advantages of the tool, and descriptive circulars, address Broadbros & Co., Batavia, N. Y.

Interesting Analogies in Nature.

A physician has recently published a pamphlet advancing a curious theory of the "oneness of the earth system." This he attempts to prove by means of the resemblance in form between the parts of the human body and many vegetable productions; and the following are some of the analogies in his ingenious argument:

"Thus the cocoa-nut is, in many respects, like the human skull, although it more closely resembles the skull of the monkey, and may perhaps serve Darwin's purpose as a link between the two; a sponge may be so held as to remind one of the unfinished face of the skeleton; and the meat of an English walnut is almost an exact representation of the brain. Plums and black cherries resemble the human eye; almonds and some other nuts resemble the different varieties of the human nose; and an open oyster and its shell are a perfect image of the human ear. 'The shape of almost any man's body,' we are told, 'may be found in the various kinds of mammoth pumpkins.' The open hand may be found in the form assumed by scrub willows and growing celery. The German turnip and the egg plant resemble the human heart. The author finds other striking resemblances between human organs and certain vegetable forms. In the course of his investigations he traces the forms of many mechanical contrivances now in common use back to the patterns furnished by nature. Thus he tells us that the hog suggested the plow, the butterfly the ordinary hinge, the toadstool the umbrella, the duck the ship, the fungus growth on trees the bracket."

Pliocene Terraces in California.

[By J. O. Cooper, M.D.]

The recent article by Mr. Amos Bowman, on "Terraces in the Coast Range" (MINING AND SCIENTIFIC PRESS, March 20, 1875), disputes some of the facts stated by me in an article on "California in the Pliocene Epoch," printed in your journal for Oct. 10th, 1874. I am therefore called upon to notice briefly a few of the points in which Mr. Bowman's statements differ from my own.

1. I am willing to leave it to the observation of any impartial geologist whether any terraces can be seen on the San Francisco peninsula north of Point Pedro or inside the Golden Gate, either east or west of the Bay.

2. The terraces described by Prof. Davidson cannot be traced by anyone (except Mr. Bowman), north of Point Pedro or inside of the Bay. Where they do exist abundantly, as near Santa Cruz, they are evidently post-pliocene, for they have been cut from the slopes of pliocene and miocene strata, which themselves are usually inclined at angles quite uncomfortable with the terraces.

3. If any one sees evidence in my paper that I consider "terrace as signifying the same thing as a bed or stratum," I hope the above statement will correct the idea. In certain cases, however, terraces do conform to strata of undoubtedly pliocene age, and these I referred to as existing "at low levels around the Bay." These are not, however, marine terraces, but of fresh water origin, and have not been described in any printed work. When the state of California becomes rich enough to publish the results of several years' work done by one of her most faithful and unjustly abused scientists, the late State Geologist, and his assistants, something more will be known of these interesting formations. Meantime, it is better to "go slow," and state only well determined facts.

4. If Mr. Bowman found any Pliocene shells at heights of 700 and 1000 feet (as he may have done), they must have been washed from the highly inclined marine pliocene strata between Lake Merced and Point Pedro. As the terraces were the effect of erosion "by the receding sea," of course no deposits of shells could be found in them. I am happy to say that I agree with Mr. Bowman as well as with all geologists that I know of, in considering the marine terraces outside of the bay as thus formed, and that there is no evidence to sustain Prof. Davidson's theory that ice assisted in this action. Similar erosion is still going on, especially on the southern coast. This is so generally accepted that I did not consider it worth discussion in former articles.

5. I did not attempt to connect these Coast Range uplifts with the Pliocene strata of the Sierra Nevada, having seen but little of the latter, and I consider the evidence so far known to prove a long period of time between the older and newer of the pliocene formations, but do not propose now to discuss this point further than to state that similar fresh water deposits were made in the Coast Range at a rather later time than those so extensive in the Sierra.

6. The last column of Mr. Bowman's article is rather obscure, but if he wishes for evidence of volcanic outflows above glacial moraines and striated rocks, I doubt not he can find it near the recent volcano described by Dr. Harkness in the MINING AND SCIENTIFIC PRESS of November 21st, 1874, as well as about many others less recent. He may find, by late geological text-books, that since the pliocene epoch there have been vast changes in the earth's surface, before any evidence is found of man's existence; changes as great as the new river beds of the Sierra seem to require. Using the term quaternary instead of post pliocene, Prof. Dana divides it thus:

Quaternary Age.

Period 1. Glacial or drift. Period 2. Champlain (melting). Epoch 1. Diluvian. Epoch 2. Alluvial. Epoch 3. Recent. Era 1. Reindeer or second glacial. Era 2. Modern.

In Europe, if not in America, man probably existed in the reindeer era. The *Mastodon Americanus* seems to have been cotemporary, even if the last of this species was not killed by man, as has been asserted. Now, the most complete estimate (Dana's Manual, 1874, p. 590), gives between 31,000 and 380,000 years as having elapsed since the mastodon existed in the later Champlain epochs, just before the recent period began. Taking the lowest estimate as right, there has certainly been ample time for all of our surface erosions.

DURING the year 1874 the coinage executed at the Carson mint in gold was 158,139 pieces, worth \$2,670,675, and in silver 1,459,017 pieces, worth \$1,411,781 70. The average during 1874 was three times greater than any previous year. The coinage at present consists of \$300,000 in gold and \$200,000 in silver per month. The monthly deposits amount to \$400,000 in gold and \$300,000 in silver.

THE water has been drained from shaft No. 2 on the line of the Sutro tunnel. There is still a considerable flow through the drill-hole made from the header, but it is only of water which naturally flows from the west country rock.

ABOUT 600 men are now at work in the Consolidated Virginia mine. In all, the company employ nearly 800 men.

Brooks' Improvement in Distilling.

A correspondent writes us from Santa Clara as follows: "In a late number of your journal you give a partial description of an alleged improvement in distilling, patented by Mr. Brooks, at the close of which you promise to speak again of the invention. In case you do, will you please enlighten us on a point mentioned, which I cannot understand? While Mr. Brooks' arrangement may work satisfactory in practice, the theory must be wrong, in my view. We all know that water, unless confined in a steamtight vessel, can not be raised to a higher degree than 212°. Now, water being somewhat thicker, may be raised a few degrees higher, but never to 269°, which is said to be necessary to vaporize fusil. But we all know that fusil will pass over, consequently it must vaporize at little above the boiling point of water, or it would not do it, and would remain in the wort. Will you please explain?"

In answer to the above, we inform our correspondent that Mr. Brooks does not vaporize the fusil oil, but leaves it in the wort. His still is so constructed that he cannot by any possibility create a pressure inside of it, therefore, the heat in the still being not over 212°, the fusil oil which requires 269° of heat to be converted into vapor must of necessity remain in the wort, and when the spent wort is withdrawn from the still, the fusil oil goes with it to the sewer. The ether is first got rid of by a preliminary condensing process, and is entirely withdrawn from the still before the alcoholic vapors begin to vaporize. This leaves him free to withdraw the alcohol, water and essential oil of the grain without fear of carrying over the fusil.

The Microscopical Society.

The San Francisco Microscopical Society held its regular meeting on Thursday evening, President Ashburne in the chair. Two proposals for resident membership were received, and Henry Molineaux, Esq., was elected as such.

Under the head of donations to the cabinet, Mr. C. G. Ewing presented a slide mounted with a colony of polyps, *serularia*, in glycerine from San Pedro bay.

C. Mason Kinne donated five slides mounted by him, comprising the elytron of a beetle, showing very marked peculiarities; raw cotton from near Visalia, Cal.; scale of salmon; raw cotton from New Mexico; and white horse hair; the three last named being mounted in balsam, for the polariscope, and which proved worthy objects for observation with that accessory. Col. Kinne exhibited some living *protococcus*, which vegetable, moving freely in the same drop of water with the animal forms *paramacium vorticella* and others, and aided to show how nearly the two great animal kingdoms are allied in the so-called lower forms of life.

Dr. Eiseu exhibited the tentacles of barnacles (*lepas*), and a variety of marine algae (*ulva*).

Mr. Hyde, Vice-President of the Society, read an interesting letter addressed to the members of the Society, from Mr. Joseph Beck of London, corresponding member, from which we quote the following: "It is from those enthusiastic and ardent workers with our favorite instrument, living in new countries and surrounded with objects inviting their examination, that we expect fresh contributions to our stock of knowledge. In microscopical apparatus there is but little new. We have increased the angle of our Achromatic Condenser to suit the purposes of those who are still studying the ultimate structure of the diatoms, and under the direction and with the assistance of Mr. Sorby, are introducing various novelties in connection with the spectroscopic, which is still claiming much attention. The intricate nature of some of these investigations, and the uncertainties attending some of them, have led some even to doubt the value of results obtained; but each new fact is a step in advance, and I cannot but believe that in due time the appearance presented under this instrument will be of great value to science. We have yet much to learn, and I think that one branch that may be of use will be the ascertaining of the time required for the absorption by vegetables of certain substances, thus aiding both the farmer and the fruit-grower in the cultivation of their crops. Some of the most interesting lectures we have had over here, have been on the instincts and queer reasoning faculties of insects, by Sir J. Lubbock, and on the great discoveries of submarine matter, resulting from the expedition of the "Challenger."

A BLOCK of marble 30 feet 5 inches long, by 20 feet wide, and 10 feet in thickness, weighing about 610 tons, was recently quarried near Columbia, Tuolumne county. It will be reduced to smaller blocks and taken to San Francisco for the Palace Hotel.

SEVERAL mining companies in Nevada county are employing Chinese labor, to the exclusion of white laborers, whereat the latter are very much excited, as it is natural they should be.

WORK has been resumed at the Santa Cruz powder mills, after a stoppage of some weeks. They will run 13 mills, employing 120 hands.

California Railroad Items.

Railroad building and surveying is pretty brisk in California just at present, and a number of new lines are projected. In other places railroads are being extended, and general activity in this line prevails. We append a brief synopsis of what is being done in different places:

A NARROW gauge railroad from San Luis Obispo down the coast to Gualdape in Santa Barbara county, is to be constructed immediately. In fact, two of them, that of Goodall, Nelson & Perkins, and another by the Hartford railroad company; and the Santa Barbara Press urges citizens of that place to build on from there to meet it. If this were done, the road would soon be carried on to Salinas, and railway connections with this city would be soon accomplished. The Goodall & Nelson managers have already purchased nine miles of iron for this road. They have also ordered work to be pushed forward with all possible haste, and the laborers are now on the way. With no obstacles, such as injunctions, this road will be completed in perhaps ninety days. The Hartford company assert their determination to construct their road as originally projected. They claim to have means to construct their proposed road, and will carry out their original plans, regardless of the Goodall & Nelson company. The outlook at present is that they will soon have two roads to San Luis Obispo, and unless the Hartford company make it the terminus of their road, will have two roads south to the Santa Maria valley, which is fast rivaling the Salinas valley as a grain-producing district.

In urging the building of a railroad between Obico and Colusa, the Colusa Sun says, as an inducement, that if the Chicoites will build the road, which will be between thirty-five and thirty-six miles, responsible parties will contract and give bonds in the sum of \$200,000 for the performance of it, to carry freight from Colusa to the side of the ship anywhere in the Bay of San Francisco for \$2 a ton. A survey of the line was commenced on the 17th inst. The surveying party returned on the 22d inst., and report a natural grade without the necessity of a bridge or filling, on the air line road from Colusa to Chico. The distance is thirty-five miles, being over a level, rich, agricultural country. There is no doubt that the road will be built soon enough to carry the fall crop. Colusa and Chico men say the stock will be taken by local capitalists without trouble. The farmers and owners of land along the proposed route are enthusiastic in support of the road, and will take stock to the extent of their means.

The San Lorenzo Flume and the Santa Cruz and Felton railroad company have about 200 men at work, and the work progresses rapidly. The flume will be fourteen miles in length, and about one and three-quarter miles is completed and working with perfect satisfaction. The company's mill is located twenty-one miles from Santa Cruz and cost \$12,000. The railroad will be seven miles long, and most of the surveyed route is graded.

The Mendocino Star learns that a joint stock company has been formed, with a capital of \$30,000, for the purpose of constructing a railroad from the mouth of Salmon creek to its headwaters, known as the Salmon Creek Basin, for the purpose of freighting short lumber to a shipping point on the coast, and perhaps for the purpose of freighting lumber, as it is intimated that a sawmill will probably be built at the headwaters of the creek.

The lease of the San Rafael and San Quentin railroad to the North Pacific Coast company, has been formerly completed, and the new arrangements thereunder were fully inaugurated last week. Three trips are run daily on the same hours as before, but the fare is reduced to 50 cents. The company will at once reduce the gauge of the old road to a narrow gauge.

WORK on the railroad bridge, over Salinas river, which was partially swept away by the flood some time ago, is progressing as rapidly as possible, and the road is expected to be in running order again some time this month.

THE Narrow-Gauge railroad between Salinas City and Monterey, will again soon be in running order, but the exact time cannot yet be stated.

THERE are 300 men at work on the Los Angeles and Independence railroad.

PANAMINT.—A gentleman just in from Panamint gives some items in relation to those mines. The Wyoming ledge is found to be six feet wide at a depth of 144 feet below the surface. The Hemlock and Alabama claims are prospecting equally well with the Wyoming. The company's mill will be ready to go to work in sixty days. All the machinery is now either in Panamint or on wheels on the way for that place.

GOON, efficient mill hands are very scarce now on Puget Sound, W. T., the industrious, the able young men seeming to have mostly left the country—gone north to the mines or south to California. To obviate the difficulties experienced from this cause, the Port Gamble company sent to Machias, Maine, for twenty-five men to come West and work for them.

A GYPSUM mine was discovered a few days since, near Lone City, Amador county. The mine will be immediately opened, if found practicable.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington D. C., March 23, 1875.

FOR WEEK ENDING MARCH 9, 1875.

BILL FILE.—F. B. Alderson, San Jose, Cal.
BUTTON-HOLE CASINO.—Virginia V. Balmfontb. Oakland, Cal.
ROAD SCRAPER.—Abijah McCosh, of Saratoga and James T. Watkins and Jasper M. Scott, Santa Clara, Cal.
NON-FREEZING HYDRANT FOR FIREPLACES ETC.—Huston I. Chapman, Portland, Oregon.
GRAIN AND STRAW LIFTER.—Donald Crane, Knight's Landing, Cal.
WATER ELEVATOR OR CHAIN PUMP.—Orson A. Davis, Washington, Cal.
REVERSIBLE PINION FOR WATCHES.—J. Gordon, San Francisco, Cal.
FRUIT DRYER.—Levi A. Gould, Santa Clara, Cal.
ICE-MAKING APPARATUS.—William Hood, San Francisco, Cal.
ORE FEEDER.—James Tullock, Sonoma, Cal.
EARTH AUGER.—Elijah Whitney, Marysville, Cal.
STUN FASTENING.—Salé Zacharias, S. F. Cal.
METALLURGIC FURNACE.—John Feix, S. F., Cal.
CLOTHES SPARKLER.—William Olson, Sacramento, Cal.

TRADE MARK

For axes.—Richard Patrick & Co., S. F. Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

Agricultural Items.

THE rain showers which visited San Francisco on Monday the 22d, though slight, seem to have been quite general in the central and northern part of the State. The following brief weather items of that day will prove of interest: Emigrant Gap.—It is raining a little; thermometer, 44; Blue Cañon.—Calm and raining; thermometer, 42; Rooklin.—Cloudy and windy; Truckee.—Cloudy and snowing the least bit; it is more rain than snow; strong wind from southeast, very cold; Colfax.—Cloudy, wind west; Summit.—Cloudy and calm; thermometer, 28; barometer, 23; it has quit snowing; Marysville.—Cloudy; has been sprinkling this morning; wind south; Chico.—Cloudy; south wind; no rain; cold; Redding.—Raining; Cisco.—Weather drizzling; wind southwest; thermometer, 40; Sacramento.—Cloudy; strong south wind; Shasta.—It commenced to rain here about eight o'clock this evening; wind south; there are prospects of a glorious rain; Tehama.—There are good prospects for rain soon; it is very cloudy; wind southeast; Dixon.—There was a slight sprinkle of rain this morning; weather cloudy and cold; wind south.

NEWMARK & Co. have sold the Santa Anita ranch to Thomas B. Fawcett of San Francisco, for \$200,000 cash. The ranch contains 8,000 acres and is situated in the valley of the San Gabriel river, eleven miles from Los Angeles, and was purchased by Messrs. Newmark & Co. three years since, for \$85,000.

EXPERIMENTS made recently in the East are decided proof that it will pay to pick out the most perfect potatoes for seed, no matter what the price may be, and that it is a losing game to plant the refuse tubers.

THE Healdsburg Flay says that in Russian River valley, and generally in Sonoma county, nearly every acre has been seeded, and the prospects for abundant crops were never more flattering.

THE Marysville Appeal of the 20th says: "Farmers who have been holding over hay for spring prices are now hauling it to market and the stables are supplying themselves at low rates."

A GRANN horse and cattle show is to be held at Petaluma April 3d, which will probably prove the grandest exhibition of the kind ever held in Sonoma county.

ALFALFA, in the opinion of the Yolo Mail, meets the demand of a grass that will withstand the hot sun, a parched earth, and the desiccating winds that sweep down the Yolo valley.

A GENTLEMAN reports to the Hollister Advance that the country south of there is prosperous, but the feed is none too plentiful for the large flocks on the range.

THE Foothill Tidings calls attention to the fact that the foothills of the State are admirably adapted for raising eumao, a material much used for tanning purposes.

THREE thousand acres in San Benito county are planted in flax.

UTAH has in successful operation thirty-one silver smelting furnaces, four arrastras, one separating and refining works, four concentrating works, and thirteen silver mills.

A NEW mining district has been organized in Napa county, and is called Schramburg.

Tapping a Shaft.

The Virginia *Enterprise* describes as follows the operation of tapping shaft No. 2 in the Sntro tunnel. The tapping of the water in shaft No. 2, Sntro tunnel, was yesterday successfully accomplished under the supervision of chief engineer of the work, Carl O. Wederkinch, a most accomplished young engineer. He had charge of the central shaft section of the Hoosac tunnel, and has had much experience in other large works of the kind. He took charge of the Sntro tunnel as chief engineer May 1, 1874, and has since been conducting that work. It will be remembered that on the 30th of June, 1874, the men were driven out of shaft No. 2 by the striking of a heavy body of water as they were drifting west from its bottom. The volume of water was too great to be handled by the pumps and the shaft, 1,040 feet in depth, was filled up to within 100 feet of its top. Work at that point was then suspended until the tunnel header should be advanced far enough to tap the immense body of water contained in the shaft. On the 8th instant the regular work of driving the header of the tunnel was suspended, being at a distance of 8,800 feet from the mouth of the tunnel and 98 feet from the water in shaft No. 2. A diamond drill was mounted and adjusted by Mr. Wederkinch, with the aid of a transit instrument in obtaining the line and a leveling instrument for the grade, in order to exactly strike the header driven east from shaft No. 2. A double bulkhead, built of 12-inch timbers was constructed between the drilling machine and the face of the tunnel, with a quarter-inch boiler-plate slide arranged vertically in its center. Drilling was begun on the 9th instant at 11 o'clock P. M., the power for the drill being compressed air. It made its way through the unusually hard rock at an average speed of 18 inches every 15 minutes, diameter of hole being 2 inches. Excepting one interruption of several hours caused by the breaking of the diamond bit, the drilling went on finely, and on March 11, at 2 A. M., three times three cheers were heard from all when the drill-rod broke through. The water coming out at the side of the rod under a head of 835 feet (to which the water had lowered since June), was white as snow, and quite hard to feel of. Great care was taken in letting back the drill-rod, but after a few feet had come out, the friction between the machine and rod and the grip of every man present was no longer sufficient. It went, like a streak of lightning, even not lacking the fiery part, and finally lodged back in the tunnel. The plate, in the middle of the bulkhead went down in front of the hole, changing the 120 inches of water coming out into a beautiful white feathery-shaped fountain. The idea of striking the workings of No. 2 shaft by a diamond drill through 100 feet of rock, at a distance of one and two-thirds miles from the mouth of the tunnel, has been doubted by most every one; its successful termination establishes here the already well-earned name that Mr. Wederkinch has attained by his accurate work on the Hoosac tunnel and in other places. In three hours the water had been lowered in the shaft 128 feet. Last evening, however, we were informed that the flow had ceased. It is supposed that the drill hole is stopped up by a piece of rock, or that a stick of timber has been sucked tightly against it. This obstruction, whatever it may be, will doubtless be shortly removed.

MACHINERY FOR THE MINES.—A large amount of machinery is now arriving almost daily for mines along the Comstock lode. Yesterday there arrived for the Silver Hill mining company a Corliss engine, said to be the largest engine of the kind on the Comstock. The frame or bed of the engine alone weighs 25,000 pounds. There were two car-loads of the machinery and its aggregate weight was 40,000 pounds. Two car-loads of machinery consisting of a steam chest, pump column, etc., arrived for the Florida mining company. Two car-loads of new machinery also arrived for the Utah mining company, making four car-loads received by that company during the past two days. Among the machinery received yesterday was a shaft weighing 7,620 pounds. The Consolidated Virginia mining company yesterday received one pinion and two spur wheels for their big mill, the weight of which was 5,870 pounds. There also arrived for the Gould & Curry company a lot of seventy-two strap plates, weighing in the aggregate 16,000 pounds. Thus is machinery of all kinds, from a large steam engine down to a small wheel or shaft, rolling in from the huge machine shops and foundries of San Francisco. This is all in addition to the vast amount of work of all kinds turned out by the several foundries, machine shops and boiler shops of this city and Gold Hill. Much machinery in the shape of air compressors, blowers, Burleigh and other drills of that kind, is brought here from the Atlantic States, while we have steel-wire cables and many other things from Europe.—*Enterprise*.

SPEAKING of the large number of immigrants arriving in Virginia City, the *Enterprise* says: "Not one in ten of these people are of any use here. They know nothing of mining, and many of them are without any trade. Why farmers and men who have all their lives been engaged in similar occupations should rush to our mines it is hard to understand."

PARTIES are already making their arrangements for extensive salt manufacture at Corrine, as soon as the spring opens.

South Mountain

A correspondent of the Idaho *Avalanche* writes from South Mountain a letter from which we make the following extracts:

The operations of the smelting works for the month of February have been light compared with what can and will be done in future. As stated in a previous letter the new furnace was put in operation on the 7th ult., and for want of coal shut down on the 18th. On account of the moisture of the new furnace, the first three days' operations amounted to nothing; consequently there were but nine days that produced any other results than the drying of the furnace. In these nine days two hundred and sixty tons of ore were put through, producing a little more than thirty-eight tons of bullion, containing:

Silver.....	\$13,292.53
And Lead.....	3,040.00
Aggregating.....	\$16,332.53
The cost of mining, transporting the ore to furnace and smelting is not more than \$22.50 per ton—260 tons make.....	\$5,850.00
Leaving the sum of.....	\$10,482.53
From which we subtract freight to San Francisco on 38 tons at \$40 per ton.....	\$1,520.00
And there is a balance and profit of.....	\$8,962.53
Or nearly \$1,000 per day on one furnace	

The Coal

Used heretofore has been principally from fir timber. Juniper is said to make a much better article and will be used mainly hereafter. The cost of coal will be much less, as well as the quality improved next summer. Now teams that draw it to the sheds have their work to do in and over deep snow, and have to be fed on hay and grain at high figures. Next summer they will have good roads to work on, and the rich grasses of a "thousand hills" to feed upon; consequently the cost of transportation from the pits will be greatly reduced.

All the Ledges

So far worked or prospected cluster around the town of South Mountain, but I am informed by those who explored the country when the ground was clear of snow, for a distance of six miles to the east there is a continuous range of metal-bearing ledges sure to be developed during the coming summer, and that as you go east this quality of precious metals increases while the quality of base metals decreases.

The Jetty System.

Among the closing acts of Congress was a large appropriation for applying the jetty system for deepening and keeping open the mouth of the Mississippi river. In this connection it may be interesting to learn what the application of this system has done for improving the navigation of some of the principal rivers of Europe. We copy from an exchange:

The month of the river Liban in Russia had six feet of water before the introduction of the jetty system and 16 feet of water after its completion. The river Pernau in Russia, six feet before and 16 feet afterward. The river Warne in Prussia had six feet of water before the introduction of the jetty system, and 13 feet afterward. The river Niemen in Prussia had at its mouth a depth of only ten feet before the jettees were applied, but afterward and up to the present time the depth of the water has been 23 to 24 feet. The river Pregel in Prussia had 12 feet of water before the application of the jettees, and now has 20 feet, though the improvement is not yet completed. The river Oder in Prussia had seven feet of water before the jettees were applied, and now it has 23 to 24 feet. The jettees there are permanent in their character. The river Danube, the mouth of which is very similar to that of the Mississippi, had nine feet of water before the application of the jetty system, and now has 21½ feet. The river Trave in Prussia had seven feet of water before jettees were constructed, and it now has 18.

MEXICAN MINES.—A correspondent of the *Bulletin*, writing from Mazatlan, says: The scarcity and dearthness of quicksilver is apparently the reason why this port is going to lose most of its trade. With the exception of the Tajo mine, near El Rosario, the Alacran at Copala, and Tamazulu near Culiacan, almost all the work in the other mining districts had to be stopped, and particularly at Cosala, the whole population is bankrupt, no returns coming from there for sometime. Fortunately the reports from Guadalcacer in San Luis Potosi, and from Huizotco in Guerrero, are very favorable, and as equally valuable cinnabar mines have been discovered in other parts of the world, it is to be hoped that the price of quicksilver will lower. At Oaxaca and at Culiacan the mines have imitated the California style of working on shares instead of the twenty-four barres, in which a mine used to be divided. The companies issue from 6 to 3,000 shares, and their value is daily quoted at the exchange; however, the principle has already been adopted some time ago in the City of Mexico, where a regular stock exchange exists. It is only something new in the minor places. The mining reports from Sonora and Lower California are very favorable, and no Indian aggressions are reported from the American frontier.

The sulphuret reduction works being erected near Nevada City are nearly completed.

Estimating the Value of Quartz Specimens.

Down at the banking rooms of the late A. Delano, as Superintendent Snyder from day to day brings up examples of the gold quartz coming out of the New York Hill mine, there is a great deal of guessing and estimating on the value of gold in the different pieces. There is a rule for ascertaining very closely the percentage of gold in a mixture of gold and quartz, and we have taken pains to condense and simplify from several metallurgical works before us as follows:

First ascertain the specific gravity of the gold specimen, by weighing it first in air, and then suspended by a fibre of silk, in water, and dividing the weight in air by the difference. Suppose it to be 8.067. The specific gravity of gold is 19.000; that of quartz is 2.600.

A. Deduct the specific gravity of the specimen from the specific gravity of the gold; the difference is the ratio of the quartz by volume: 19.000—8.067=10.933.

B. Deduct the specific gravity of the quartz from the specific gravity of the specimen; the difference is the ratio of the gold by volume: 8.067—2.600=5.467.

C. Add these ratios together, and proceed by the rule of proportion. The product is the percentage of gold by bulk:

$$10.933 \div 5.467 = 16.400$$

$$16.4 \text{ is to } 5.467 \text{ as } 100 \text{ is to } 33.35$$

D. Multiply the percentage of gold by bulk, by its specific gravity. The product is the ratio of the gold in the mixture by weight:

$$33.35 \times 19.000 = 633.65$$

E. Multiply the percentage of quartz by bulk, by its specific gravity. The product is the ratio of the quartz in the mixture by weight:

$$66.65 \times 2.600 = 173.29$$

F. To find the percentage, add these ratios together, and proceed by the rule of proportion: 633.65 ÷ 173.29 = 806.94.

$$806.94 \text{ is to } 633.65 \text{ as } 100 \text{ is to } 78.35$$

Hence a mixture of quartz and gold, having the specific gravity of 8.067, contains 78.35 per cent. of gold by weight.—*Foothill Tidings*.

MINERAL CHARACTER OF PUBLIC LANDS.—An opinion of the Supreme Court, in the case of *McLanghlin vs. Powell*, recently filed, in which the question of proving the mineral character of public lands is decided, and which contains a point that may be of interest to parties in this district. The court holds that in an action for the possession of patented lands, wherein the mineral lands are excepted, while the plaintiff may not be required to prove the non-mineral character of the land, the defendant must be permitted to establish that the lands sued for are within the exception. The reverse was the ruling of the court below, and upon this point the Supreme Court reversed the judgment, and remanded the case for a new trial. The opinion is by McKinstry.—*Stockton Independent*.

PROSPECT MOUNTAIN.—From S. J. Beebe we learn that considerable work is being done on the western slope of this lofty range. On the Manhattan claim, which was located in 1869, an incline has been opened from the bottom of the main shaft, and a pipe vein about two feet in diameter has been exposed, the ore of which assays from \$120 to \$160. The Cloud ledge has been opened to a depth of 50 feet, and several tons of excellent smelting ore have been extracted, assaying about \$80 in silver, with 50 per cent. lead. Work is still being prosecuted with advantage on the Williams mine, the Star, and several others. If the owners could only get a fair price for their ore, so that they might be enabled to meet current expenses, several valuable mines would soon be developed.—*Eureka Sentinel*.

A PONY MILL.—A neat mill, capable of reducing three tons of ore per day, has just been erected in Lower Gold Hill by Mr. Charles Feuerer, a man who has had much practical experience in milling. This little mill will be of great use in making working tests of ore for new mining companies and in working for men who own small veins containing occasional pockets of rich rock. In the vicinity of Silver City there are many small leads of gold-bearing quartz, in working which poor men might make very good wages provided there was a place where they could get their ore speedily and honorably worked whenever they had accumulated a lot of from ten to fifty tons. A mill supplying this want should do a good business.—*Enterprise*.

The fever created by the mineral development at Newburyport, Mass., is such that the Newburyport *Herald* says: "Pasture lands which stood on the assessor's books at \$8 an acre have actually been sold at about \$2000 an acre where there had been no ore found, but merely from the fact that they were adjoining the mine, and in a line with the vein which has been determined."

HEAVY BLAST.—Thirteen thousand and one hundred pounds of Santa Cruz powder was exploded in the Enterprise mine at Sucker Flat on the 18th inst., preparing a large quantity of gravel for washing.

The quicksilver mines in San Luis Obispo county produced 500 flasks last month. An additional mine will start a furnace soon, when the yield will aggregate not less than 900 flasks monthly.

The Livermore Coal Mine.

The Livermore *Enterprise* says: On Sunday morning we took a run up to the Livermore coal mine. Superintendent Thomas Harris escorted us to the newly discovered vein of coal, which is located about two hundred yards to the north of his residence, and there gave us all the information necessary on the occasion. The shaft was started about five feet square and at an angle of forty degrees incline. It follows a heavy hanging wall of arm sandstone, which passes through the hill from east to west and pitches to the north. The seam of coal was very light at first, but at a depth of fifteen feet commenced to be compact and took body. From this point till they reached about thirty-five feet, the vein increased in size until it became three feet, the hanging wall becoming as smooth and solid as granite, and the foot-wall well defined. But little if any dirt next to the coal. At fifty feet the strata had widened to five feet of very clear, glossy coal. But little water here so far troubled the workmen in their descent, and they are enabled to work rapidly and to great advantage. On top of ground there was upward of twenty tons of coal ready for shipment. The company are arranging to erect suitable hoisting works and prosecute the sinking of their shaft to a depth of perhaps two hundred feet.

It is a matter not to be doubted now that a heavy body of coal has been found in this new mine, and the company are assured by experienced coal miners that thousands of tons are in sight. We think as soon as the proper hoisting works are erected and other necessary machinery placed upon the ground, work will be pushed to great pecuniary advantage. At present our people generally feel highly elated over the prospects of the mine, and confidence in its beneficial advantages to our town is gaining strength. The shaft on Friday morning had reached a depth of 110 feet, with the vein still increasing in width, and coal improving in quality.

The Monroe mine is the name given to the quartz lode lately taken up by Messrs. Getchall, Mosher & Campbell at the Lone Tree, above Wheatland. Samples of the rock have been taken to San Francisco for assay, and the owners expect rich returns.

MONTANA is using its first Burleigh drill, introduced there by the National Mining Company at Unionville.

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voted especially to mining affairs, has an able corps of
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produces with illustrations the new machinery and
processes of mining and reducing, and kindred sub-
jects, and gives full account of operations in the Pacific
States and Territories. There is scarcely anything
published in it but what is of interest to miners, and
local papers can reproduce but little of this matter,
and that without illustrations. —New North West.

General News Items.

Postoffice change for the week:—Established: Excelsior, Sonoma county, O. Walker, P. M.; Isolatta, Sacramento county, Cal.; Josiah Pool; Los Angeles county, Cal.; Josiah Locke, Camp Polk, Washington county, Or. Samuel W. Hendlan; Possey Rock, Lewis county, W. T. Mrs. Ira Watson; New Ashken Frasier, Lewis county, W. T.; Marcell Perlier; Silver Creek, Lewis county, W. T.; John Tucker. Appointments: Carl E. White, Albion, Mendocino county, Cal.; George W. Scott, at Cache Creek, Yolo county, Cal.; James F. Swain, at Modesto, Stanislaus county, Cal.; Alfred Frye, at St. Thomas, Lincoln county, Nev.; Mrs. L. L. Wimpy, at Hingham, the Creek, Stevens county, W. T.; Wm. P. Pole, at Beaver, Beaver county, Utah; U. F. Gunnison, at Gunnison, San Pete county, Utah; James J. Walker, at Kaysville, Davis county, Utah; William Ohnesorgen, at San Pedro, Pima county, Arizona.

Capt. Harlow, a 49-er, and well known as a steamship captain on this coast, and latterly in the employ of the G. N. P. S. Co., has permanently retired from a sea-faring life, and will devote the rest of his days to agricultural pursuits. The company presented him with a handsome gold watch and complimentary letter on the occasion of leaving their service.

General Butler, says the Civil Rights bill does not give the negroes any private or social rights more than they have at common law in barber shops, saloons, etc., but was intended to apply to public conveniences, licensed amusements, etc.

On Monday last Andy Johnson spoke in the Senate in opposition to the Louisiana resolution. Just seven years ago the initial steps for his impeachment were taken in that chamber. His arraignment of the President was a severe one.

Pete Cooper, Manton Marble, Bierstadt, E. L. Youmans of the *Popular Science Monthly*, Judge S. J. Ruggles, John Hay, Judge Curtis, and a number of other prominent New Yorkers propose visiting California in May.

E. P. Buckley, late license collector of San Francisco, turned out to have been a Bose Tweed on a small scale. He swindled the city out of nearly \$100,000 per annum during his term.

By order of Governor Pacheco the execution of William Dona, who was to have been hanged at Modesto, on the 19th inst., has been stayed until Friday, April 2d.

Tiburcio Vasquez, the notorious bandit, was hanged at San José on the 19th inst. The notorious paid \$1 an inch for the rope that swung him from the scaffold into eternity.

The flood at Port Deposit, Maryland, and Havre de Grace, is stated to be fearful, the water is from five to fifteen feet deep in the streets.

The resolution sustaining the bandits action in the Louisiana affair passed the Senate on Tuesday—Johnson and Booth voting with the Democrats in the negative.

Charles Perkins, a machinist by trade, snioided in Gold Hill last week. Dissipation and domestic troubles the cause.

An ice gorge extends in the Delaware river eighteen miles, and the ice all the way is from ten to fifteen feet high.

Thermometer at 5 deg. below zero; and gold 16 1/2 above par in New York on the 22d—a blue Monday that.

The Beecher case is still the "chief sorrow" in Brooklyn. Bessie Turner has been on the witness stand for nearly a week.

Chief Justice McKean, of Utah, has been removed, and David P. Low appointed in his place.

The P. M. S. S. Co. offer for sale their steamers, Arizona, Ancon, Moses Taylor and Nebraska.

The Senate has confirmed the reciprocity treaty with the Sandwich Islands.

Chavez, the bandit, was in Hollister the evening of the day Vasquez was hanged.

John Mitchell, the Irish patriot, is dead.

Healdsburg wants a public library.

The Senate has adjourned sine die.

Four coal hanks are in operation near Empire City, Oregon. Each mine employs about seventy-five men. Fifty tons are daily taken out of each mine. The coal is extensive, and most of it is shipped to San Francisco.

The Lewis mining district, established last fall, sixteen miles southwest of Battle mountain, promises to be one of the best in the eastern part of Nevada.

State from the Chile Bar quarry, El Dorado county, was used in repairing the roof of the Cary House, Placerville. It is a very superior article.

There are a great many persons on Puget Sound, W. T., preparing to go to the Cassiar mines this spring.

Over five hundred men are mining in Bear valley, San Bernardino county.

One of the oil wells in San Fernando is now flowing fifty barrels of oil per day.

Woodward's Gardens embrace an Aquarium, Menagerie, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

METALS.

Table with 2 columns: Item and Price. Includes American Pig Iron, Scotch Pig Iron, White Pig Iron, Oregon Pig Iron, etc.

GENERAL MERCHANDISE.

Table with 2 columns: Item and Price. Includes Bags, Flour, Sugar, Coffee, etc.

LEATHER.

Table with 2 columns: Item and Price. Includes City Tanned Leather, Santa Cruz Leather, etc.

Gold, Legal Tenders, Exchange, Etc.

San Francisco, Thursday, March 25, 1875. LEGAL TENDERS IN S. F. 11 A. M. 31 to 38. GOLD BARS, 990. SILVER BARS, 4 and 48 per cent. discount.

Any person receiving this paper after giving an order to stop it, may know that each order has failed to reach us, or that the paper is continued inadvertently, and they are earnestly requested to send written notice direct to us. We aim to stop the paper promptly when it is ordered discontinued.

Mining and Other Companies.

Cincinnati Gold and Silver Mining Company.—Principal place of business, San Francisco, California. Location of works, Kelsey Mining District, El Dorado county, Cal.

Electric Mining Company, Location of principal place of business: San Francisco, State of California. Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 16th day of February, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Table with 4 columns: Name, No. Certificate, No. Shares, Amount. Lists shareholders of Electric Mining Company.

Geneva Consolidated Silver Mining Company.—Location of principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, State of Nevada.

Notice.—There are delinquent upon the following described stock, on account of assessment No. 4, levied on the second day of January, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Table with 4 columns: Name, No. Certificate, No. Shares, Amount. Lists shareholders of Geneva Consolidated Silver Mining Company.

Names. No. Certificate. No. Shares. Amount. Includes Jeremiah Callaghan, D. W. Doubtless, Geo. Treat, Trustee, etc.

Keystone Quartz Mining Company.—Principal place of business, San Francisco, California. Location of works, Butte Township, Sierra county, Cal.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of March, 1875, an assessment of \$1.00 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, northwest corner Pine and San Francisco streets, San Francisco, California.

Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley Township, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 15th day of March, 1875, an assessment (No. 3) of one dollar per share was levied upon the capital stock of said company, payable immediately in gold coin of the United States of America, to the Secretary, at the office of the company, Room 8, No. 315 California street, San Francisco, California.

Silver Sprout Mining Company.—Principal place of business, San Francisco, State of California. Location of works, Kearsarge Mining District, Inyo County, California.

Theresa Mill and Mining Company.—Principal place of business, San Francisco, State of California. Location of works, Coulterville District, Mariposa County, California.

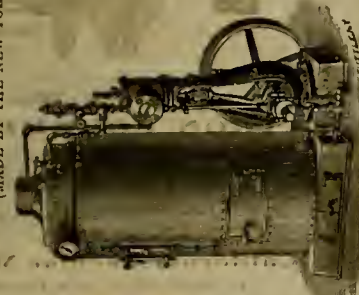
Tuolumne Hydraulic Mining Company.—Location of principal place of business, City and County of San Francisco, State of California. Location of works, Tuolumne county, State of California.

Table with 4 columns: Name, No. Certificate, No. Shares, Amount. Lists shareholders of Theresa Mill and Mining Company.

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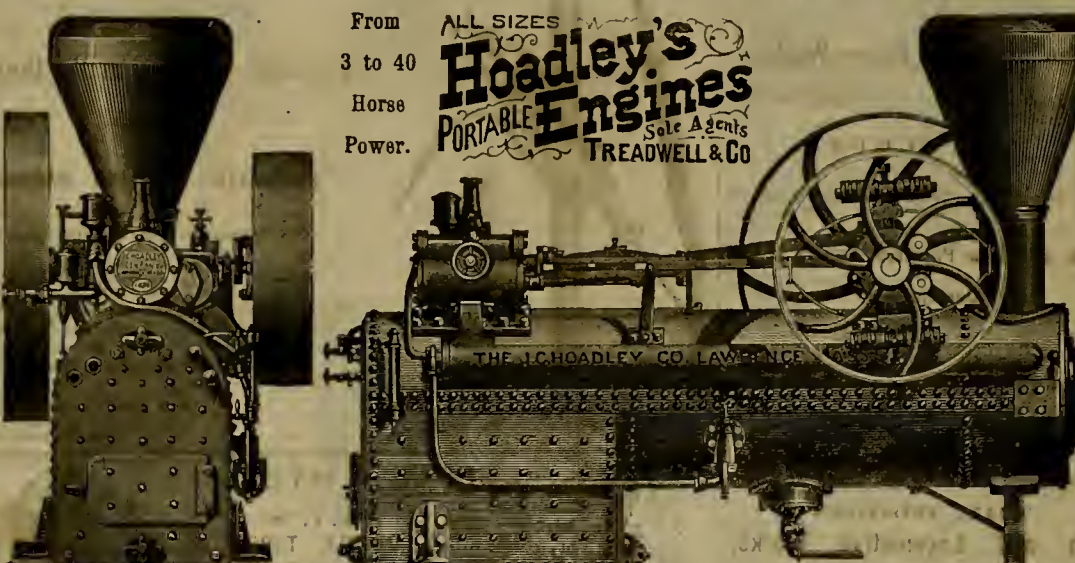
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To Obtain a Patent,
well-constructed model is generally first needed, if the invention can well be thus illustrated. It must not exceed 12 inches in length or height. When practicable, a smaller model is even more desirable. Paint or engrave the name of the article, and the name of the inventor, and his address upon it. and the model (by express or other reliable conveyance), plainly addressed, to "DEWEY & CO., MINING AND SCIENTIFIC PRESS OFFICE, SAN FRANCISCO." At the same time, send a full description, embodying all the ideas and claims of the inventor respecting the improvement describing the various parts and their operations. Also send \$15 currency, amount of first fee of the Government. The case will be placed on our regular file, the drawings executed, and the documents made up, and soon sent to the inventor for signing. As soon as signed and returned to us with the fees then due us, it will be sent straightway to the Patent Office at Washington or designs no models are necessary. Duplicate drawings are required, and the specifications and other papers should be made up with care and accuracy. In some instances for design patents two photographs, with the negative, answer well instead of drawings, or for further information, send a stamp for our illustrated circular, containing a digest of PATENT LAWS, 112 illustrated mechanical movements, and HINTS and INSTRUCTIONS regarding the RIGHTS and PRIVILEGES of inventors and patentees, which will be furnished post paid. Also a copy of NEW PATENT LAW of 1870: When the invention consists of a new article of manufacture, a medicine, or a new composition, sufficient to make the experiment (unless they are of a common and well-known character), and also of the manufactured article itself, must be furnished, with full description of the entire preparation. or Processes, frequently no model or drawings are necessary. In such case, the applicant has only to send us an exact description, and what is desirable to claim.

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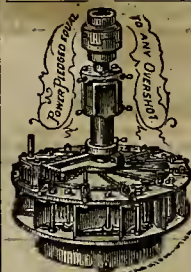
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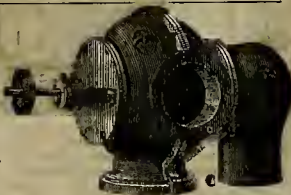
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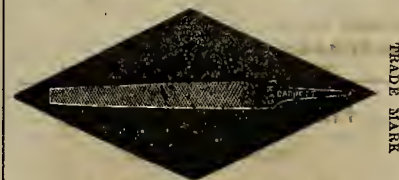
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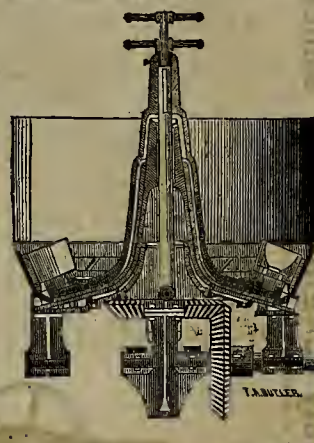
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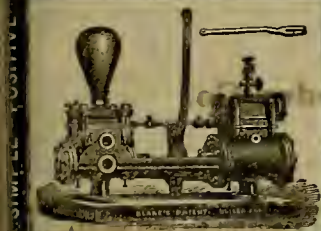
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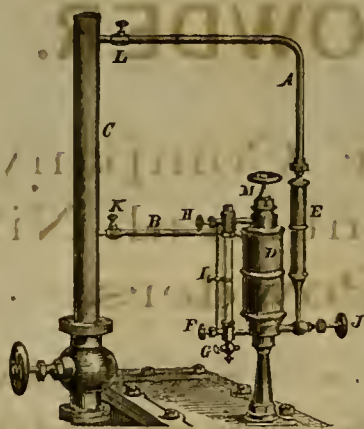
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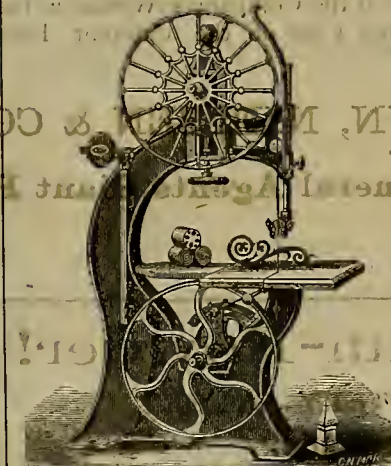
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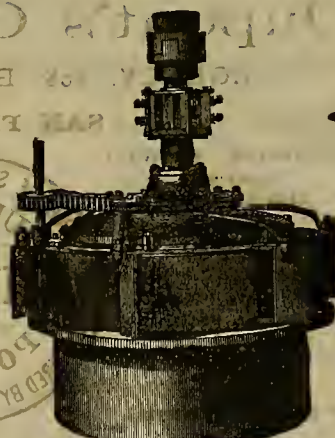
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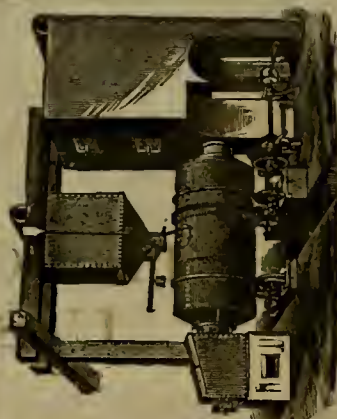
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This machine, complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 20 blows per minute, in a mortar, provided with screens on both sides, and crushes FINE 60 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$600.

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Circulars, &c., will be furnished, if required.
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OAKES'S PATENT



Quicksilver Strainer.

Patented January 26, 1875.

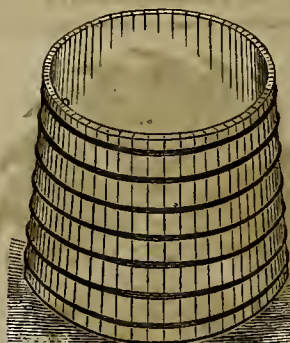
For description see MINING AND SCIENTIFIC PRESS, March 6, 1875.

For Cleaning Quicksilver Before Using it for Amalgamation.

Mill men are invited to examine the Patent Quicksilver Strainer at the office of the Agents.

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1874. A GRAND SILVER MEDAL. 18



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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 3, 1875.

VOLUME XXX
Number 14

Improvement in Screw Propellers.

The frequency with which propeller blades have been lost from different steamers during the past year or two has provoked considerable discussion and comment, and many people question whether the propellers can be made strong enough to stand the strain on large vessels. The *City of Peking* lost two blades of her propeller on her voyage from New York to this port, and after they were repaired she lost one more in her first voyage from here to China. The *City of Tokio*, a sister ship to the *City of Peking*, also lost one blade of her propeller in her voyage from New York to San Francisco. Both of these vessels are very large, and would be unwieldy under sail alone, so that the confidence inspired by the size becomes lessened when the liability to breakage of the propeller blades is considered. Inventors have been for some time past trying to devise some plan which would overcome this difficulty in connection with propellers, and many suggestions have been offered. The conclusion arrived at by some as to the cause of these accidents, is that the blades are given too much pitch, and that in order to get a large propelling surface the consideration of safety to the propeller is ignored. With an immense vessel like the *City of Peking*, for instance, with very heavy and powerful machinery, the strain on the blades is very great. When she meets a heavy sea, and her headway is denuded for the moment, with the engines still working, the strain on the propeller is suddenly and greatly increased. The greater the flare or "pitch" to the propeller blade the greater the strain in such a case. When the vessel is going ahead smoothly of course it is different, but when we think of what the screw has to bear in a heavy gale, the only wonder is that propellers stand as much as they do.

Steam vessels are usually poorly supplied with gear for sailing, and the serious results which arise from breaking a propeller should an accident happen during a gale, are easily imagined. Among the devices intended to counteract the tendency to breakage is the one shown on this page, which was recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, by Mr. James H. Loftus, of Oakland. This construction, while it renders it easy to remove any blade, should it become necessary, is intended more particularly to prevent the breaking of the blades at what is usually a weak point, the shank, about a foot or so from the hub.

In this invention the main blade, A, is made of a suitable material and thickness, and it is strengthened in its weaker points by the addition of shorter leaves, of which any number may be used that are desirable. In our illustration two extra leaves are shown upon the back, and one upon the front of the main blade. The main blade is bent at right angles at the end next the hub, and fits into a groove planed into this hub, as can be seen in Fig. 2. The front supplemental leaf is bent in the same direction, while the two rear leaves are bent in the opposite direction, thus forming a strong base, which fits solidly into the groove in the hub.

Each of the blades is fitted in the same manner, and the whole are held in place by means of clamping rings or hands (shown at B) which are driven on from each end of the hub.

THE CONSOLIDATED VIRGINIA mine is yielding 450 tons of ore daily. The ore breaks on the 1300, 1400 and 1500-foot levels of the mine are looking splendidly, and show no signs whatever of the diminution of the regular daily yield. The bullion yield for the month of March was increased to nearly a million and a half.

CROSS CUTTING on the 1700-foot level of the Ophir mine is being prosecuted with all the energy possible, with some very favorable indications of an ore development in the east cross-cut on the California line.

Hydraulic Mining in California.

No. 19.

The Extraction of Gold.

Quicksilver is used to collect and combine small particles of gold, in the form of amalgam. To facilitate this action it is necessary to use it in such a way that it may be constantly exposed to a contact with these minute particles of gold. For this reason the washing through the sluice-boxes must commence before any quicksilver is used, so as to get the interstices between the riffles filled with small gravel, sand, clay, &c.

This washing without quicksilver may be carried on for a day, and light top-gravel will be the best material to use.

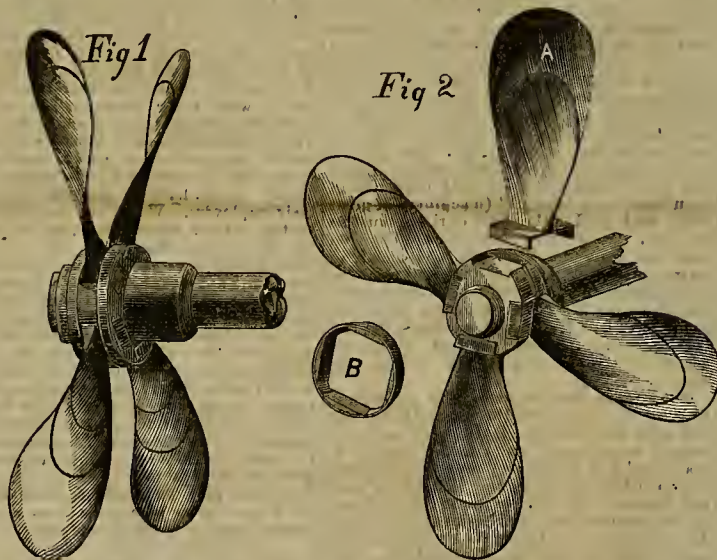
After the openings in the different riffles are thus filled, so as to prevent the quicksilver from dropping clear to the bottom of the sluices, it may be applied, for the first charge,

a year, when the whole line of sluices is deprived of its gold and quicksilver.

The riffles, whatever they may be, are put alongside the sluices, ready to be replaced for new service.

Cleaning the Amalgam.

The amalgam must be placed in a quicksilver bath to separate the gold from any baser metal, particularly lead, which has been scattered by the hundred pounds over the hill-sides of California by quail and rabbit hunters. The amalgam must be well broken up, and rubbed and washed repeatedly. In this way the gold, as the heaviest part, will settle to the bottom, and all the other metallic substances will float on the top of the quicksilver. After this washing the amalgam is deprived of the free quicksilver by straining through a filter of canvas, and afterwards put in a bath of water and sulphuric acid (one-third acid and two-thirds water) and bailed and stirred over a slow fire for about forty minutes. By this process the remaining lead is generally removed, and the



LOFTUS' IMPROVED SCREW PROPELLER.

with a liberal hand. From 500 to 600 pounds are used for a sluice of 5,000 feet length. The upper parts of the sluice are generally charged more profusely than the lower parts, as a portion of the quicksilver is carried down by the stream.

The quicksilver must be scattered in a light spray all along the sluices; iron sprinkling-pots, made for the purpose, are used with good effect. The charging of the sluices is generally attended to twice a day; but it must be admitted that a more liberal and more frequent application of quicksilver would be only beneficial. The daily charges of quicksilver are reduced to about 100 pounds, so that a supply of one hundred flasks of quicksilver (about 74 pounds per flask) will last for a six months' run, allowing for the quicksilver regained by the semi-monthly cleaning up of the upper part of the sluice-boxes.

Cleaning Up.

The upper part of the sluice, provided with either scantling-riffles or block-riffles, is generally cleaned up once or twice per month. Whenever this is resolved upon the sluices are gradually emptied of their gravel contents down to the riffles, and these are removed successively, commencing with the upper riffle.

A small stream of water is applied to move gently the black sand, or fine gravel, which may remain in the sluices. The amalgam or quicksilver is scooped up and put in wooden or iron buckets. Here and there pieces of scantling are placed across the sluice to check the flow of the quicksilver. Brooms, scrapers, and knives are used to collect the amalgam which may hide in small fissures of the wood. A general cleaning up takes place once or twice

The Tenth Industrial Exhibition.

All the preliminary arrangements are being rapidly made for the Tenth Industrial Exhibition of the Mechanics' Institute of this city. Mr. J. H. Culver has been appointed Agent for this exhibition, and has commenced to call on parties who intend to make displays. Mr. Culver has been connected in an official capacity with several of these exhibitions, and is well known among us. Blank applications for space can be procured at No. 27 Post street, and it is important that these applications be sent in as soon as possible. The exhibition will open on the 17th of August.

It is to be hoped that our manufacturers and artisans will, for the credit of the city, unite with the miscellaneous exhibitors, and make the exhibition a worthy one. The display of machinery at the last Mechanics' Fair was a meagre one, and not at all in proportion to the interest represented. At that time our foundrymen and mechanics were all very busy, and were unable to do as much for the exhibition as they desired. They are busy now, too, but have nearly five months time to prepare such articles as they intend to display. They should accordingly begin right away, and make up their minds what to do—and do it. We hope to see a display of machinery this year, which will throw in the shade all previous efforts.

Some of the manufacturers complain that the fair is more of a Fair than an Industrial Exhibition. But they must remember that the managers are compelled by force of circumstances to rely entirely on the manufacturers and artisans to bring it up to the proper standard. If it is not as much of an Industrial Exhibition as a fair, it is the fault of the manufacturers, and not the managers. The latter provide the space, light, power and spectators. The manufacturers ought to provide the objects of attraction. A great many, of course, attend these exhibitions to see, and be seen; but still there are thousands interested in the machinery department, who would spend their whole time there if this department was filled. This part of the exhibition is by far the most interesting to many, and our foundrymen ought to "keep up their end," and make a creditable show. They have been prosperous of late, and can afford to sacrifice a little time to this matter. They should remember also, that they could not possibly find a better way of advertising, and should by all means take advantage of the opportunity.

RANSOME STONE.—Mr. Ernest L. Ransome has commenced the manufacture of Ransome stone in this city, on his own account and by a new process. The stone was formerly made by the Pacific stone company, but it was found that the cost of manufacture was prohibitory, and the company retired from business. Mr. Ransome now has a new patent and can manufacture a good article as cheap as any other manufactured stone. Mr. Ransome's office is No. 10 Bush street and the factory is on Octavia street, near Greenwich. The Ransome was the first artificial stone used on this coast, and Dr. Stone's church was the first building upon which it was used. Every style and character of stone work is made by the process employed, some of the ornamental work being very handsome.

The Kimball manufacturing company has just completed four monster wool presses for the new wool warehouse, on Townsend street, two being for Ball & Julien and two for John F. Knox, Esq. The imported presses cost from \$1,200 to \$1,500 dollars each. The Kimball company manufacture an equally powerful press for \$750.

At the Mint in this city, during the month of March, the gold coinage was: Double eagles, \$2,180,000; half eagles, \$20,000. The silver coinage was: Half dollars, \$127,000; dimes, \$185,000; trade dollars, \$30,000. Total coinage, \$2,542,000.

The new retorts of the Amador quicksilver mine have been completed and are now in good running order, and the work of extracting the pure quicksilver is now under full headway.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner in Mining Statistics.

Owyhee Mines.

The lost issue of the *Owyhee Avalanche* gives a general review of the mines in that part of Idaho. For sometime these Idaho mines have been under a cloud, and assessment after assessment has been levied upon them. Judging, however, from the review of the *Avalanche*, the flattering developments made this winter in the Mahogany, South Chariot, Golden Chariot, War Eagle and other mines, in connection with the encouraging prospects of the base metal deposits in South Moutain, make it safe to predict that the bullion product of the coming summer will be a great deal larger than during any previous season. We condense the following items from the *Avalanche*:

Golden Chariot.

From Col. Keown, the veteran Superintendent of this mine, we learn that shafts are being sunk in both sections of the mine, including what was formerly known as the Minnesota. Four levels are also being driven. The Chariot shaft is down below the 11th station to a depth of 20 feet, and the Minnesota shaft is down 60 feet or more below the 10th, and towards the 11th station. The 10th level, Minnesota, is already in 75 feet south, and the 10th level, Chariot, is in 100 feet south towards the Linkton chimney. The 11th level, Chariot, is in southward about 14 feet, and the 11th level north just starting a few feet in. The developments thus far are very satisfactory. In a ledge encountered recently a very large, rich vein was found, and in one place in the 10th level Chariot it was found to be 7 feet in width. Operations are being pushed with all possible speed. Since the 21st of November more than 400 feet of shaft have been sunk, about 215 feet in the Minnesota and 191 feet in the Chariot, besides sinking two winzes and making explorations in the upper levels. The working force is not large, but will be increased in a short time.

The Golden Chariot mill will be in operation in a few weeks. It has been renovated and put in thorough repair during the winter, with new mortars, cams, tappets, etc. The mill is in much better condition now than it ever was before.

Ida Elmore.

Superintendent Corey reports main shaft now 26 feet below the 13th level (quite sufficient for pump). Work of sinking has been suspended, and soon as lower pump is in place and preparatory work done, attention to cross-cutting will be given at 11th, 12th and 13th levels, each new level being 120 feet in depth. New boilers work splendidly, and doing 25 per cent. more work with one third less wood than the old boilers.

The work of putting in place the 13th level pump is progressing well and approaching completion. Expect soon to be ready to commence opening new levels. New set of boilers now in mill and furnace is being built and connection made. In two weeks the mill will be ready to start up.

South Chariot.

Supt. Corey reports connection with Mahogany drift on 10th level. Eighth level cross-cut is in 47 feet, showing several strata of quartz, and considerable water in the face indicating near approach to the ledge. Winze No. 2 on this level is down 31 feet, showing a ledge of 15 inches wide of fair pay ore. This winze is north of the slip and within 80 feet of the Minnesota lode. It makes favorable showing for 9th level north. Ninth level drift is 27 feet north of winze No. 1, or almost 200 feet north of shaft, and has begun to show some very rich ore, although the vein is small, being from six to eight inches thick. It is steadily improving in size as the work progresses, and promises to prove an important development.

Mahogany.

On the 9th level, where drifts are already run, a nearly continuous body of ore is shown for 400 feet, and for an average width of 2½ feet. We are now opening up preparatory to opening out the ore, which at every point is of good quality and the ledge strongly and well defined. This level can be made to yield 5,000 tons of high grade ore. We are now taking out 12 tons of ore per day, which will soon be increased to 20.

Water sump below 11th level is nearly complete, the shaft being some 22 feet below station and crosscutting for ledge, which should be reached at a distance of about 28 feet, will be commenced now. Drift north on 10th level is now in a distance of 98 feet, and south drift on some level 73 feet, both carrying the same good ore, and strong, well-defined vein as heretofore reported. South drift on 9th level is in a distance of 439 feet. There is still another chute of ore further south, as shown by recent work in the 8th level, which the 9th level drift should reach about 30 feet further. The winze on 9th level is down 31 feet through good ore. The stopes on 9th and 10th levels now opening are all in fine ore, and promise a satisfactory yield, both as to quantity and quality.

War Eagle.

A rich body of ore has been struck in the northern portion of this mine, which gives good promise of being extensive. We were last evening shown a large specimen from the new find which was thoroughly permeated with gold and silver. It appears to be entirely different from any ore hitherto found in the

mine, and has a decidedly healthy look. Ore continues to be raised as usual from the mine, and hauled to the Golden Chariot mill.

Pauper.

Rapid progress is being made in the development of the Pauper, and a large amount of good pay ore can be extracted as soon as another level shall have been opened.

Empire.

In this mine they have commenced driving the 6th level drifts both north and south from the crosscut in a large vein of good ore, which promises to be richer and more extensive than any yet found in the mine. Empire is looking up.

A True Story of the Black Hills Excitement.

The Chicago *Journal* gives the following version, as the true story of the Black Hills excitement:

Situated in northwestern Wyoming, near the Nebraska and Dakota State line, are the Black Hills, of which so much has been said within the past few years, and over which a fever of excitement has been raised this spring throughout the Northwest, on account of the alleged existence there of gold and silver in fabulous quantities and easy of access. The hills spoken of are a cluster of volcanic elevations, detached from the Rocky mountains, and in comparison with the great and elevated peaks in the range proper, are but heaps of dirt. General Custer thoroughly penetrated this region last fall, and found that the vegetation there was ordinary in its growth, timber small and not over abundant, water scarce, and mineral wealth not remarkable. This, then, is the region to which the public is directed, and from which is promised a fortune for all who will take stock in the expeditions preparing to invade it. A region where there is gold to be had; gold, for Custer found indications of it; gold, for parties lately returned have it on exhibition. But the question of the existence of gold and silver is the only one which must be answered in seeking wealth by mining. Not "how much?" but "how attainable?" is the all-important point. The mountains of the West are full of gold, but men grow poor in getting it out. Not a stone, scarcely, is there in the whole Rocky mountain range that has not gold in it. Gold quartz is found on every side, holding with a flinty grasp its precious wealth, and the sand in all the streams that have a source in the mountains of the West, even in the Missouri river, hundreds of miles from its source, will "wash out" the coveted yellow dust at every pan. But gold in stones is gold in prison, and gold in quartz can only be got out with gold expended in "crushers" and "stamps" (machinery of great cost), while gold in the sands of rivers must be "washed out" by slow processes. The gold exhibited from the Black Hills is mostly in quartz, just the same article that fortunes have been sunk upon in Colorado these many years, in getting machinery to extract its yield; and as for the Black Hills "gold workings," it will take water, a scarce article in that region (see a map of the country) to get rich in that way.

But the question of those who are instigating the movement into the Black Hills is not "Is gold out there?" It is, "Can we get a rush of men through our cities, over our railroads, and a rush of money into our pockets?"

Two or three years ago the Black Hills were not dreamed of, even in Sioux City, Iowa, where now the seat of excitement is located. That city then relied upon its river commerce and its situation at the head of the Upper Missouri trade for its prosperity; but, in an evil hour to Sioux City, the Southern Dakota railroad was projected to Yankton, and the latter city became acknowledged as the coming shipping point for freights from railroad to steamboats. Sioux City's pulse ran low, and "What shall we do?" was the interrogatory uppermost in the minds of her citizens.

Back of Sioux City are high and precipitous bluffs, and one fine morning, soon after the Dakota Southern project became a fixed fact, the people of Sioux City and the strangers within her gates were electrified with the announcement that gold had been discovered in the bluff! It was heralded by mouth and telegraphed throughout the land; every soul was stirred, outsiders rushed in, and within a week's time the bluffs were driven full of stakes to mark off A, B and C's claims. Gold of wondrous richness was exhibited in store windows and carried around by interested parties. It was found abundantly in some claims in "vein" and in "pocket." Sioux city was happy. Business was lively. Money began to get "reckless." But the end came. At length, "close" some one discovered the secret. It was all a hoax! The bluffs had no more gold to them than a snow-drift. The big bonanza had been "altered."

This was Sioux City's excitement No. 1; and mark you, everybody, the leading men of the excitement then, are the leading men of the excitement now. "If such a little gold *furor* could make things so lively," the schemers soon began to argue, "why not get up a great excitement, and make us all rich?" And so they soon behought them of the Black Hills, on the point which would most naturally be reached by way of their town. No man had been seen from there, but still gold specimens were soon on exhibition (they had seen service before), purporting to have come from the region through traders and Indians. The business men were talked with in their stores,

and shown the advantages of such a scheme. They were asked to subscribe to send men East to "work up" an excitement. This was last year, and the expected "rush" did not "pave out" very well. Excitement No. 2, like No. 1, accomplished little. However, fate and hard times made it necessary that the coon be caught, and that a voice might be heard from the hills themselves, a party was sent out last winter, amply provided for and provisioned, to stay until the grand tide should set in. Two of the party came back ten days since, in the nick of time to start the ball rolling. One of the eye-witnesses is in Chicago now, accompanied by two of the champion gold-fever makers of the city of Sioux, and the ball has begun to roll—the ball which is meant, not to crush money out of the Black Hills, but out of the hot-headed men who become attacked with the fever.

Who pays the expense of the expeditions organized to come here and work? Ask the Sioux City merchants. Which way will they direct all expeditions? Through Sioux City, to be sure. How much per head will the Black Hills Association get for every man whom it sends over the Western railways? Ask those inside the ring.

The mystery that is surrounding the reports of riches in the Black Hills—the word of two men against the Custer expeditions alone being given—should deter men who have to work for a living from going on so wild a chase at the beck of unsubstantial rumors. Common sense will tell every man who has had experience in mining that there are no fortunes anywhere, in any gold fields, unaided by money and machinery. Added to this are the positive orders from the War Department to keep back all intruders from the land, ceded by treaty to the Sioux Indians. Who, in the face of all these facts, will consent to be led captive by an excitement worked up to further the selfish ends of unscrupulous parties.

TUOLUMNE COUNTY MINES.—The Tuolumne Independent says: The mines of Tuolumne offer many good chances for the investment of capital, and those below who know not what to do with their uninvested means, and prefer mining to other business, would do well to investigate the many good opportunities offered in this county. We would earnestly advise them, however, to come and see for themselves, or send those in whom they can implicitly trust, of good judgment and practical experience. Kid glove experts and adventurers on the make, are not wanted; for Tuolumne has suffered too much, in times past, by these fools and knaves. They have done more to injure our quartz interests than all other causes combined, and every man interested in the welfare of this county should have no dealings with such or their employers. We wish our mines represented on their merits alone, and by this only we wish them to rise or fall. As one among many instances of judicious investment in our mines and as an evidence that such opportunities exist, we may mention the Knox & Boyle. One-half of this mine was offered to parties if they would furnish the sum of \$25,000 to open and develop it.—The proposition was accepted, and after using only \$7,000 (the balance lies in bank) the mine was not only made self-sustaining but has and is paying handsome dividends, besides carrying on the work of extended developments. Judge Preston is Superintendent of this mine, and it is by having just such energetic and practical men in charge of several of our mines, that Tuolumne is gradually taking her proper place among the most noted lode-mining districts of the Pacific slope.

MINING DECISION.—The Secretary of the Interior on the 25th ult., made a final decision of the contest of the Bullion Mining company with the "420" Mining company, of Nevada. The former applied for a patent to the mine on the Comstock lode, and the latter filed an adverse claim. The Commissioner of the General Land Office decided that the Bullion company were entitled to a patent, and the case was appealed to the Secretary of the Interior. Meanwhile the case was carried into the Nevada Courts, which also decided in favor of the Bullion company, whereupon the "420" company took a writ of error to the U. S. Supreme Court, and claimed that the Secretary of the Interior should suspend proceedings to await the decision of that tribunal. Secretary Delano now holds that the U. S. Supreme Court has no jurisdiction over any contested mining case or writ of error after it has been adjudicated by the highest Court of the State or Territory in which the claim is situated. Being satisfied of the correctness of the Commissioner's decision, he therefore directs that a patent be issued to the Bullion company, in which a reservation shall be inserted reciting the fact that the surface ground described is the estimated area of the lode, and that only the usual surface ground embraced within the walls of the lode is intended to be connected. The Bullion company will thus get a patent for 943 feet along the lode, together with the surface ground that is bounded by the east and west walls thereof.

MARKING INK FOR LINEN.—Take the white of ten eggs, and beat them to a froth; to this add an equal quantity of water, and mix it well with comminuted uinnabar. As it is a tolerably thick liquid, pass it through a fine cloth, when it is ready for use. It is of a reddish color, and is set by pressing a hot iron over the wring side of the cloth as soon as dry. The hardest washing, acid or alkaline will not affect it.

Carpentry, Joining, Etc.

Carpentry and joining, though two distinct trades or arts, are usually combined in one; an expert in the two may be considered a builder. Carpentry consists in the assembling and fitting together, by framing, of pieces of timber whether large or small. It is distinguished from joining in the fact that the fitting is done without the use of other edge tools than the saw, the axe, the adze and chisel. The term carpenter originally referred to what is now called a wheelwright, and is derived from the Latin *Carpentum*—a car. The Latins called a wheelwright, *Carpentarius*. But the English word from the above derivation has now entirely lost its original significance.

A joiner is distinguished from a carpenter from the fact that his work is more nice and complex, and the plane, auger, etc., has to be added to his kit of tools, to enable him to meet the requirements of his calling. The joiner makes doors, window frames, stair cases, and the internal fittings, generally, of a house.

The one who shapes and frames timbers for the construction of buildings is sometimes called an artificer. An architect is one who plans and lays out the work, and superintends the building. He is a contriver rather than a worker. Architecture or the science of building, was one of the first arts taken up by man—next to providing food it was his first necessity. In the process of time it has become a visible art, and as an industrial pursuit, it is one of the most important in all the list of industries. It, perhaps, more than any other, measures the degree and progress of civilization; it is a pretty sure and the most significant visible index of the wealth and luxury of a people.

The California pioneer has had the rare privilege of witnessing the growth of a State from the primitive tent life, up through all its stages of cabin, shanty, cloth and paper, and balloon house, up to the magnificent palaces which are now beginning to adorn and beautify the streets and avenues of this Golden City of the far West—and all within the short period of only one quarter of a century! It is safe to say that history, nowhere, in all the centuries of the past, furnishes such another example of such regular and rapid growth. No one intervening phase of architectural progress has been omitted in our advance from the most primitive style of architecture up to the grandest and most perfect of any, even the oldest cities of the old world.

California seems to be forming a school of architecture peculiarly her own and one especially fitted to her local needs and conditions. She is also giving employment to an unusually large number of mechanics, in this direction, in proportion to her population. The class of dwellings now sought for by the working men of this city is also of a character altogether superior to those constructed for that class of people in our eastern cities, or in fact in any city, in the world. This comes from the fact of the larger degree of prosperity which attends the mechanic and working men here. Thus the rule already laid down, that the architecture of a people is a measure of their wealth and luxury, holds good here as well as elsewhere. San Francisco promises to become not only a city noted for the palaces of her millionaires, but also a city where the working man and mechanic are better housed than in any other city in the world.

Curiosities of Welding.

There has lately been shown in this country a very interesting specimen of blacksmith work. By means of Schierloh's welding compound, it is alleged that, in one example of bar of Bessemer steel, five different kinds of iron and steel have been perfectly welded, without changing its shape in the least. The bar was rolled into form at Thompson's steel works, in Jersey City, and is ¾ by 2½ inches in the cross section.

First, a piece of Bessemer steel, cut from the end of the bar, was welded fast to itsgrate the heating and welding occupying eight minutes. On the reverse side of the bar a piece of fine cast steel was welded in six minutes. Further along on the bar a piece of blister steel was welded in eight minutes. This same steel cannot be welded with borax, as the high temperature needed with that flux makes it as brittle as cast iron under the hammer. Opposite this a piece of wrought iron was welded in six minutes, and further along on the bar a piece of cast iron was welded in three minutes. The bar was a piece of the mold-board of a plow. The bar, with its additions, was then ground and polished on the edge, so as to show the point at which the welded metal came into contact. No weld was visible on any one of them, and the difference in the metal could only be seen by the color after polishing. This solves great many important problems in iron manufacture, among others the welding of Bessemer steel.

The cause of a leak in the relief light-house New London is found to have been a ham which was probably left in the bottom of the vessel when built, thirteen years ago. Moved with the continual motion of the vessel, it was worn through plank and keel to the copper plating, which alone has kept the vessel from sinking.

SCIENTIFIC PROGRESS.

Fall of a Meteoric Stone—A Large Fragment Secured—Its Structure, Etc.

The fall of a meteoric stone of unusual dimensions was recently reported from Central Iowa. The phenomena occurred on the evening of February 12th, at about half-past 10. Its apparent size, as reported by observers nearby, was about half the diameter of the moon, and accompanied by a beautiful train. The color and vividness were about like that of molten iron. While in view they were seen to separate into many fragments, and after about three minutes the reports of three explosions were distinctly heard.

Visit of a Scientist to the Spot.

Attracted by these remarkable reports Prof. N. R. Leonard, Professor of Astronomy at the Iowa State University, has visited the locality, and has made substantially the following report to the *Davenport Gazette*:

The exact locality of its fall was the south-east quarter of section 5, township 80, range 9 west. It was on the farm of Mr. Sberlock. Some members of his family were returning from a spelling school at the time of the descent of the meteor, and saw, as they thought, three or four fragments fall in the direction of their house. Those of the family who remained at home, heard this fragment as it went whizzing by, and thought that it had passed over the house. They sought for it the next day and the day following, but in consequence of the deep snow, did not find it until Monday, when a daughter of Mr. S. found it about 50 rods northeast of their house.

The meteor struck upon the snow and ice just beyond a little slough that runs through Mr. Sberlock's pasture field, making a very slight indentation in the ground, and bounded northwest a distance of thirty feet or more, up a slight declivity, and came to rest upon the snow. It was apparently warm when it fell, for when found it was adherent to the ice and snow underneath, so that it required a smart rap to loosen it. The professor entertains the suspicion that the place pointed out is not the first place of striking, but that when the snow goes off he shall be able to find on the other side of the slough a more decided mark of impression where it first alighted, and from which it bounded to the spot first mentioned. This, of course, is mere conjecture, but it seems that the impression made upon the ground where it first alighted should have been more decided. The weight of the entire fragment was seven pounds six ounces, though we are sorry to state that before Prof. L. could gain possession of it it had reduced to three pounds eight ounces, to supply specimens, not to meads of science but simply to neighbors or curiosity hunters. This mutilation of the specimen is greatly to be regretted, and as it is every way probable that with the melting of the snow other fragments now buried in the deep snowdrifts will be found, the hope is entertained that the press and all who desire the advancement of science in this rare and deeply interesting field will use all their influence to prevent the mutilation of each other fragments as may be found, and to urge that preparatory to the dividing up of the meteor, among the different museums or cabinets of the State it shall all be collected at one place so that it may be examined and photographed as a whole—or as nearly so as possible.

The specific gravity of the specimen appears to be near 3.50, its structure strong, with some admixture of iron. That face of the fragment which formed a part of the surface of the original body is covered with a comparatively thick black coating, not perfectly smooth; while that face by which the fragment was joined to the main body is coated in like manner, but in a less degree.

The outer surface has the pitted appearance characteristic of such bodies.

Prof. Leonard has placed a sample in the hands of Prof. Hinrichs for chemical analysis, and hopes soon to be able to announce definitely as to the number and proportion of the different elements it contains.

TO SHOW THE PATH OF AN ELECTRIC DISCHARGE.—A correspondent of the *English Mechanic* says: "Take a sheet of glass, wash it well with soda and water, dry it with an unsoaped towel, polish well with a clean wash-leather. Having found the 'striking distance' of your Leyden jar, battery, or electric machine, place the sheet of glass just below the points of discharge, so that they may rest upon it. The shock may now be passed over the sheet, when on removing the glass, and breathing on it, a picture of the track of the electric fluid will be distinctly visible, as clear glass on a dull ground."

THE AGASSIZ MUSEUM.—It is thought that the Agassiz Museum at Harvard, will soon reach the desired amount of 200,000, thus making it possible to draw the \$50,000 appropriated by Massachusetts. With this \$250,000 new halls are to be built, new facilities for instruction are to be provided, and the classification and arrangement of the museum is to be carried forward much further than it was at Agassiz's death.

The Earth—Its Heat and Contraction.

Professor P. M. Duncan, F. R. S., recently delivered at the Royal Institution a course of lectures upon "The Grand Phenomena of Physical Geography." He pointed out that there is strong evidence that the earth is a solid body now cooling. As it cools the rocks must contract; moreover, those rocks which are rich in silica will not contract so rapidly as cooling as others, consequently herein is a source of change of shape of the earth. It is well known that surface changes are going on; that some large areas of land are in course of slow upheaval, while others are slowly sinking, and that at one geological period there was a great upheaval of the larger portion of the continent of North America. The globe, therefore, is cooling unequally. The radiation from some parts is greater than at others, so in this there is a further source of disturbance.

Sir William Thomson has calculated that every year 92 horse power of work—for heat means work—is got rid of from every 247 acres of the surface of the globe. The dissipation of energy and the contraction of rocks not being uniform, the effect of these disturbing causes is to produce horizontal thrusts, which form mountain ranges by crumpling up the earth, for mountains are formed by this crumpling, and not usually by direct volcanic or other upheaval. The changes produced by the contraction are slow, and there is every reason to believe that our present sea floors and our present continents are extremely old, geographically speaking, so far as their present forms are concerned. He said that the upper part of Snowdon consists of sea sand, fossil sea fishes, and volcanic ashes all mixed together; in fact it appears to have been at one time in the same condition that the Bay of Naples is in at present, that is to say, volcanic ashes fell into it and sometimes buried fish. The lower part of Snowdon consists of vast streams of old lava. At some geological period the crumpling action already mentioned took place below the Bay of Snowdon; consequently the bottom of the bay was elevated and became the top of the highest mountain in Wales. Rain, and rivers, and atmospheric changes then played upon it and during the course of long ages, sculpturing out the beautiful mountain scenery which characterizes the Snowdon range.

Structure of Coal.

By close investigation E. W. Binney, F. R. S., believes he has established the following facts: Soft caking, or cherry coal, is chiefly composed of the bark, cellular tissue, and vascular cylinders of coal plants with some macrospores and microspores. Caking coal has much the same composition, except that it contains a greater proportion of hark. Splint, or hard coal, has nearly a similar composition, but with a great excess of macrospores. Cannel coal, especially that yielding a brown streak, is formed of the remains of different portions of plants which had long been macerated in water; it contains a great excess of microspores. Macrospores are from 1.20th to 1.25th of an inch in diameter, and can be easily seen by the naked eye. Their exterior is composed of a brown coriaceous substance, containing within it carbonate of lime, or bisulphide of iron, according to the nature of the matrix. The microspores are about 320 times less in size, and contain some form of hydrocarbon, which, by the action of heat, becomes paraffin. These conclusions were arrived at merely as to the composition of the different kinds of coal. Each seam is materially affected by the nature of the roof, since, if it is an open sandstone, gaseous matter can freely escape, which is, of course, the case when the seam is roofed in with air tight, or shale or blue bind.

The Lower and the Higher Life.

An eloquent inaugural address was delivered by Dr. William Stokes at the late annual meeting of the Royal Irish Academy. After review the recent progress of science, he concluded as follows:

"The conservatism of energy, directive though not creative, in the living organized structure, and the chemical affinities in which that is unorganized, show, it might be held, that a lower mode of life pervades every existing being; but we believe that in God's own time that higher life which shows itself in progressive organization, and is terminable, will have a different existence, at least as regards the human being—one freed from material associations, freed from physical influences and from moral shortcomings. It is believed by thoughtful men that matter is indestructible. May we not find that as it has, in time, subverted the physical, so in eternity, it will, when spiritualized, subvert the moral law, and thus an undying result will be evolved? It has been written that we 'see through a glass, darkly,' but are there not grounds for the belief that each will not forever be the case? May we not believe that every discovery in development, in structure, in chemical composition, and in electrical and optical character, will be, when related to the property of life, a fuller ray of the burning luster by which we approach the footstool of that throne where we shall be permitted nearer and nearer to contemplate the power and the ineffable light of Him from whom comes all life?"

MECHANICAL PROGRESS.

Bearings.

The results of experiments made on the effects of friction between various substances, have recently been tabulated by M. C. Kunzel. The heat produced, other conditions being equal, is in proportion to the hardness of the substances, and, on the other hand the greater the difference in the hardness of two substances rubbing against each other, the less the heat produced by the friction, and the harder of the two heats more than the other. If friction takes place between glass and cork, the amount of heat received by the two respectively is as seven to one, and between bronze and cork, four to one.

For durability alone, of course, bearings should be of metal as hard as that of the arbors which they support, but considering the wear of the latter, the former should be as soft as possible. In practice, however, certain precautions are to be observed; the bearing must not cut the arbor, and it must wear as little as possible; it should not get hot even when lubrication fails, and lastly, it should possess resistance enough to bear all the shocks that fall upon it without being deformed or broken. The alloys of copper and tin generally in use are rarely homogeneous, with the exception of that which contains eighty-two to eighty-three parts of copper to seventeen or eighteen of tin. When there is less tin in the composition, granulation takes place during cooling, which alters the homogeneity of the alloy, and causes the cutting both of bearing and arbor. When an alloy of copper and tin sets slowly, the first part consolidated is a very soft alloy, not containing more than 7 to 10 per cent. of tin; this forms, as it were, the shell of the bearing, while the hard alloys containing seventeen to eighteen parts of tin, sets afterwards and fills up the shell. When a bearing thus formed is in work, the soft alloy soon gives way, and the hard grains within attack the arbor and are often torn out and carried away when grease fails.

A good bearing should be the very opposite of the above; its shell should be very hard and durable, and the interior filled up with a softer composition. This result is attempted to be obtained by fusing together several alloys of different compositions and degrees of fusibility, so as to produce by cooling to given alloys, but the operation is delicate and the result uncertain. Phosphorus bronze succeeds best in this way; the shell is then almost entirely formed of very hard bronze, and the interior of a soft alloy of copper and tin. The bearing may then be considered as a series of layers of soft metal enclosed in a casting of metal almost as hard as the arbor itself. The microscope reveals this disposition with great clearness.

The results obtained with various kinds of bearings used on the Belgian and German railways are thus given: Bronze composed of 83 parts of copper and 17 of tin, costs 3 fr. 25 c. per kilogramme, and wears at the rate of 11.6 grammes for four bearings per 1,000 kilometres, the cost being 0.037 fr.; bronze containing 32 parts of copper and 18 of tin costs 0.032 fr.; the same applied to carriages with brakes, wears at the rate of 109.5 grammes, and costs 0.335 fr.; white metal, composed of 3 parts of copper, 90 of tin, and seven of antimony, costs 3 fr. 73 c., wears at the rate of 14.8 grammes, and costs of 0.055 fr.; ditto containing copper 5, tin 85, and antimony 10 parts, costs 3 fr. 66 c., wears at the rate of 11.3 grammes, and costs 0.041 fr.; ditto composed of lead 84, and antimony 16 parts, costs 1 fr. 48 c., wears at the rate of 12.2 grammes, and the expense is 0.018 fr. per 1,000 kilometres; lastly, phosphorus bronze costs 4 fr. 37 c., wears at the rate of 2.3 grammes, and the expense is 0.010 fr. only, but when applied to carriages with brakes, the wear rises to 9.5 grammes, and the expense to 0.041 fr.—Iron.

NEW AND VALUABLE PRINTING PRESS.—A new printing press made in Liverpool, Eng., by Dunan & Wilson, for the *Christian Union* newspaper of New York, is a remarkable novelty in this class of mechanism. It prints, folds, pastes, and binds the paper inside of a cover, which it also prints; and delivers the numbers, thus completed, at the rate of 5,000 copies per hour, and may be worked up to 6,000 per hour. The paper is drawn from a roll. The whole machine is 27 feet long, 7 feet high, and the cost is \$20,000. The folding apparatus may be disconnected whenever necessary, and the machine used to print without folding. Various attempts have heretofore been made to attach folding machines to printing presses; but this, we believe, is the first successful example of the kind.

IMPORTANT DISCOVERY.—It was an accidental discovery by Goodyear that brimstone would vulcanize India-rubber, and one of the most important to the industrial interests of the world. An accidental discovery of recent date, it is said, makes it possible to enamel cast-iron, and all kinds of bearings, and thereby prevent the friction and heat which is so expensive, dangerous and often disastrous in running cars and machinery. Des Moines capitalists are getting ready to introduce the article. It can be applied like a lubricant, and just as readily.

Toughened Glass.

We have made several allusions to the late French improvement in glass manufacture, whereby that heretofore fragile material is made to possess a good degree of toughness; but we have not, until the past week, been able to learn the means by which this toughening is accomplished. This process appears to be distinctly announced in the following paragraphs, which recently appeared in the *London Times*:

It has long been known that when glass is heated to redness, and kept at that temperature for a considerable time, its physical properties are changed in a remarkable manner. Thus it becomes opaque or feebly translucent, much harder and tougher, and somewhat like porcelain in appearance. This change is termed "devitrification," and is caused by the conversion of the glass into a coarsely-crystalline mass, of which sections are beautiful objects when seen with a microscope in polarized light. The subject was investigated by the renowned French philosopher, Raman, early in the last century; and to objects of devitrified glass the name of Raman's porcelain is usually applied. Such objects are exhibited in the Museum of Practical Geology, in Jernyn street, London.

It has been reserved for another Frenchman, a gentleman farmer, to discover the singular fact that when glass is heated to redness and then cooled or annealed in oil its toughness is greatly increased, or, what is equivalent, its fragility is greatly diminished, while its transparency remains the same. Thus, suppose a rectangular pane of glass placed flatwise and supported on two of its opposite edges to break when a given weight is allowed to fall upon it—say, from the height of two feet—it would, after having been toughened in the manner above stated, resist the same weight falling upon it from the height of six feet or eight feet. It is strange that, although glass has been manufactured during the last 2,000 years, yet such a simple and probably very important fact as this should only recently have been found out, and equally strange that the discoverer should be a gentleman farmer.

The foregoing information on the new process of toughening glass is given on the authority of Mr. C. W. Siemens, F. R. S., who is well known in connection with telegraphy and the furnace which bears his name. His brother, an eminent glass-maker at Dresden, has tried the process and pronounces it to be "certain and unquestionable."

ALLEGED IMPROVEMENT IN SHOT GUNS.—Capt. John L. Kerr, of Allegheny City, and Wm. D. Squires, of Sioux City, Iowa, have recently received Letters Patent for an improvement in shot guns, which it is said, promises the greatest utility to sportsmen. It consists simply in a parallel enlargement of the bore of the gun at the muzzle some seven or eight inches down. For the last month they have been making the most minute tests, and have reduced the improvement to fixed rules, by which any good gunsmith can make a correct shooting shot gun, or improve almost any gun now in use. Their principal tests were made with old Harper's Ferry muskets, and notwithstanding their ponderous, non-elastic character, they were made to shoot as well or better than the best imported shot guns.

If such is the fact, that an old musket, with so trifling an expense, can be made to shoot as good if not better than the best imported English guns, the invention is most certainly an important one.

A VALUABLE metallurgical process has recently been brought forward by a Birmingham inventor, which admits of the filing of articles of brass with molten iron. The balance weights for chandeliers, pillars, columns, and large weights may be made, advantage being taken of this process, at a much diminished cost. It is simply necessary to immerse the brass shells in water, and the molten iron is then poured in. The shell cannot, of course, attain a higher temperature than 212 degrees, the boiling point of water, while the temperature of its contents may be about 3,000 degrees. In making large or imperial weights by this process, the plan devised by the inventor is that of imbedding the shells in iron filings, the high conducting powers of which is thus turned to account.

CANAL STEAMBOATS.—According to the recent report of the State Engineer of New York, the steamers on the Erie canal, invented by Mr. Baxter, have successfully solved the problem of rapid transit, so far as canal navigation goes. Nine steamers of the Baxter Company were in operation on the Erie canal last summer, and this fleet will be increased the coming season to one hundred. The average time of their round trips from Buffalo to New York has been fifteen days, consuming only twelve tons of coal during the round trip.

TUNGSTEN STEEL.—A simple and certain process, it is claimed, has been perfected by Biermann, of Hanover, by which a white, exceedingly hard and brittle cast-iron, containing from five to forty per cent. of tungsten, can be produced, which is adapted to chilled work, and can be added to cast-iron in any proportions.

Mining Stocks.

The mining share market has been pretty lively this week, and prices realized have been good. The Gold Hill end of the Comstock has been in the ascendant, and transactions in these stocks have been comparatively extensive. Movements in Idaho and Ely district stocks have been small, the principal attention being drawn to Comstock mines. Of the situation there the *Enterprise* thinks that, eventually, the improvements and new developments now steadily being made along the line will attain such importance through constant accumulation that they will force recognition in the market. Although the impetuosity of the people at large constantly runs far ahead of drifts, cross-cuts, winzes and all other works undertaken for the development of the Comstock mines, yet all these openings are being pushed toward the great ore-bodies as rapidly as men and machinery, working day and night, can perform the task. When the public mind has become excited and has run too far ahead of the reality, it has nothing to do but to return, take a rest and start again when the humor returns; meanwhile the real work in the mine is steadily, though it may be slowly, advancing.

The *Enterprise* says: All is going on well at the north end of the lead, and in due season there will no doubt be new and valuable developments to report, which will gratify and satisfy the clamoring and excitement-loving surface world for at least three days. It is not only at the north end of the lead that prospecting operations are tedious, but also at the south end, and in all other places where hard rock is to be passed through and floods of water, deficient ventilation and other obstacles to progress are to be overcome. All is being done in all of our mines that men and machinery can do, and we shall see many valuable developments along the Comstock before many months have passed. Toward the south end of the lead two or three companies are upon the eve of opening up bodies of ore, and ere long we may expect to hear good news from some of these. Several "outside" mines are already furnishing ores to the mill for reduction, and very soon some others will be doing the same. Our prospecting companies are all in excellent spirits and the people generally have unbounded faith in the permanence and value of the mines along the Comstock range.

Sales at the S. F. Stock Exchange.

Last Week.	This Week.
THURSDAY, MARCH 25.	THURSDAY, APRIL 1.
MORNING SESSION.	MORNING SESSION.
230 Alpha.....	470 Alpha.....
1240 Belmont & Belcher.....	480 Belmont & Belcher.....
185 Belcher.....	510 Belcher.....
670 Bullion.....	510 Bullion.....
135 Confidence.....	510 Confidence.....
55 Caladonia.....	70 Chollar.....
70 Crown Point.....	2030 Crown P. Int.....
220 Chollar.....	600 Confidence.....
1780 Caladonia.....	250 Hale & Norcross.....
190 Con Virginia.....	545 Empire Mill.....
310 Empire Mill.....	215 Gold & Curry.....
15 Exchange.....	215 Gold & Curry.....
185 Gould & Curry.....	180 Imperial.....
120 Globe.....	170 Justice.....
70 Hale & Norcross.....	160 Julia.....
516 Imperial.....	50 Kentucky.....
120 Justice.....	230 L. & B. Bryan.....
300 Julia.....	630 M. & C.
380 Knicker.....	905 P. H.
90 Knicker.....	100 Overman.....
1320 Mexico.....	120 Savage.....
1645 Upr.	185 Sierra Nevada.....
210 Overman.....	100 Seg. Belcher.....
180 Success.....	650 Union Con.....
55 Savage.....	574 Yellow Jacket.....
410 Sierra Nevada.....	
1880 Union Con.....	
725 Yellow Jacket.....	

Afternoon Session.	Afternoon Session.
600 American Flat.....	295 Atlanta.....
295 Atlanta.....	2620 Andes.....
2620 Andes.....	595 Belmont.....
595 Belmont.....	200 Chollar.....
200 Chollar.....	135 Challenge.....
135 Challenge.....	100 Dayton.....
100 Dayton.....	200 Elipse.....
200 Elipse.....	320 Empire Idaho.....
320 Empire Idaho.....	1245 Eureka Co.....
1245 Eureka Co.....	450 Franklin.....
450 Franklin.....	15 Golden Chariot.....
15 Golden Chariot.....	150 Globe.....
150 Globe.....	150 Idaho.....
150 Idaho.....	150 Knicker.....
150 Knicker.....	425 Kossuth.....
425 Kossuth.....	490 Leo.....
490 Leo.....	150 Lady Washington.....
150 Lady Washington.....	310 Meadow Valley.....
310 Meadow Valley.....	200 Mansfield.....
200 Mansfield.....	200 Mahogany.....
200 Mahogany.....	1200 Original Gold Hill.....
1200 Original Gold Hill.....	150 Pacific.....
150 Pacific.....	160 Poorman.....
160 Poorman.....	300 Russian.....
300 Russian.....	1200 St. Louis.....
1200 St. Louis.....	185 Raymond & Ely.....
185 Raymond & Ely.....	230 Ray Patch.....
230 Ray Patch.....	200 South Chariot.....
200 South Chariot.....	295 Silver Hill.....
295 Silver Hill.....	450 Silver Chariot.....
450 Silver Chariot.....	915 Woodville.....
915 Woodville.....	70 Wash & Greole.....
70 Wash & Greole.....	2500 Wash Fargoe.....

JUDGING from reports from the Nevada county papers it seems that many new claims are being started up and that prospectors are not idle. The *Foothill Times* says: We want a score or more mines of the class of the Idaho, Empire, Enreka and New York Hill at work, in order to make things prosperous as Grase Valley deserves to be, and the only way left to bring about such a result, since capital seems attracted to California street operations on the Comstock, is for miners themselves to go to work and show that their properties are really valuable; when, after the re-creation from stock-gambling takes place, as it surely will, men of means will be glad to invest in and properly open them.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
American Flag M & M Co	Washoe	7	50	Mar 26	May 4	Gen R. Sninney
Andes S M Co	Washoe	4	150	Feb 25	Mar 29	M. Landers
Adams Hill Cons M Co	Eureka Nev	8	15	Feb 18	Mar 24	W W Traylor
Alps S M Co	Ely District	8	25	Feb 10	Mar 22	O D Squire
American Flat M Co	Cal	10	5	Mar 9	Mar 15	O E Deane
Atlantic & Pacific Cons M Co	Cal	10	5	Mar 9	Mar 15	Edward May
Bacon M & M Co	Washoe	3	50	Mar 9	Mar 12	D F Verdenal
Bellevue M Co	Cal	11	50	Feb 17	Mar 23	J W Verdenal
Bell M & M Co	Cal	11	50	Feb 17	Mar 23	J W Verdenal
Buckeye & S M Co	Washoe	13	50	Mar 4	Mar 10	C H Sankley
California S M Co	Washoe	11	300	Mar 9	Mar 13	R Wegerer
Chariot Mill & M Co	San Diego Cal	2	50	Feb 17	Mar 22	F Swift
Cherry Creek M & M Co	Nevada	2	50	Feb 17	Mar 22	F Swift
Chief of the Hill M Co	Washoe	6	25	Mar 26	Apr 30	Charles S Neal
Coos Bay Oregon Coal Co	Oregon	1	100	Feb 5	Mar 10	T P Beach
Crown Point R C & S M Co	Washoe	5	50	Mar 12	Mar 22	J M DeBungton
Daney G & S M Co	Washoe	13	50	Mar 22	Mar 26	Geo R Spinnay
Dardanelles M Co	Washoe	2	100	Feb 5	Mar 10	W S Duval
Davton G & S M Co	Washoe	2	100	Feb 16	Mar 23	W E Dean
El Dorado Water & D G M Co	Cal	5	50	Mar 12	Mar 18	J W Verdenal
Globe Cons M Co	Washoe	5	75	Feb 18	Mar 22	J Maguire
Gold Run M Co	Cal	10	15	Feb 9	Mar 15	O C Palmer
Golden Chariot M Co	Idaho	13	200	Mar 8	Mar 12	L Kaplan
Ida Elmore M Co	Washoe	16	100	Feb 10	Mar 17	W M Deane
Independent G M Co	Cal	8	50	Mar 18	Mar 19	Gen T Grimes
Julia G & S M Co	Washoe	21	200	Feb 12	Mar 15	A Noel
Justice M Co	Washoe	14	300	Feb 12	Mar 15	F S Kennedy
Lady Bryan M Co	Washoe	3	50	Feb 25	Mar 13	E F Stern
Lady Bryan M Co	Washoe	8	50	Mar 18	Mar 19	Frank Swift
Memmoth Silver M Co	Nevada	18	10	Feb 25	Mar 13	D A Jennings
Meadow Valley M Co	Ely District	18	100	Feb 2	Mar 10	J W Verdenal
Merced G & S M Co	Nevada	1	50	Mar 22	Mar 26	J W Coleman
Monitor Belmont M Co	Nevada	5	50	Mar 16	Mar 19	W W Hopkins
Newark S M Co	Ely District	18	100	Feb 2	Mar 10	W Willis
New York M Co	Cal	13	100	Feb 12	Mar 12	H C Kibbe
North Bloomfield G M Co	Cal	36	100	Feb 3	Mar 12	T Derby
Overman S M Co	Washoe	31	300	Mar 16	Mar 20	Ceo D Edwards
Phil Sheridan G & S M Co	Washoe	2	75	Jan 21	Mar 2	W R Townsend
Punch West Extension M Co	Washoe	7	100	Mar 10	Mar 17	T L Kimball
Prussian G & S M Co	Washoe	4	50	Mar 24	Mar 3	R H Brown
Red Jacket M Co	Idaho	6	50	Feb 1	Mar 9	W Willis
Rock Island G & S M Co	Washoe	1	100	Mar 17	Mar 17	W Willis
Sage M Co	Washoe	17	500	Feb 25	Mar 24	E B Holmes
Serator Silver V Co	Idaho	8	100	Mar 27	Mar 31	J H Sayre
Silver Oord M Co	Washoe	11	50	Feb 25	Mar 3	Frank Swift
St. Patrick M Co	Cal	10	50	Feb 2	Mar 8	F V Verdenal
Star King M Co	Washoe	10	25	Feb 25	Mar 31	Louis K. Kaplan
Sutro M Co	Washoe	30	50	Feb 17	Mar 22	W R King
Tuloria & Imperial T & M Co	Cal	4	15	Feb 18	Mar 12	H C Kibbe
Ward Hecker Cons M & M Co	Nevada	4	30	Feb 27	Mar 8	D A Jennings
Ward Ellis S M Co	Robinson District	3	5	Feb 10	Mar 18	J M DeBungton
Washington & Frele M Co	Ely District	14	100	Feb 18	Mar 22	F O Cleary
Wells Fargo M Co	Cal	2	100	Mar 21	Mar 21	M A Burt
Woodville Cons S M Co	Washoe	1	100	Mar 25	Mar 17	W M Helman

OTHER COMPANIES.—NOT ON THE LISTS OF THE BOARDS.

Company.	Location.	No. Amt. Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Alhambra Q M Co	Cal	1	5	Mar 21	Apr 28	R Von Pfister
Alpine G M & M Co	Cal	1	125	Feb 21	Mar 22	J F Lighner
Arizona U M Co	Washoe	12	75	Mar 18	Apr 12	J Maguire
Cedarberg G M Co	Cal	2	10	Mar 8	Apr 13	J M DeBungton
Cienega P M Co	Mexico	2	50	Mar 8	Apr 9	D M Bokes
Cienega P M Co	Cal	2	50	Mar 8	Apr 9	R Townsend
Edith Q M Co	Cal	3	30	Mar 10	Apr 22	Wm Stuart
El Dorado State Co	Cal	1	15	Mar 4	Apr 5	Hinch Elias
Electric M Co	Cal	2	40	Feb 16	Mar 22	T B Engard
Empire Hill Cons M Co	Utah	2	40	Mar 10	Apr 5	G J Glos
Enterprise Cons M Co	Cal	2	25	Mar 10	Apr 24	F J Hermann
Excelsior M Co	Cal	1	25	Mar 20	Apr 26	R Von Pfister
Fresno Q M Co	Cal	1	25	Mar 15	Apr 10	R Von Pfister
Genoa S M Co	Cal	1	20	Mar 15	Apr 10	Ford Rogers
Gold Mountain G M Co	Bear valley Cal	4	100	Jan 25	Mar 6	J P Vallier
Golden Brown M Co	Cal	2	6	Mar 3	May 1	Daniel Buck
Home G M Co	Nevada	2	50	Mar 22	Apr 24	P J Watson
Imperial Central M Co	Idaho	2	50	Mar 22	Apr 27	R H Brown
Imperial S M Co	Washoe	21	100	Feb 10	Mar 17	F W Dean
Independence Cons M Co	Cal	2	250	Feb 4	Mar 13	F J Hermann
International Gold M Co	Cal	1	15	Feb 13	Apr 2	J M DeBungton
Interoceanic M Co	Washoe	12	75	Mar 18	Apr 12	R Goldsmith
Lake Count' Q M Co	Cal	5	10	Mar 10	Apr 15	A Baird
Los Prietos M Co	Cal	2	50	Mar 6	Apr 12	S H Smith
Mariposa L M Co	Washoe	12	50	Feb 16	Mar 23	H O Kibbe
Mariposa L M Co	Cal	3	100	Mar 16	Apr 21	J F Nesmith
Pauper M Co	Idaho	4	75	Mar 4	Apr 10	W F Bryant
Phoenix Tunnel & M Co	Utah	1	10	Mar 3	Apr 14	J P Cavallier
S. Jose M Co	Egan Canon	6	500	Jan 27	Mar 6	A Carrigan
Silver Gloud G & S M Co	Cal	2	25	Feb 8	Mar 15	A Enquist
Silver Peak M Co	Washoe	6	50	Feb 23	Mar 26	A Enquist
Silver Spring M Co	Cal	6	50	Feb 17	Apr 17	T B Wintard
Table Mt Alpha W Co	Cal	6	110	Feb 5	Mar 15	T F Crouse
Theresa M & M Co	Cal	2	20	Mar 13	Apr 14	M B Hoskon
Tuolumne Hydraulic M Co	Cal	2	200	Feb 23	Apr 17	M B Hoskon
Washoe M Co	Washoe	2	200	Mar 29	Apr 21	W E Dean
Weaverville D & H M Co	Washoe	1	50	Feb 28	Mar 29	F H Rogers
Woodville C & S M Co	Washoe	9	100	Mar 25	Apr 23	W M Helman

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Amador Cons S M Co	Nevada	J M DeBungton	Merchants' Ex	Annual	April 5
Andes S M Co	Cal	Called by Trustees	507 Montgomery st	Special	April 5
Baltimore Cons M Co	Cal	Called by Trustees	302 Montgomery st	Special	April 7
Bunker Hill Q M Co	Cal	Called by Trustees	19 First st	Special	April 6
Franklin M Co	Cal	Called by Trustees	302 Montgomery st	Annual	Mar 23
Golden Chariot M Co	Idaho	Called by Trustees	Merchants' Ex	Special	April 8
Greene M Co	Idaho	Called by Trustees	Academy Building	Annual	April 20
Illinois Central M Co	Idaho	Called by Trustees	Academy Building	Annual	April 11
Lawson M Co	Washoe	H C Kibbe	415 California st	Annual	April 12
Providence G & S M Co	Cal	Called by Trustees	415 California st	Special	April 24

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M. Co.	Washoe	H. C. Kibbe	415 California st	300	Jan 1
Black Bear Cons	Cal	H. C. Kibbe	415 California st	40	Nov 16
Chlor M & M Co	Washoe	Frank Swift	415 California st	100	Mar 11
Crown Virginia M Co	Washoe	Charles H. Fish	401 California st	200	Jan 12
Crown Point M Co	Washoe	O. E. Elliott	220 Clay st	100	Mar 5
Diana M Co	Nev	W. W. Traylor	415 California st	50	Mar 5
Eureka Consolidated M Co	Nevada	D. F. Verdenal	415 California st	50	Mar 5
Ray Patch M Co	Nevada	D. F. Verdenal	415 California st	50	Mar 5

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office at San Francisco:

PLUTO P. F. Co., March 27.—Object: Buying, selling, and operating quicksilver furnaces in the States and Territories of the Pacific coast. Capital stock, \$150,000. Directors—H. H. Eames, R. D. Walbridge, Wm. L. Ward, Matthew Bridge, and John W. Fitch.

FRANK PATTERSON G. M. Co., March 21.—Capital stock, \$2,000,000. Location: Indian valley, Plumas county. Directors—H. C. Bidwell, H. Cox, Thomas J. Kerr, Paul Cornell and Miguel J. Quin.

PACIFIC ECONOMIC M. Co., March 27.—Object: To work the Moose mine, in Utah Territory, and to mine in California and Nevada, and the States and Territories adjoining the same, and to carry on mining and prospecting works and machinery, and to establish agencies in New York or elsewhere with a view to procure funds for the corporation and to act as agents of mining companies, owners of mines, or others. Directors—James Brodie, William H. Cummings, Alexander Kydd, A. H. Griffith and S. Strahan. Capital stock, \$5,000,000.

CORONADO CONS. G. AND S. M. Co., March 29.—Location: Elko county, Nevada. Directors—J. B. Fitch, J. W. Pence, L. I. Mowry, Edward Chatlin, and Mrs. M. Pierson. Capital stock, \$10,000,000, divided into 100,000 shares.

CONS. ALABAMA G. AND S. M. Co., March 30.—Location: State of California. Directors—Michael McDonald, Wm. W. Burns, W. L. Higgins, Augustus Laver and Edward A. Edwards. Capital stock, \$7,500,000, divided into 75,000 shares.

WEST END D. TILLING Co., March 30.—Capital stock, \$300,000. Object: Manufacturing spirits in this city and county. Directors—J. G. Goldsmith, A. G. Van Winkle, J. B. Snyder, Thos. Donnelly, and J. H. Scrubridge.

AUBURN GRAVEL M. AND DITCH Co., March 30.—Object: To conduct the general business of mining and conveying water in Placer and Sacramento counties, and elsewhere in this State; to construct all works necessary for the proper extraction and reduction of ore and metals, and the conveying of water; to acquire mineral mining claims, mill sites, water rights, ditches and flumes, and other property pertaining to the general business of mining and conveying water, and to hold, use, and dispose of the same. Directors—P. Crowley, James Gannon, C. N. Felton, H. F. A. Schussler and William T. Higgins. Capital stock, \$1,000,000, divided into 10,000 shares.

BADGER CONS. M. Co., March 30.—Location: Goose Creek district, Elko county, Nevada. Capital stock, \$8,000,000, in 80,000 shares. Directors—Jas. A. Pritchard, E. W. Leonard, D. Porter, Matthew Canavan and Joseph McGillivray.

TERRACE CONS. M. Co., March 30.—Location: Goose Creek district, Elko county, Nevada. Capital stock, \$8,000,000, in 80,000 shares. Directors—J. A. Pritchard, E. W. Leonard, D. Porter, M. Canavan, and Joseph McGillivray.

SCOTIA M. Co., March 30.—Location: Poverty Hill, Sierra county, Cal. Directors—A. T. Elliott, H. Wikeman, David H. Walker, T. F. McCarthy and J. H. Dickinson. Capital stock, \$5,000,000, divided into 50,000 shares.

SANTA CLARA COUNTY M. Co., March 30.—Location: Santa Clara county, Cal. Capital stock, \$2,000,000. Directors—J. Neale, E. J. Wilson, R. B. Harper, John Harper and Henry Michaels.

THIRTY-FIVE trains are now running daily over the Virginia and Truckee railroad.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior in proximity to the mines mentioned.

California.

AMADOR.
RIOB STRIKE IN THE KENNEDY.—Amsdor Ledger, March 27: We are pleased to chronicle the fact, that in sinking the main shaft in the Kennedy mine, a very rich strike has been made at the depth of 700 ft. The ledge at that depth presents a width of 6 ft, and increases as sinking proceeds. The ore now being taken out is evidently the richest, as a body, yet discovered in the mine, the rock being the regular ribbon rock peculiar to the great mother lode, and well charged with free gold and rich sulphurets. The main shaft has evidently reached the south edge of an extensive chimney lying north. The company will, in a short time, commence the erection of a forty stamp mill to be propelled by water, which will be, when completed, a great saving in the cost of crushing over steam power.

THE ST. MARTY'S GRAVEL CLAIMS.—Several days ago there was a partial clean up of a few days run on pay gravel in the above named claims, which revealed the fact that the claims contained very heavy gold; one nugget weighing \$46, and a large number of others varying from \$3 to \$10. The company are now placing three hydraulics on the claims, two Little Giants, and one of less caliber. The claims, which embrace near nine acres, nearly the whole of which is valuable mining ground, belong to the Amador consl and mining company.

RUSSELL HILL.—Mining is being vigorously prosecuted at Russell hill, with very satisfactory results, and preparations are being made to mine the hill on an extensive scale. No doubt exists as to the richness of the ancient channels penetrating the hill, and when the underground system of these channels shall be understood, so that they can readily be followed, heavy returns in gold will be obtained.

BUTTE.
IRON.—Oroville Mercury, March 26: For some time past it has been known that iron existed in considerable quantities over in Wyandotte township, in this county. A few weeks since a party traveling over the hills came upon a rock that seemed to him highly impregnated with the ore. He broke off several pieces and gave them to his friends in town. One of them was sent to an assayer in San Francisco, with the request that he would test it and see what amount of silver and gold there might be in it. The answer returned was that neither of the above metals were to be found, but that it was rich in magnetic iron. Soon after a company was formed, consisting of Thomas Callow, Supervisor Freer, E. A. Mathews, G. M. McBride, A. Goldstein, and a man by the name of Meyers, who lost no time in staking off their claims. It is within seven miles of the railroad, over a good road, part of the way, and the balance can easily be made so. In the immediate vicinity is to be found an abundance of the best kind of lime rock, and also plenty of wood and water.

ate erection of a furnace. A furnace, however, will involve a heavy outlay of money, principally in the construction of roads, and before going into this expense, he deems it best to personally explain the entire situation to his brothers, living near Visalia, who are largely interested, and for this purpose he goes over there next week. Mr. Moffat has been prospecting in the vicinity for fire clay, and has opened some that is thought will do, but which is to be submitted to a furnace test at Cerro Gordo. The prospects are altogether favorable for the immediate construction of a furnace.

NEVADA.

OMAHA MINE.—Grass Valley Union, March 30: This new ten inch pump at the Omaha mine is now safely in the mine, and began its work last Saturday. This pump will be able to fork out the water for a great many months to come, and there can be no danger now of the mine filling up any more. The Omaha's sulphurets, left over after the last crushing of ore, have been worked. Those sulphurets have behaved very well, turned out rich in fact, and gave the neat result of \$116 to the ton. With rock that pays about \$53 to the ton exclusive of sulphurets, and then sulphurets paying \$116 a ton, we call the Omaha ore very good.

PUMPEO OUT.—The shaft of the Idaho is being dipped out. It has been re-timbered for 100 ft, from the 900 to the 800, and while the men were timbering it the water was allowed to collect. A large tub raises the water to the 600-ft level, where the big pumps get at it and raise it to the drain tunnel. It will take several days to get it in "fork." As soon as this is done they will put in the rails and the shaft will be completed and ready for the cages.

GASTON RIDGE MINE.—The Gaston Ridge mine, situated between Washington and Eureka South, in this county, is working along very well. The new tunnel is now in about 400 ft, and in about 70 ft more the ledge will be cut. The ledge is a very large one and as far as it has been worked shows well in the true indications of richness namely: free gold.

DAY MINE.—Foothill Tidings, March 27th: The Day mine, situated in Willow Valley, near Nevada City, which was worked some years ago and produced many thousands in gold from near the surface, but never was opened to a depth of over 30 ft at any point, has recently passed under the management of Capt. T. W. Moore and others, who have purchased steam hoisting machinery and are preparing for an energetic movement thereon. The Day is noted for the great length of pay chutes developed near the surface and for the good average quality of the rock taken out, as it were, from the "grass roots." We are told that the last day's work was done on the ledge at a depth of 30 ft, below which they could not get because of water, and the then owners were not able to put on machinery for pumping, was in ore which would pay sixty dollars per ton, and it is believed that with the facilities for work which are now being put on, this mine will soon make croakers and sleepy-heads open their eyes with surprise.

THE Howard Hill mines, Lucky and Cambridge, now owned by a San Francisco company and working under the superintendence of Captain John White, are likely to soon redeem that once famous locality from the disrepute it has fallen into these last few years. Considerable prospecting has been done the past winter and a few days since the stamps of the Gold Hill mill were dropping on a grist sent down from there. About twenty tons of rock was put through, which yielded, as we understand, at the rate of \$40 per ton. This we believe was from the Cambridge lode about 40 ft deep and the ledge averages at this depth about a foot in thickness. This result will be very apt to induce an increase of force and the starting up of the company's mill.

PLACER

GREENE MINE.—Placer Herald, March 27: With the completion of the new eight-stamp mill, this company have, undoubtedly, the most perfect and convenient works in the district. The buildings on the mine are neat and substantial; the machinery of the most approved kind. The mill, being convenient to the shaft, is driven by the same engine, (40-horse-power) that drives the pump. Another engine, 16-horse power, is used exclusively for hoisting. The water from the mine is raised above the building, whence it is conducted, by pipe back to an immense reservoir in the side hill, from which it is drawn to supply the mill and boilers, as needed. The mine itself is well opened. The main shaft being down about 300 feet, from which two levels are run, one at 100 feet, and the other at 200 feet deep. The first named is in from the shaft about 50 feet east, and about 75 feet west; the second is in from the shaft about 140 feet east, and about 110 feet west. They are now stopping from each side of the main shaft between the 100 ft. and 200-ft. levels. The mill is kept steadily running to crush the rock as fast as it is hoisted from the mine. There has yet been no clean-up since the new mill was started, but indications for fair returns are favorable. The energy displayed by this company is a matter of just praise. Supt. Wm. Green, and Frank Laveley, the competent and accommodating foreman, both shareholders, are entitled to much of the credit.

QUICKSILVER.—A few days ago C. C. Ragdale handed us a piece of ore from the Nickerson quicksilver mine, located a short distance the other side of Bear river, which, from appearances is quite rich. Men working in the mine pronounce the ore worth 5 per cent. in quicksilver. The shaft on the mine is now down about

90 ft. The width of the ledge is not exactly known. From the croppings it is supposed to be at least 200 ft. wide.

SANTA BARBARA.

QUICKSILVER MINES.—Santa Barbara Index, March 29: The news from over the mountains is of the most encouraging character. There are good reasons for believing that the Santa Barbara (Los Prietos) quicksilver mines will prove the richest in the world. The energetic superintendent, Mr. Cassell, is driving the work right ahead, and once his furnaces are in operation, and that will be soon, the world will learn something of the mineral wealth of Santa Barbara county.

SONOMA.

PROSPECTING.—Sonoma Democrat, March 26: Recent explorations near Bunch's Station, on the Healdsburg and Pies Flat road, have proven the existence of gold and silver bearing quartz as well as stone coal. Captain Eastman has located claims of such of those minerals, as well as of quicksilver. The gold and silver mines are the Star and Wandering Jew, and the quicksilver ledge is called the Wanderer.

SISKIYOU.

MORNING STAR.—Yreka Union, March 27: The Morning Star company started up their eight-stamp mill about a week ago, and the plates of the batteries are looking very well. This company experiences more difficulty in saving their gold than any other company on Salmon, owing to their quality containing considerable silver, which latter they have not as yet any means of saving. The prospects of this mine are looking extremely good at present.

As a proof of the immense quantity of quartz in this section, we are informed that Mr. Hobson claims to have knowledge of the locality of no less than 40 different quartz ledges.

BUSINESS at the Ber is looking 'n'p, and the prospects for a prosperous future were never better.

THE Klamath quartz mine under the superintendence of friend Deggett, is coming to the front rank among quartz mines. Each month's clean up shows an increased yield of ballion over the last. This company have lately attached revolving blankets to their batteries, and are now putting up pans, settlers, etc. The company intend shortly to erect a furnace for the purpose of roasting their sulphurets.

THE Star of the West company have now an 8-ft ledge, at about 87 ft below the surface, and the ledge is continually widening. The quartz is very rich, a large percentage of it exhibiting free gold. Some specimens of quartz from this ledge are as rich as we have ever seen come out of any mine.

Messrs. Bennett and Miller have nearly completed their arrangements for working the forks of Salmon Bar. This Bar is very large, and has paid rich all around it, and there is hardly any doubt that there is pay all through it. Messrs. Bennett and Miller are both live and energetic men, and have expended a large amount of capital in this enterprise. We wish them unbounded success.

TUOLUMNE.

CINNABAR.—Tuolumne Democrat, March 27: Some pieces of float cinnabar has been found at Marah's flat, on the south side of Tuolumne river. Several parties have taken up claims and are now hunting to find the vein; they have much confidence in being successful. A small piece brought from there we have seen; it is rich in quicksilver.

TULARE.

GOLD.—Tulare Times, March 27: From a reliable source we learn that gold has been discovered in the foothills, near Wag's mill, and about 35 miles from Visalia. Some parties are now engaged in washing on a small scale, but profitably successful. Further prospecting may result in some very rich discoveries. Our mountains have never been thoroughly prospected and wonders may yet be discovered.

Nevada.

WASHOE DISTRICT.

SERRA NEVADA.—Gold Hill News, March 25th: Sinking the new shaft is making excellent headway. The water no longer interferes with the work. Driving the northeast drift on the 700-ft level of the old shaft is making good progress, the face in ledge matter.

LEO.—The northeast drift, running from the north cross-cut, is now in 25 ft, and the vein of ore in the face of the drift is from 15 to 18 inches wide, and still widening. The ledge at this point is about 40 ft wide, and the prospects of making a good development are steadily improving.

JUSTICE.—Main drift south at the 800-ft level now in 55 ft from the incline, with the face in hard ledge matter and very wet.

LARRY BAYAN.—Driving the southwest cross-cut on the 380-ft level is going steadily forward, with evident indications of soon reaching the ore vein.

KOSUTH.—The main west drift on the 350-ft level has penetrated the ore vein a distance of 70 ft, proving it much more solid and hotter defined than on the levels above.

WELLS-FAIGO.—The sinking of the new shaft is being pushed forward as lively as three shifts of men, working night and day, can do it.

DAYTON.—Sinking the main shaft below the 400-ft level is still making good progress. The face of the main south drift on the 300-ft level is still in a fine character of quartz and low grade ore.

LARRY WASHINGTON.—Shaft down over 400 ft. Two ft per day are made at present. The water has decreased somewhat, being probably drained to a certain extent by the Justice shaft.

SILVER HILL.—The north prospecting drift, on the third station level, is showing much more favorable indications of an ore development in that portion of the mine.

EUROPA.—The face of this drift or cross-cut, from the winze, 113 ft below the adit level, is now through the west wall of the ledge and cutting into the vein itself, the whole face being in quartz, which looks splendidly and gives good assays.

AMERICAN FLAT.—The main south drifts on both the 750 and 800-ft levels are still driven vigorously ahead, running nearly parallel with the ore vein, and affording some very promising indications of good ore developments ahead.

ORIGINAL GOLD HILL.—The cross-cut from the main south drift, to intersect the valuable ore development found in the npraise above that level is about cutting into it.

SAVAGE.—The main south drift on the 2200-ft level has not yet completed a connection with the north drift from the bottom of the south winze, but will probably do so in a day or two more. When that is accomplished, the drifts enlarged to a good working size, and car tracks have been laid, the cross-cutting of this level can be commenced, and some good results may be looked for.

CALIFORNIA.—Sinking the O & C shaft is making splendid progress. It is now down 300 ft. The re-timbering of the north drift on the 1550-ft level is making steady progress. The face of cross-cut No. 3, on the 1500-ft level has encountered ore of a very rich character, proving more and more the steady continuation of the ore body to the northward. The north drift on the 1500-ft level, to connect cross-cuts Nos. 2 and 3, is still in ore of the finest possible description. East cross-cut No. 2 encountered a few small clay seams during the fore part of the week, which have again given place to fine solid ore. The winze being sunk from east cross-cut No. 2, on the 1400-ft level, to connect with the north drift on the 1500-ft level, is down 38 ft, the bottom still in fair grade ore. The south drift on the 1400 ft level, from this winze, to connect with east cross-cut No. 1, is in 97 ft, the face still in low grade ore.

OPERA.—Daily yield, 150 tons of ore. There is little or no change to report of either the yield or appearance of the ore breasts on the 1465-ft level. Sinking the northeast winze below the 1465-ft level is making good headway, following the dip of the ore, which at that point inclines to the north and west. The northeast drift on the 1600-ft level at the bottom of the north winze is still driven vigorously ahead, the face still in rich ore. This drift is in a distance of 60 ft, all the way in good ore, and insures the development of a valuable ore deposit on that level. The southwest drift at the 1600-ft station of the new shaft is making good headway, the face still in hard porphyry.

CONSOLIDATED VIRGINIA.—There is no prospecting being done in the mine at present, with the exception of running the east cross-cut on the 1400-ft level, on the California line. That drift is in a distance of 165 ft, the face still in porphyry, with occasionally small stringers of quartz. This drift has probably 30 or 40 ft yet to run to reach the ore vein. The mills are all running steadily and everything in and about the mine looks bright and prosperous.

OVERMAN.—The heavy flow of water in the main shaft is kept below the 900-ft level by active pumping. Preparations are being made to put in the new pump, which is contracted for and will soon arrive.

CROWN POINT.—Daily yield, 500 tons of ore, keeping the company's mills steadily running. The ore breasts on the 1400, and those between the 1400 and 1500 ft levels, are all looking well and yielding the usual amount of milling ore. Cross-cutting and prospecting on the 1600-ft level is still energetically carried on, without any valuable developments to report. The 1700-ft station is about completed.

NORTH CONSOLIDATED VIRGINIA.—The new shaft of this company is located 2000 ft north of the great C & C shaft, Virginia, and is now down 85 ft. It consists of three compartments, substantially timbered, and is sinking in very promising vein material, some of the quartz assaying from \$3 to \$8 per ton.

UTAH.—The erection of the new pumping machinery is making steady headway. Prospecting the ore vein both north and south on the 400-ft level is still vigorously prosecuted.

SENATOR.—The southeast cross-cut on the 400-ft level is showing a steady improvement as the drift advances into deeper ground. The ore in this drift has from its commencement shown much base metal, which could not be worked by the ordinary milling process, but there is every indication now of the ore becoming more free as the drift advances.

GLOUCE CONSOLIDATED.—The face of the main west drift on the 400-ft level is still in quartz and ore of a fine character.

MEXICAN.—The ore in the face of the north drift on the 1465-ft level is looking much more promising as the work advances.

CALEDONIA.—The incline shaft is timbered and finished to a depth of 60 ft below the 1000-ft station. Prospecting on the 900 and 1076-ft levels has developed nothing new during the week.

FLORNA.—New shaft down 446 ft to-day. The foundations for the new boilers and heavy hoisting machinery are being laid, and all the arrangements for the new works are being laid out and directed under the supervision of Mr.

Patten, the constructing engineer of the new mill and works of the Consolidated Virginia mining company.

GOUTIN & CUREY.—Driving north on the 1700-ft level, to connect with the south drift from the Best & Belcher, is making steady progress, the face continuing hard blasting.

CHOLLAR-PORTER.—The face of both the south drifts on the 1150 and 1250-ft levels are still in barren porphyry. Grading the site for the company's shaft is making steady progress.

JULIA.—The main south drift on the 1000-ft level is still pushed vigorously ahead, the face in soft porphyry with a mixture of quartz and clay of a very favorable character.

ROCK ISLAND.—The shaft is down 231 ft below the first station level, the bottom in good working ground. It is the intention to open a new level at a depth of 20 ft more, and start a drift for the ledge.

KNICKERBOCKER.—The north and south drifts on the 600 and 700-ft levels are still driven energetically ahead, following the east clay wall of the ledge.

NIAORA.—Sinking the incline shaft: has been resumed. This shaft is down a depth of 150 ft, at which point ore of a high grade was encountered. Some fine developments are confidently looked for as greater depth is attained.

SUTRO.—Excellent progress is being made with the main west tunnel, the face still in soft working ground. A considerable flow of water will probably be encountered before the main ore vein is reached.

LEVIATHAN.—Shaft down 150 ft. Some spots of very good ore are occasionally met with, and the prospects for developing a good, paying mine are excellent.

IMPERIAL-EMPRE.—Sinking the main incline is making fair headway. The main south drift and the east cross-cut on the 2000-ft level are each still driven vigorously ahead.

YELLOW JACKET.—Cross-cutting the ore vein, on the 1740-ft levels, is being pushed vigorously ahead, with some favorable ore indications, but nothing that as yet indicates paying bodies of ore.

WOONVILLE.—Sinking the winze in the north drift, below the 300-ft level, is also making good progress, the bottom still in ore of a fine character.

Oregon.

THE MINES.—Walla Walla Union, March 20: Until quite recently the prospect for a good mining season has been very dull indeed, for although we have had unusually heavy snows in the valleys it was unusually light in the mountains, consequently there was no prospect of a good supply of water. But within the last week or two there has been a considerable addition to the amount of snow in the mountains, and the prospects for a moderate supply are greatly increased thereby. Still there will have to be a good deal more fall before a good and abundant supply will be assured.

MARYSVILLE MINING & WATER CO.—Bedrock Democrat, March 24: On yesterday we had the pleasure to make the acquaintance of Mr. Best, who has just arrived from Marysville to attend to the interests of the Marysville water and mining company, whose works are located at Auburn, in this county, where they now have in 1,500 ft of flume, which will convey some 2,000 inches of water. It is the intention of the superintendent to run day and night and it is expected that they will be able to wash down 1,500 square yards of ground every 12 hours. The company are well pleased with their prospects, and look for big pay from their mining operations this season. Mr. Best has the appearance of being a practical man, and understands the business of which he has charge. The company have five goose neck nozzles from 2 1/2 to 3 1/2 inch, and three Little Giants on the way here, some of which will be for sale. Here will be a good opportunity for some of our hydraulic companies to supply themselves with these improved means of washing down banks. The Marysville company will commence running as soon as water starts.

Arizona.

LOCAL MINING AFFAIRS.—Arizona Citizen, March 20: It is now fully demonstrated that the Ostrich lode is at least six miles in length, and runs from five to ten feet in width. The new discovery made by D. C. Thompson, three miles from the Ostrich, is simply that distance from the Ostrich mine but on the same lode. Tom Roddick, who was among the first discoverers and is now an enthusiastic explorer of the country, says that he is convinced that the Ostrich has the full extent of length, thickness and richness that anybody has ever represented. In opening up the Sultan and Crescent, fully three miles from the Ostrich claim, he finds the vein ten feet wide. He is making a cut across the top of about twenty feet from which a shaft is to be sunk. He was in town early in the week for supplies, and while here had two assays made from the top ore; one showing it to contain \$9.42 in silver and \$120.58 in gold, and the other \$9.42 silver and \$75.36 gold. From the Eclipse claim, he had one sample assayed which gives \$61.26 silver and \$60.29 gold. This is the lowest in value of any sample we have heard of being made, and assays have been made of ores taken from various parts of the lode for six miles.

A man whose name we did not learn, came in this week with a pound and a quarter of gold taken from ore reduced in an arrastra off southward. The gold was put into a bar at the Tucson assay office.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Ninth Lecture Delivered before the University of California College of Agriculture, on Friday, January 29th, by PROF. C. E. BESSEY.

Insectivorous Plants.

A week ago I called your attention to some peculiar things, certain peculiar relations existing between plants and insects. Now, strange as these relations, existing between plants and insects may seem, there are others stranger still. If it is a strange thing that insects in visiting certain plants in search of honey must pass into the flower by one channel and out by another, or, if the slight motion imparted to the stamens excites our wonder, what shall we say of the plants which have paths dotted with nectar to lure honey-loving insects, or those with traps set for their prey, which, when caught, they afterwards digest; or those still stranger ones which actually reach out and seize the unfortunate insect that ventures too near and hold it in an embrace which only ends in the total destruction of the victim? Such plants, the ones of which I shall speak this afternoon, may very properly be called insectivorous (insect-eating).

There are the Pitcher plant, Sun Dew, Fly-trap and a few others, and we have here before you illustrations of them.

The Fly-trap is represented here, [Fig. 1.] There are several species of the genus *Sarracenia*, and this genus is well represented by these two diagrams; this found in the Northern States, and this found in the Southern States. [For a representation of one species, see Fig. 2.] Several species of this genus have, as you know, leaves which are pitcher-shaped, or in some cases trumpet-shaped. You see the upper one bears some faint resemblance to a pitcher. These are allied to it. [The Professor here pointed to sketches illustrating different plants, pointing out some of their peculiarities.]

These leaves have more or less water in them, or, a watery fluid.

This fluid is secreted at certain times—

Not at all Times—

Sometimes there is no fluid.

At other times you find an abundance of it. It is found upon chemical tests to have a decided re-action. If any meat or organic matter is put into this fluid, it will act as a solvent. Bits of flesh allowed to remain in it for a time will be found to have dissolved much more rapidly than if they had been placed in ordinary water.

This fluid, instead of being rained in, as it might seem, seems to be actually secreted. That is, there are little glands placed along from this point downwards. These little glands secrete this fluid and pour it out. [The lecturer then spoke of certain peculiar arrangements in the habits and structure of these plants, showing that this fluid certainly is a secretion, and is not rained into the receptacle containing it.] Above this surface, which is found in these tubes, the inner walls are made exceedingly smooth, and above this smooth track is another, covered over with bristles, which are pointing downward, and so arranged that as an insect visiting the flower gets upon this it loses its foothold very readily.

So you see how it would act. Supposing an insect happens to get into this water here and tries to get out; it first has to cross this smooth track, and if it succeeds, above that then it meets this array of bristles. The edge of these bristles is so smooth it cannot get any hold at all, as there seems to be a *cheval de frise* of the cavity. Around the mouth is a

Track Covered With Honey,

And this is secreted in some species in very great abundance. And more than this, there is a little pathway of honey right around this point [refers to diagram], and upon this lid-like portion there are little drops of honey, and then along this to this part right here.

These honey drops are placed along so that insects are attracted by this. They follow it up just the same as a pig follows up a trail of corn. The insect passes just over the edge of the leaf, plunges down and over it, goes into the bath below, and, from experiment, it is found they can never get out.

Now this watery fluid into which the insect falls has an acid reaction, and is somewhat allied to the gastric juice of the stomach, so that it actually digests these insects. This fact of the arrangement of this honey pathway for luring the insect to the top of the leaf and then having it fall into the fluid secretion was just made out within the last year by certain physicians in the Southern States.

This is the *Darlingtonia Californica*. [Fig. 3.] It differs from this order of pitcher plants in this; that while in this case [Fig. 2.] the upper part of the leaf is more or less open and exposed to the air, in this, [Fig. 3.], the open point is away under this edge, and from the edge of this opening there is hanging down a very strange appendage, which has a red color; and, by the way, I should call your attention to the fact that we have some brilliant colors placed up here close to where the lure is given. A portion of the plant is

Smear'd Over,

To use an observer's own expression, with honey. Now, see how the insects act. Insects usually visit the flowers which have some

bright color or which have some strong odor, some fragrance; those are the things which usually attract them. The insect, flying along, notices this, and is lured on until very soon it is toppling over into this water in here, where it is imprisoned and very soon is digested.

Now another thing pointed out by an observer is this: This appendage is found to have about the same color as the plant itself, and he makes this suggestion that it would be well to notice whether the plant has not attempted here to feed these insects in one case and in the other case to feed upon them; whether those of

Fly Traps. As to the use made of the captured insects, it would appear from the observations made within the last year that it is altogether likely, perhaps quite certain, that the plants make use of this decaying matter in just the same way animals make use of the food received which is in their own stomachs; so that these are so far like animals.

Drosera, or Sun Dew, is one of the small marsh plants. Its leaves are covered over with little viscid, glandular hairs. If a piece of organic matter such as an insect or piece of beef be dropped upon one of these little leaves,



Fig. 3—DARLINGTONIA CALIFORNICA.

the very same color, which in one case would give the insect honey and pollen and everything that it wants, in the other case following it up carefully—will not be found to lure it on till it flies over into this cavity and is destroyed. Some hold that in this case, as in this other, there are smooth tracks, perfectly smooth, so that the insect can readily pass out and that others are covered over again with retrorse prickles so that when an insect is once in there it stays there, and never can get out. In an

the hairs very soon begin to turn toward this bit of beef. Very soon they touch it with their little glandular tips, and when one touches it sticks. Very soon the leaf folds over the insect and actually in a short time it coils around so that thirty, forty, or fifty of these little hairs



Fig. 1—Two Leaves of the Fly Trap.

allied form, but in a near relative, the

Pitcher Plant

Of the East having very near the same arrangement. This is the plant found in the Eastern Hemisphere. It climbs by these tendrils. This plant has been known a great many years, simply as a curious one. You find it spoken of in all your botanies as an example of what a plant can do in modifying its original leaf form. Dr. Hooker thinks this has also a leaf track as there is more or less honey also upon this. There is also found abundance of water in here which has the same chemical characteristics, so that it actually works the same way the *Darlingtonia* does. This is a species of *Sarracenia*. These are known as the Pitcher Plant



Fig. 2 *Sarracenia Drummondii*.

close around the insect; of course the insect is destroyed.

Mrs. Mary Treat, an observer in New Jersey made the following observations:—

At fifteen minutes past ten she placed a piece of raw beef upon a leaf of one of her plants and at ten minutes past twelve,—that is just about two hours—two leaves had folded over the beef, partially or entirely hiding it from sight.

At 11:30, the same day, she placed living flies upon leaves of the plants, and at 12:48—a

little more than an hour afterwards—one of the leaves had folded

Entirely Around its Victim,

And some time after the fly had ceased to struggle. At 2:30, four leaves had each enclosed a victim. She tried mineral substances and pebbles, but in twenty-four hours neither of the leaves had made any move like clasping these articles. Evidently they knew what was good for them. She wet a piece of chalk in water, and in less than an hour bristles were curving about it, but soon unfolded, leaving the chalk free upon the blade of the leaf. It was found, in making experiments with another species, with a piece of apple, after eleven hours part of the bristles were clasping it, but not many of the glands were touching it. Evidently it didn't like apples as well as it liked beef. The same observer found that when live flies were pinned at half an inch distance from the leaves, the leaves moved toward the insects, and in less than two hours had reached them.

I don't know how to explain it, I don't know how the plant in that case knew the fly was a half an inch away from it, but in some way it did know it, and managed to go over and grasp it.

The *Dionaea*, or Fly Trap, is perhaps, all things considered, the most wonderful plant of which we have any knowledge; though almost all plants become more and more wonderful, the more we study them. The plant is somewhat peculiar in structure, having a dilated bell-like portion, and at the top of this it bears a sort of rounded blade with a kind of enlarged fringe in the centre. This, as you see, bears little bristles, so that when these two sides come together they meet thus: [The points of the bristles passing by each other.] Upon the surface, upon each side are three or four bristles. These are sensitive.

These two sides fit together in such a manner that the action is much the same as an ordinary rat-trap; where you open out the jaws in this way, and if you happen to touch the spring here, the jaws spring suddenly together. The action is almost the same. I have frequently taken a pin and irritated these little hairs and they would clasp with a quick motion, just like a little trap. Now, if an insect happens to alight on this upper portion, and happens to strike one of these little hairs, you see what the result would be; it would be caught. Now, you see why these hairs are made so that they close in that way.

These hairs, by thus closing in, make a prison with little bars. The insect tries to get out, but usually does not succeed. It has been known for a great many years that flies were caught by this plant, so it was called the "Fly Trap."

Botanists looked at it as a curious plant and it was called the fly plant. Mr. Darwin, however, discovered that there was something in the plant more than the catching of flies, and to him we owe very much of the knowledge we have of it. This last two years or so, many facts have come out. We don't know very much about this plant. We do know enough, however, to regard it as far more than a curious thing, it is a wonderful plant, and when we stand before it, we see attributes which we had supposed peculiar to animals alone. It not only destroys flies. It is destroying just as effectually many of our old ideas of the essential difference between plants and animals. Mr. Canby, a botanist, of one of the Southern States, finds that the insect caught as prey is absorbed, so that in one or two weeks nothing but the shell of it remains. The leaf pours out a fluid which is like the gastric juice, and has the power to dissolve the insect. That is what Mr. Canby found out.

Mr. Darwin finds that this fluid is acid in its reaction, just as the gastric juice; that is, not only has it the same chemical reaction, but it also acts as does the gastric juice. Mr. Canby further finds that when the insect has dissolved, in a few days it is absorbed, so that in one or two weeks nothing but the shell of the insect remains. The leaf is then opened and is ready for its second meal.

Mrs. Mary Treat, of Vineland, the same observer before mentioned, last spring made some observations upon three of these plants. Her account reads more like feeding an animal than like feeding a plant:

"May 5th, plant No. 1. Two leaves caught house flies. Another leaf caught a large blue-bottle fly. May 12th. The two large leaves on No. 1 which caught house flies are opening." That is, the flies were dissolved and absorbed and the leaves opened out in a good healthy condition, ready for more flies. "But the leaf which caught the large fly has succumbed." That seems to be very frequently the case; when it has taken an overdose it seems to be taken with indigestion. "May 5th. A strong leaf has closed over an insect almost as large as a squash bug. June 5th the leaf opened. Leaf healthy. Nothing left of the bug but the shell." Entirely dissolved, as you see. "June 14th.

It has Digested the Bug."

The beetle is longer in being digested, and so it goes on. She says: "In this way I managed to get nine beetles entrapped, but only one leaf was strong enough to digest its victim. My favorite plant, the strongest one, from May 1st to October has caught forty insects and digested most of them."

That is, a little plant, only about four or five inches in high, with these leaves three inches in length, a little plant like that catching and digesting forty flies! A strong story,

GOOD HEALTH.

Trichina.

MESSES. EDITORS:—In your issue of a fortnight ago you gave us a long and interesting dissertation on trichina and its fatal effects on the human system. Now could you not kindly inform us whether there is no cure or no preventive for this alarming evil save in a total abstinence from all porcine nourishment? Are we to infer from your article that we must banish the very palatable dish of ham and eggs from our table? Shall we eschew the time-honored dish of pork and beans, so dear to the heart and stomach of every New Englander—and must pickled pigs' feet and soups be tabooed forever? Or, are we to understand that it is only in fresh pork, or that which has been but partially cooked that this terrible parasite exists? In short, does no ordinary preparatory process kill the trichina?

Yours Respectfully,
G. A. HAMILTON.

Virginia City, March 22.

ANSWER:—The trichina will easily succumb to a heat of 212 degrees F. Hence, no danger need be apprehended from pork which has been thoroughly cooked.

THE TOOTH ACHES.—A correspondent says that after suffering excruciating pain from this ache, and having tried in vain to obtain relief, Betty told me a gentleman had been waiting some time in the parlor, who said he would not detain me one minute. He came—a friend I had not seen for years. He sympathized with me, when I told him how sadly I was afflicted.

"My dear friend," exclaimed he, "I can cure you in ten minutes." "How? how?" inquired I; "do it in pity." "Instantly," said he—"Betty, have you any alum?" "Yea." "Bring it, and some common salt." They were produced; my friend pulverized them, mixed them in equal quantities; then wet a small piece of cotton, causing the mixed powders to adhere, and placed it in my hollow tooth. "There," said he, "if that does not cure you, I will forfeit my head; the remedy is infallible." It was so. I experienced a sensation of coldness on applying it, which gradually subsided, and with it the torment of the toothache. Easily tried.

DOCTORS.—There is no danger that the physician will ever become a useless member of society, for the simple reason that instead of decreasing the share of his duties, the culture of preventive medicine—of the knowledge of how to prevent diseases as well as to cure them after they are engendered—must tend to amplify and enlarge the same. His will be the task, not merely to recognize the forms of ails and endeavor to combat their effects, but to look into the future and, through the aid of all circumstances of the present, predict possible evils and point out means of defense. Add to this the constantly increasing knowledge of drugs and their properties, of the wonderful relations of mind and body, of the nature and habits of disease, which science is rapidly developing, and the physician of the future has before him not a narrower but a far wider field for the exercise of his skill.

FOR DIPHTHERIA.—A Mr. Greathhead, of Australia, communicates to the public a very effective remedy for diphtheria. It is simply the use of sulphuric acid, of which four drops are diluted in three-fourths of a tumbler of water, to be administered to a grown person, and a smaller dose to children, at intervals not specified. The result is said to be a coagulation of the diphtheritic membrane, and its ready removal by coughing. It is asserted that where the case thus treated has not advanced to a nearly fatal termination the patient recovered in almost every instance.

AVOID MARBLE-TOP TABLES.—According to the *Herald of Health* marble-top tables are to be avoided. It says: "They are cold, and rapidly absorb the heat and vitality of the body, robbing it of its life. We have heard of one invalid whom the doctor could not cure until one day he noticed she used a marble stand, and suspected it had something to do with her ill health. So he forbade her touching it. Soon she was cured. We know healthy people who feel the twinges of pain in a shoulder by sitting near one. They are handsome, but unhealthy for all that."

DISINFECTANT AND MOUTH WASH.—A weak solution of permanganate of potash will destroy instantly any taint from diseased teeth or imperfectly cleaned plates, and should always be used to rinse spirituous with in hot weather. It is cheap, satisfactory, almost tasteless, not poisonous, and quite free from smell. It may be satisfactory to some to know that this will remove the taint of smoking from the breath if used as a mouth-piece.

TO CURE HOARSENESS.—When the voice is lost, as is sometimes the case, from the effects of cold, a simple, pleasant remedy is furnished by beating up the white of an egg, adding to it the juice of a lemon, and sweetening with white sugar to the taste. Take a teaspoonful from time to time. It has been known to effectually remove the ailment.

How to Become Fleshly.

You would like to be round and rosy-checked. Then go to bed early after having spent the evening socially. Cheerfulness and contentment are the friends of healthfulness. Sleep in a pure atmosphere and in a room into which the sun has shone through the day. Don't be afraid of the night air, for there is no other air at night, and you would certainly die before morning if you did not breathe it; avoid draughts and dampness; sleep as long as you can and get up as soon as you wake, if you feel rested. Drink all the pure cold water you can swallow first, and ride or walk in the open air for half an hour; then eat a breakfast of Graham bread, baked sweet apples with cream, or some other fruit, with a soft, fresh-boiled egg, or a bit of beefsteak and a baked potato, and drink a glass of new milk, if you like it.

Enjoy what you are doing, either for itself or what it will bring you. Breathe as much pure air as possible; bad food and pure air will make flesh faster than impure air and good food. For dinner, eat roast beef or mutton, or rare steak, with bread, potatoes and all vegetables that are relished, a dessert of plenty of ripe fruit, with cream and sugar, but without pastry or cake. If tired, rest a little before dinner, and take a short nap after it. Don't work hard enough to produce excessive perspiration, if you can help it, or until you feel very much exhausted.

For supper, eat oat-meal porridge, cracked wheat, or Graham meal, with cream and fruit, and a fresh roll; or, if you don't feel hungry, take a glass of milk and eat nothing. Drink little tea or coffee, or none at all. Bathe every day to keep the skin clean and in a surprising short time you will grow plump and light hearted. But remember, you must laugh to grow fat.—*Milwaukee Magazine*.

INVERTED TOE-NAILS.—The application of the muriated tincture of iron to the nail and the surrounding ulcerated and granulated surface, once or twice a day, with a camel's hair pencil, will effect a complete cure. As a general rule to apply it once a day, at bed time, will be sufficient. The ulcerated surface heals with astonishing rapidity, and the nail assumes its normal appearance, making a complete cure, in most cases in a few weeks. Paring and cutting the corners of the nail usually do more harm than good.—*Surgical Reporter, Philadelphia*.

USEFUL INFORMATION.

HOW MALT IS MADE.—The grain is first taken up by an elevator run by steam, and is poured into a weighing bin, from which it passes through an automatic arrangement, where the chaff, light heads, dirt, etc., are carried off by the air, after which the good grain passes over a sieve, which separates any other foreign matter which may remain. It is then carried to the storage room by a conveyancer. The grain is now ready for the steeping or soaking tubs in the basement, where it remains from 24 to 48 hours, according to the grain and temperature. After being sufficiently steeped, the grain is removed to the different floors by an elevator and spread out so as to give it time to sprout before being placed in the kilns. It is necessary in the manufacture of malt to have the grain sprout in order that the sugar may be extracted, from which the alcoholic properties are derived. After the sprouting process the grain is placed in the kilns, which have to be kept at a certain temperature and the malt stirred up or turned over several times to prevent its being overheated. It requires fifteen to sixteen days to convert the barley into malt ready for the manufacture of beer.

HOW TO USE A GRINDSTONE.—Common grindstone spindles, with a crank at one end, are open to the great objection that the stone will never keep round, because every person is inclined, more or less, to follow the motion of his foot with his hand, which causes the pressure is always applied to the very same part of stone, and will soon make it uneven, so that it is impossible to grind a tool true. To avoid this, put in place of the crank a small cog-wheel of 13 cogs, to work into the former. The stone will make about 1/7 of a revolution more than the crank, and the harder pressure of the tool on the stone will change to another place at every turn, and the stone will keep perfectly round if it is a good one. This is a very simple contrivance, but it will be new to many of our readers.

BLACKENING SHEET ZINC.—The following is a new process lately discovered for obtaining zinc sheets of a solid black color. The sheet of zinc is cleansed by hydrochloric acid and sand, and then plunged into a solution of equal parts of chlorate of potash and sulphuric acid. A slight velvety-black deposit is immediately formed. The plate is carefully washed with water, allowed to dry, and then plunged into a solution of asphalt in benzine, left to drain, and rubbed with a piece of cotton rag.

BIG GUNS.—Seventy years ago the heaviest naval gun was a thirty-two pounder, weighing two tons and a half, and ten pounds of powder was a charge. A gun now in process of construction at Woolwich, England, twenty six feet and nine inches in length, will weigh eighty-one tons, throw a projectile of 1,250 pounds weight, and requires 210 pounds of powder to load it.

BEEF STEAK ELECTRICITY.—The six Christmas lectures for juvenile listeners at the Royal Institution, London, were delivered by Dr. J. H. Gladstone, F. R. S. He chose for his subject, "The Voltaic Battery." Most of the experiments and teachings were of course too elementary to interest the readers of these pages, but one of the experiments revealed a fact not generally known. He said that in daily life weak electrical currents are at work where their presence is often little suspected; for instance, enjoining a person at dinner to have a silver fork in one hand and a finger upon the steel part of a knife held in the other, it follows that, when he plunges the knife and fork into a beef steak, two dissimilar metals are thereby placed in a moist conducting substance, consequently a voltaic circuit is formed and an electric current flows through the body of the individual between the knife and fork. To prove that this was really the case, he connected a reflecting galvanometer with the knife and fork by means of wires; he then proceeded to cut a beef steak, and the current thus generated deflected the needle of the galvanometer, so that the spot of light which it reflected was seen traveling along the scroen by all the observers.

CREMATION.—The practice of cremation by open-air burning has frequently been referred to as long practiced by the Indians in various parts of the country; but we have no recollection of ever before meeting with a cremation process, as described below. We copy from an exchange: Cremation appears to have been practiced in this country in the ages anterior to its occupancy by our present race. In the region of North Carolina the custom was to cover the body with clay and build a fire upon it, which not only consumed the body, but converted the clay into a hardened mass, or sarcophagus. In the region of Indiana it appears to have been the custom to place the body, with the feet, within an oven of clay, the ashes being left in the receptacle after incineration.

TO CRYSTALLIZE FLOWERS.—Construct some baskets of fancy form with pliable copper wire, and wrap them with gauze. Into these tie to the bottom violets, ferns, geranium leaves—in fact, any flowers except full-blown roses—and sink them in a solution of alum of one pound to a gallon of water, after the solution has cooled. The colors will then be preserved in their original beauty, and the crystallized alum will hold faster than when from a hot solution. When you have a light covering of crystals that covers completely the article, remove the basket carefully, and allow it to drip for twelve hours. The basket makes a beautiful parlor ornament, and for a long time preserve the freshness of flowers.

MEAT AND WINE.—Meat does not oxidize or putrify in compressed air, though it undergoes changes of color, texture and flavor. Certain fermentations may be arrested by oxygen at a high pressure. Wines may be prevented from undergoing acetous fermentation by the action of compressed air. Wine (even new wine) may also be prevented from undergoing any deteriorating change by rapid agitation for 24 or 48 hours under a pressure of two or three atmospheres—in fact wine may be "aged" in a few hours by that process.

TO DO AWAY WITH MATCHES.—A recent French invention, which, it is claimed, will sweep away the match trade, is an electrical tinder box, small enough to be carried in a cigar case. On opening the box a platinum wire is seen, which, by touching a spring, is made at once red-hot, so that it will ignite a cigar. A mesh of cotton steeped in spirits may also be introduced into a tiny cone, and a little lamp is the result. The hidden agency which heats the wire is a miniature electrical battery, set in action by touching the spring.

HOW TO PREVENT BENZINE STAINS ON CLOTHING.—The brown marginal stain generally left after removing a grease spot with benzine, may be prevented by strewing gypsum or lycopodium upon the cloth immediately after removing the spot, as far as the material is moist, and allowing it to remain on until perfectly dry, when the gypsum can be brushed off, leaving the cloth without the usual unsightly rim.

AN excellent way of cleansing soiled Brussels carpet, in the spring when stoves are removed, is to take a bucketful of soft water, with a pint of ammonia added. With this give the carpet a good rubbing, but do not moisten it too much. Immediately afterwards wipe up with a clean dry cloth, and the carpet will be thoroughly clean and free from dirt without shaking.

ALVAN CLARK, the Cambridge telescope maker, who worked ten years to establish a reputation, is getting ready to manufacture an immense telescope for the Austrian Government, and is also negotiating with the trustees appointed by Mr. James Lick for the erection of an instrument in a California university.

A 999 years' lease has just run out in England, and the estate has reverted to the representatives of the original owners. The land is at Woolwich, and was wharf property 1,000 years ago, but was leased to the Crown for military purposes.

COMPOSITION OF WOOL GREASE.—According to Schulze and Ulrich, the hulk of the natural wool grease of sheep consists of compound ethers. A part of alcohols and fatty acids are in a free condition.

DOMESTIC ECONOMY.

Fish as Food.

Fishes yield an almost endless variety of food for man. They furnish a much greater number of edible genera and species than any other class of the animal creation, and from them some nations derive their chief maintenance. The inhabitants of the most northern parts of Europe, Asia and America, where but few slimy plants are found, are compelled to live almost exclusively on fish.

The great bulk of the soft part of fishes consists of voluntary muscles forming the flesh, which are disposed upon the sides of the spinal column—four series on either side. They are soft, pelvical and but little permeated with blood. Fish flesh contains more water than the flesh of either quadrupeds or birds. In many fishes the flesh is mixed with, or covered by, oily or fatty matter, as in the salmon, the herring, the sprat and the eel. This is more abundant in the thinner or abdominal parts than in the thicker or dorsal portions. Hence, the thinnest part of salmon is preferred by epicures. After spawning, the quantity of this oil is greatly diminished.

In the cod and many other fishes, the muscles are arranged in more or less wedge shaped masses, called flakes, which, after cooking, readily separate from each other, owing partly to the contraction of the muscular fibre, and partly to the solution of interposed ligamentous tendinous matter. In the flat or eel-shaped fishes, the flesh has rather a fibrous than a flaky arrangement. The flesh of the whiting, the cod, the haddock, the sole, the flounder, the turbot and other species, is white; hence, they are termed white fish. The flesh of fish is in the greatest perfection for food at the period of the ripening of the milt and roe. It is then said to be in season.

Fried Meats.

This frying of meat is most unwholesome and unprofitable for the eater, however convenient it may be for the cook. It robs it of its juices and hardens its texture. The extreme heat of the fat not only burns the outer layers of the meat, so as to injure their value for nutritive purposes, but also changes the chemical conditions of the fatty acids, giving rise to products which obstruct the breathing and causes ringing of the eyes and nose of the cook, and which are more or less harmful to the eater. The peculiar flavor of the meat is in a great measure lost by frying, and for it is substituted the flavor of the fat in which it is cooked. This fat permeates the fibers of the meat in such a way as to render them less soluble in the watery fluids of the mouth and stomach, and thus causes difficult digestion.

It is to be feared that our cooks have a fatal facility in the use of the frying pan. It is the most mode of preparing meat, and so inferior to every other in its result, that we may reasonably hope that the improvement in this respect will continue. Broiling on a gridiron over a quick fire costs a little more time and trouble, and very likely fuel also; but by this process the juices of the meat are sealed up, to a certain extent, instead of being evaporated, and the nutritive value thereby much increased. The superiority both of flavor and digestibility which broiled meat possesses are perfectly well known. The general substitution of the gridiron for the frying-pan in the hasty cooking of meats, would be most advantageous to the health.—*Herald of Health*.

Apples in Imitation of Ginger.

To three pounds of very hard apples take two pounds of loaf sugar, and a quarter of a pound of best white ginger. Put these in layers (having first sliced the apples in eight pieces and cored them) alternately in a wide-mouthed jar. Next day infuse an ounce of white ginger, well bruised, in about a pint of boiling water; let it stand till the next day. Then put in the apples that have been two days in the ginger. Simmer slowly until the apples look clear. Take great care not to break the pieces.

The following is another recipe, which we find in the *London Garden*: For 4 lbs. of apples take 4 lbs. of sugar, 1 quart of water, and 2 oz. of heat essence of ginger. First pare the fruit, cutting out every particle of core; then shape it to resemble the small kind of preserved ginger. Boil the sugar and water nearly twenty-five minutes, until it is a nice syrup, then put in the apples; be sure not to stir them much; add the essence of ginger (if 2 oz. be not sufficient, add more). It will take nearly an hour to boil, until it becomes yellow and transparent. There will be some pieces that will not clear; put them by themselves, as they will spoil the look of the rest. It will require skimming.

PREPARING POTATOES FOR FOOD.—First, in whatever manner they are cooked, it should be done rapidly—roasted, boiled or fried. Nothing is so soon spoiled by slow cooking as the potato, and should be removed from the fire and placed upon the table when done. Potatoes that are mashed or baked on a dish, are perhaps an exception. The potato may be boiled, mashed and passed through a sieve, and dried upon dishes, and put away for seasoning stews, soups or hash, and are nearly as good as when fresh, for such dishes.

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Says the Gold Hill News: "Many of the emi-
grants from the East, who intended coming to
the land of the bonanza, are wisely concluding to
continue their journey to California, for the
present, at least. On last Sunday thirteen car
loads of them passed Reno, en route for Sacra-
mento. Some of them stated that advice from
their friends already here and unable to obtain
employment, has caused them to change their
point of destination.

J. A. BELL has discovered in the San Fer-
nando mountains, about 28 miles from Los
Angeles, a large vein of sulphur, being 15 feet
wide and almost the pure article. In the imme-
diate vicinity he found a vein of coal that
would average about five feet in width. The
coal is what is known as black slate, and is
very hard.

ANOTHER steamer is to be placed on the
Feather river, to ply between Marysville and
San Francisco. The keel will be laid at the
intersection of the Yuba and Feather rivers.
The lumber will be brought from the northern
coast, and the machinery will be made at the
Marysville foundry. The steamboat will be
owned by a citizen of Marysville.

THE Lewis District, which is situated about
sixteen miles southwest of Battle Mountain, is
attracting considerable attention, and accounts
from there are exceedingly favorable. A lot of
rock from this ledge recently worked at Winne-
muca, yielded \$2,500 to the ton.

OUT near the Tacoma coal fields has been
found an immense quantity of granite, said to
be as fine as any in the world for building pur-
poses. Also marble of first-class.

OVER 150 claims have been entered on vari-
ous ledges in Josephine county, since the excite-
ment over the tonanza discovery there.

A BAR of bullion valued at \$6,676 was sent
down to this city a few days ago from the Vint
mine, Baker county.

THE miners from all the districts in Utah re-
port vast amounts of ore ready for shipment as
soon as the roads will permit.

The University Collection of Minerals.

We are pleased to state that the extensive
collection of ores and minerals at the State
University, is to be properly arranged and
classified. The Regents of the University have
appointed Mr. H. G. Hanks to a position simi-
lar to that of the Keeper of Mineralogy at
the British Museum, and he will immediately
enter upon his duties.

The collection at the University is very large
and a valuable one, but in its present disordered
state is of no use to the students. The collec-
tion comprises that of the State Geological
Survey, the Voy, the Pioche, and the Hanks
collections, besides a large number of miscel-
laneous material donated by individuals. These
will all be merged into one and be properly
identified, classified and labeled. The labels
will be printed and give the name of the dis-
tinct collection, the name of the donor, etc.

It is the intention to draw from every part of
the Pacific coast, material to add to the present
collection, and classify and arrange everything
in proper order. There are to be three distinct
collections. The first will consist of the finest
specimens of all classes, which will be placed
under plate-glass, properly labeled and identi-
fied, but which cannot be handled, although the
specimens can of course be examined through the
glass. The second will also be a complete one,
and will be labeled and placed in drawers, so
as to be accessible to the students for examina-
tion. The third will be for the purposes of
analysis, exchange, etc.

Mr. Hanks intends giving his whole attention
to classifying and arranging this material, and
will make all exchanges for the University.
He will also make microscopic slides of all the
minerals and rocks. He proposes not only to
collect minerals and rocks, but all sorts of
metallurgical products. People who have any-
thing of interest in these lines will do a great
favor to the University and the State, if they
will forward such specimens as they can, giving
details they think proper to make public. All
these articles will be placed in the museum and
the fullest credit given to the donor. Articles
of this character addressed to the University
Museum, Department of Mineralogy, will be
forwarded free by Wells, Fargo & Co. If du-
plicate specimens are sent, so much the better.

Mr. Hanks says that when time admits and
it is considered essential, careful examinations
or analysis of substances will be made and the
result forwarded to the donor. For instance,
a mineral water, a salt, borax, or peculiar soils,
which are interesting, will be analyzed or
otherwise examined. In making a salt or soda,
sulphate of copper, or any manufactured arti-
cle, if it is essential to know the character of
the special mineral used, Mr. Hanks will ac-
knowledge receipt of the article and give all
the information in his power. In such cases
as it is considered essential an analysis will
be made free of charge. The advanced students
will also make experiments with material of
this character, the results of which will be for-
warded to the donor. They desire to procure
all metallurgical products of whatever character,
such as samples of bullion, slag, tailings, wash-
ings of sluices, etc. Samples of earth from dif-
ferent hydraulic mines are solicited, as well as
specimens of ore, etc., from all mines on the
coast, with such information concerning it as
the donors are willing to impart.

The collection of the State Geological Sur-
vey, now at the University, is very extensive,
but has never been properly arranged. The
Hanks collection, recently purchased by James
Keene, and presented to the University, is all
properly labeled and classified. The Voy and
Pioche collections are both in pretty good or-
der. All of these merged into one, with the
additions made in the next few years, will
make a collection larger than any in the United
States. It is to be hoped that the mining com-
munity will bear in mind the fact that the
University will be thankful for donations, and
that the collection will at all times be open to
the public.

The Regents have made a wise choice in
selecting Mr. Hanks to fill this position. He is a
skillful chemist and assayer, and is as expert
in determining ores or minerals at sight as any
man in California. He has had great experi-
ence in collecting and identifying this class of
material, having made several fine collections
for himself and for other parties. He has been
curator of Mineralogy at the California Acad-
emy of Sciences for some years. With him
this work will be a labor of love, and no one
could take more interest or pride in making the
collection so varied in its character and correct
in its classification. Mr. Hanks has made a
special study of the microscopic determination
of minerals, a branch of science which will in
a few years assume great prominence. He has
now a fine assortment of objects of this charac-
ter, mounted for microscopic examination, and
will take pains to collect and prepare a large
number of slides for the University.

THE tunnel which has been commenced by
the Virginia and Gold Hill water company, to
connect the head of their flume with Mariette
lake, will be 2,900 feet in length, passing
through the main mountain ridge between
Hobart creek and Lake Tahoe.

Land Plaster or Gypsum as a Fertilizer.

The manorial value of land plaster—sulphate
of lime—has long been known and acknowl-
edged. As long ago as when Benjamin Frank-
lin lived and employed his peculiar but most
effective modes of presenting great and im-
portant truths to his countrymen, land plaster
was employed as a dressing upon the land of
our most advanced and intelligent farmers.
That great philosopher once adopted the fol-
lowing characteristic method of teaching the
value of this important mineral as an aid to
growing crops: He selected a large grass field
by the side of a public highway near Philadel-
phia, which rose gradually from the road to
the rear of the field, and staked out upon its
surface the forms of certain letters; within
these forms he sowed freely his favorite fer-
tilizer. As the season wore away the grass
thus prepared soon shot up far ahead of the
surrounding herbage which was not so treated,
until it finally stood out in such bold relief
of luxuriant green that no passer-by could fail to
observe the phenomena, which explained itself
in the magic words—LAND PLASTER. This was
a practical test of the value of the fertilizer,
which fairly spoke for itself in words which
could be neither ignored nor disputed.

The philosophy of this fertilizer—exactly
how it acts upon vegetation—is not fully under-
stood or agreed upon by agricultural writers.
It is well known, however, that it has a great
affinity for ammonia, one of the most fertiliz-
ing agents known. It is this quality which
gives its great value as a disinfectant about
stables, where ammoniacal gas is so abundant.
A slight sprinkling of gypsum on a compost
heap arrests the escaping gases at once, and
the unpleasant volatile ammonia is lost to the
sense of smell. As fast as the ammonia passes
from the mass it is taken up by the sulphuric
acid contained in the gypsum end in combina-
tion therewith forms a sulphate of ammonia
which, when placed in contact with the root-
lets of vegetation, in a not over moist soil,
readily gives up its ammonia as food for the
plant.

Hence it is reasonably supposed that when
spread upon land, without a prior contact with
the compost heap, it collects ammonia from the
atmosphere and conveys it to the plant in the
same manner as already described. Others
suppose that when applied directly to the
land it possesses the power of condensing
moisture during the cool hours of the night,
and imparting its nightly accumulations to the
soil or plant roots during the day. Whether
one or both, or neither of these propositions
are true, there can be no mistake about its
great value as a fertilizer to every species of
vegetation—whether grass, grain, vines or
trees. The experiment of Franklin has been
tried time and again in nearly all parts of the
country, and almost always with the most grati-
fying success.

The conditions of its use are simply a not
over moist soil. In corn or roots it may be
dropped in the hill; but the usual way of ap-
plying it is to sow it broadcast upon the sur-
face—for wheat, as soon after it is up as it be-
gins to show the need of moisture; the same
with grass. For trees and vines it should be
spread freely upon the ground. It need not
be harrowed in when so spread under any cir-
cumstances. We have little doubt but that
this fertilizer would prove of great benefit to
the dry, arid soils of California. We under-
stand that some of our farmers are already ex-
perimenting with it, and we trust some of them
will send us the results of their experiments
as soon as results are reached.

In the best agricultural districts of the East
gypsum has become a staple article among
farmers. They use it as the most reliable
remedy in cases of drouth. A slight dressing
of this, applied to corn in the early stages of
its growth—about the time of its first cultiva-
tion—produces marked results. It is benefi-
cial to all crops in nearly all conditions, es-
pecially in case of drouth; and it is this point
which we would like particularly to impress
upon the minds of the farmers of California,
where drouth is the paramount agricultural
difficulty. This fertilizer may be obtained of
Lucas, Gesner & Co., of this city. See their
advertisement in its appropriate place.

Fona lumbermen have discovered, located
and worked a quartz gold mine on the Fresno
river, opposite to a place called Indian Peak.
They have worked about thirteen tons of ore,
cleaning up nearly \$5,000. The parties have
been offered and refused \$40,000 for their dis-
covery.

ANVICKS from San Bernardino state that the
long lost Gunsight ledge has been found. It
was first discovered on the edge of Death val-
ley by a party of immigrants in 1849. It was
always reported very rich, and specimens of
the ore received confirm all that has been said.

MR. TOLLES is putting in on Gold canon, be-
low Silver City, a revolving sluice for extract-
ing the silver sulphurets from tailings. By the
action of the water passing through the sluic-
e, the blankets are washed every fifteen minutes.

THE Newport mining company of Coos Bay
is buying a tugboat for its own use.

Notices of Recent Patents.

Among the Pacific Coast patents recently ob-
tained through Dewey & Co.'s SCIENTIFIC PRESS
American and Foreign Patent Agency, the fol-
lowing are worthy of mention:

EYELETING MACHINE.—John Coombe, San
Jose, Santa Clara county, Cal. This patent
provides an eyeletting machine, which will
punch the hole for the eyelet, and also fasten
the eyelet in the hole after it is punched, by
means of a single plunger, and without shifting
the article in which the eyelet is to be fastened
after it is once fixed for punching. To do this
properly the inventor provides the machine
with a clamp or holder, in which the article to
be eyeleted is held while the eyelet hole is be-
ing punched and while the eyelet itself is being
inserted and fastened. A sliding die, which is
operated by a lever, has a hole for the punch to
pass through in making the eyelet hole, and
also a short standard upon which the eyelet is
set previous to punching the hole. The ar-
rangement of the hole and eyelet standard is
such that by operating the slide both can be
brought under the plunger as required.

IMPROVED FAUCET.—William C. Bussey, San
Francisco. The applicant for this patent
claims to provide a faucet for drawing liquids
from casks, etc., without the employment of
either a rotating plug or spigot. Into a hollow
tube which is driven into the cask is secured
a short plug through which a hole is made
communicating with a hole in the stem of the
tube and through which the liquid passes.
Over one end of the plug is slipped an India
rubber tube which is squeezed together by a
clamp consisting of two jaws just below the
end of the tube, thus regulating the
flow of the liquid. A spring fits around the
end of the stem and a screw extending through
both jaws of the clamp close and regulate the
tube by compression.

CAR COUPLING.—Thomas J. Habbell, Yount-
ville, Napa county. The many terrible acci-
dents which have occurred to brakemen and
others engaged in coupling cars have rendered
any invention which would do away with risk of
maiming or killing men engaged in this busi-
ness as among the most valuable to be imagined.
The inventor claims to have invented a perfect
self coupler and uncoupler. The operation of
coupling as described, goes far to prove that
the claim of the inventor is a just one. It is
automatic in its operation, and by means of a
lever worked from the platform, the cars can
be uncoupled and separated without danger to
life and limb.

ADJUSTABLE DEVICE FOR BRAKE BARS.—Robt.
J. Knapp, Half Moon Bay, San Mateo Co.,
Cal. This invention relates to an improvement
on wagon-brakes, and consists of a method of
adjusting the brake-bar by which the distance
lost by the wear of the brake-shoes, can be
readily taken up. Brake shoes, of course, be-
come very worn in time, and as the short arms
of the operating levers have a slight move-
ment, as compared with its long arms, it will
be seen that where the block becomes worn the
bars will drop too far. To remedy this defect
this brake-bar was invented.

TIRE UPSETTER.—Quentin Cincinnati Tabbs,
Windsor, Sonoma county. The object of
this invention is to provide an improved man-
ner of upsetting metal bands and tires for the
purpose of shrinking or reducing their diam-
eter. The machine is operated by a leverage
power which can be increased to any required
degree.

AT THE SAVAGE mine the two new hoisting
engines to take the place of the old incline
engine are in place, and will be ready to start
up in a few days. These engines are each of
200-horse power, and will work the mine to the
depth of 4000 feet with the most perfect ease.
The new wire rope for the incline has arrived,
and is being placed on the big drum ready for
use. This drum is of the same pattern as that
used by the Crown Point Company, is three feet
longer, and is tapering from one end to the
other, so as to wind the rope with greater ease
than the old style. The rope is two inches in
diameter, and weighs over 25,000 pounds, the
last 1500 feet gradually tapering to 1 1/4 inches
in diameter.

THE Battle Mountain Measure for Measure of
the 20th, reports a new mining discovery by J.
L. Higgins and E. Bickett, four miles south-
west of Battle Mountain. Assays of the ore
run from \$111 to \$300 the ton in silver.

CHEYENNE is endeavoring to get up a Black
Hills gold excitement in opposition to Sioux
City. Old miners and trappers in Utah, who
have been in the Black Hills, pronounce the
discovery of gold there a great humbug.

THE yield of gold from placers and quartz in
Montana for 1874 is placed at \$2,360,170, di-
vided as follows: Placers, \$1,554,007; quartz,
\$496,170.

SINCE January 1st, San Francisco has re-
ceived over 6 000 flasks of quicksilver from the
various producing districts of California.

A New Milling Machine.

The Tanite company of Stroudsburg, Pa., exhibited at the last Fair of the American Institute in New York, a new machine in which an emery wheel is used, for the first time, for surfacing files and sad irons, finishing anvils, nuts, ribs, keys, slide valves, straps, slides, cross-heads, and in short, for accomplishing the majority of work now surfaced on the ordinary planer, milling machine, or shaper. It will be remembered that the emery wheel made by the above-named corporation is of the solid type, and a brief review of the advantages claimed for it may appropriately precede the mechanical description of the large, fine engraving herswith presented, of the machine above referred to.

sad iron, which is shown secured in the chuck on the table, G. In addition to performing this labor, the gearing, immediately driven by pulley, C, also rotates the vertical shaft, H, which in turn transmits power to the cones on its right. These again (through the medium of a belt, other cones, and further suitable interposing mechanism) revolve a vertical rod, I, the lower end of which is fitted with a globe joint. Its upper extremity carries a pinion, which, by means of the handle, at J, may be thrown into action with one or the other of two racks under the table, G, so that the latter, by manipulating the handle as required, may be caused to travel automatically to and fro under the emery wheel, and over such distances as the dimensions of the work make necessary. The hand wheel, at K, allows of similar movement to be imparted to the table by hand, in circumstances where the automatic motion is not desired.

ing the employment of the diamond tool unnecessary. The cut made is much deeper than has hitherto been considered possible to accomplish by the emery grinder. The manufacturers also claim that in those articles in which first quality iron is used, on account of its being more easily worked, the use of their wheel will soon save enough valuable metal to pay for a machine. From a careful examination of the apparatus, these advantages appear to us to be well substantiated.

These machines are manufactured by the Tanite Company, and are sold on this coast only by H. P. Gregory, 14 and 16 First street, San Francisco.

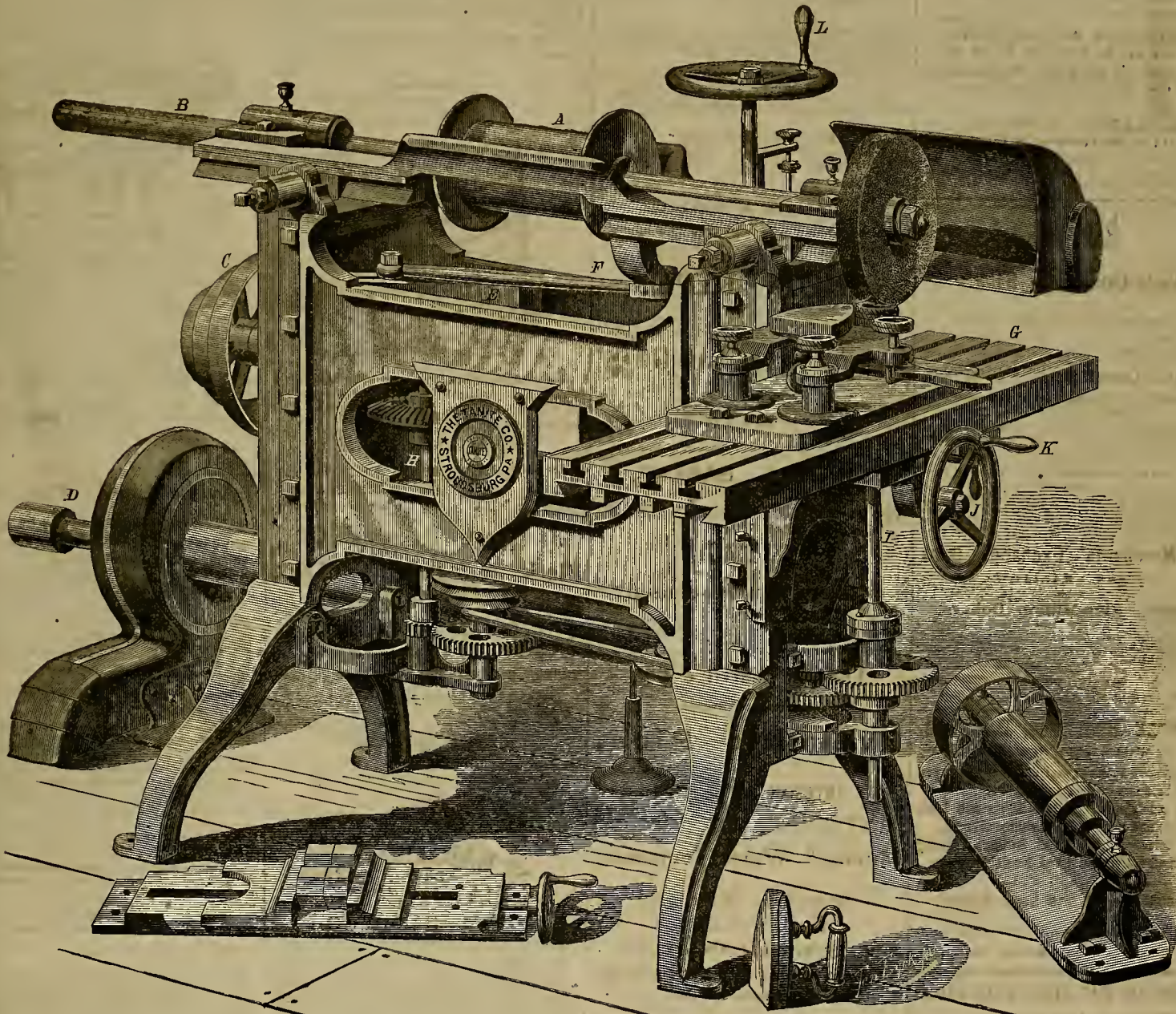
Sewing Machines.

It is the general impression that through the refusal of Congress to extend certain sewing

ing machines. The cheap machines are now sold at a price as low as the makers can afford to sell them, and the first-class machines are not going to reduce their prices on account of the refusal of Congress to extend the patent mentioned.

The first-class machines are manufactured by companies which have large establishments, fitted up at immense expense, with all the necessary machinery to turn out machines at the lowest possible price. To successfully compete with these companies, it would be necessary to expend very heavy sums for purchasing machinery; and even then the wealthy companies own the larger number of patents for improvements, and can make them cheaper than those who have to pay for the use of these. This, of course, would in a great measure prevent others from competing with the richer companies.

It is a combination of patented improvements



THE TANITE COMPANY'S IMPROVED MILLING MACHINE.

The solid emery wheel performs the office of a rotary file, the cutting edges of which never grow dull. It is hard and travels steadily at a high speed, the latter exceeding, with safety that of the grindstone, while the emery cuts faster and lasts longer than the sand. Being composed of an artificial mixture, its grit is more even than that of the natural substance. Finally, the solid wheels are successfully used for putting the cutting edges on tools of all descriptions, and they may be produced of any shape, fitted for any special work.

The clearness of our illustration gives an excellent idea of the details of the machine. The driving belt acts upon the pulley, A, secured to shaft, B. The latter at its left hand extremity carries another belt, leading to a counter shaft attached to the floor (represented detached, and lying on the right of the machine), whence a third belt returns to the pulleys, C, and a fourth to the blower shaft, D. Through suitable mechanism, the pulley, C, actuates the slotted crosshead, E, the revolution of which communicates, by the rod, F, reciprocating motion to the main shaft, B, imparting to the emery wheel, represented on the right hand extremity of said shaft, a transverse movement across the

The mode of operation consists in adjusting the work in the chuck to the proper elevation and starting the machine. The surface of the sad iron, for example, is thus carried under the wheel, and at the same time the latter is drawn across it; and this continues until the motion of the table transports the object out of the action of the grinder. The workman then gives the hand wheel, shown at L, a part of a turn, thereby moving a fine screw which passes through an arm on the table, thus slightly elevating the latter, so as to give new surface for the tool to take upon. The handle, J, being shifted, the work travels back under the wheel, and so the operation is repeated as often as is desired, or else a new article is substituted after one passage under the emery. To avoid injury to tools and workmen, a small suction blower, with the necessary pipes and an enlarged receptacle in rear of the wheel, is provided, and so arranged as to draw away all dust, while at the same time to be easily removed for setting the work. For keys and similar small articles, a different chuck (see sample in the foreground of the engraving) is needed.

The machine, it is claimed, allows of using the wheel to its full capacity, while protecting the same against uneven wearing, thus render-

machine patents, we will have cheaper sewing machines hereafter. Many persons think also that the large companies, like the Wheeler & Wilson, Grover & Baker, Weed, Florence, etc., will have to reduce their prices from fifty to seventy-five per cent., on account of competition. Now this is a mistake, for first-class sewing machines will probably be no cheaper for some time to come. The reasons for this are simple, though not generally understood.

In the first place the patent which Congress refused to extend was for the four-motion feed, which is only one of a large number of patents under which the various machines are manufactured. Still, this feed is used by all of them. The refusal to extend this patent will permit other machines to use the four-feed motion without having to pay royalty, but all the first-class machines are protected by a large number of other patents; while the ordinary low-priced machines have been compelled heretofore to use the common feed or pay the royalty to the owners of the patent, they can now use the improved feed free, but we do not see how it is going to break the price of first-class sew-

which make the first-class machine, not one patent. The wealthy companies have made it a point to buy up all the good patents themselves, and they keep patenting every improvement of any importance. This enables them to keep the best machines in their hands. As these machines are improved from time to time, in several cases the whole machine has been changed for the better as new patents were added. Any one can now make a sewing machine of old-fashioned character, using patents which have run out, but they do not manufacture a first-class machine such as most people want when they buy. Any agent will say that a simple change will have the effect of selling thousands of machines, so the inferior machines have little chance against those which have all the latest patented improvements.

Timber is being buried in the Consolidated Virginia mine at the rate of 6,000,000 feet per annum, and in all the other mines in like proportion. The Comstock lode may well be said to be the tomb of the forests of the Sierras.

The Eberhardt mill at White Pine will shortly start up again.

Business Directory.

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Refers to Dewey & Co., Patent Agents; Judge S.
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San Francisco Office.....No. 412 California street.
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Subscribed, \$3,000,000. Paid in, \$1,500,000.
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posits, make collections, buy and sell exchange, and issue
Letters of Credit available throughout the world, and to
loan money on proper securities. 2v27-cowhp

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Receive consignments of Gold, Silver and Lead
Bullion, and make Cash advances thereon.
Invite Correspondence from Bankers, Mining
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411 Bush street, above Kearny..... SAN FRANCISCO
4v27t G. MAHE, Director.

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For sale or to lease, the LEVIATHAN COPPER
MINE, in Alpine county, California.

The ore, which is in the form of silicate, black and
red oxide, and gray sulphide, with metallic copper
finely disseminated, averages from two to five feet
thick, and 15 to 50 per cent. copper. A few parcels
taken out during exploratory operations realized \$30-
000 for Bluestone. In sight, 2,000 tons 20 per cent. ore;
on dump, 300 tons 15 per cent. Supply inexhaustible.
Title perfect. Minimum present capacity, 10 tons per
day, which may be extended indefinitely. Cost of
extraction, \$'. There is also a stratum of sandstone 20
feet in thickness, impregnated with 26 per cent. of
pure sulphur. To a coin purchaser highly advantage-
ous terms will be offered. For further particulars
apply to Louis Chalmers, Silver Mountain, Alpin
county, Cal.

Glasgow Iron and Metal Importing Co.
Have always on hand a large Stock of
Bar and Bundle Iron, Sheet and Plate Iron
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m8-m2

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ARTESIAN WELL PIPE.

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All Sizes Made and all Work Guaranteed
130 Beale Street,



Self-Fastening
Bed-Spring.



Double-Spiral
Bed-Spring.

We manufacture all sizes of BED and FURNITURE
SPRINGS, from No. 7 to the smallest Pillow Spring;
also, the Double Spiral Spring, which is the most dur-
able Bed Spring in use. It is adapted to upholstered or
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make the celebrated Obermann Self-Fastening Bed
Spring. Any man can make his own spring bed with
them. They are particularly adapted to Farmers' and
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Bronze Turkeys

Gobblers, 30 to 40
pounds. Hens
15 to 20
pounds.

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HOUDANS.

EGGS, fresh, pure, packed so as to hatch after arrival on
any part of the Coast. For illustrated Circular and Price-
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Emden Geese

40 to 50 pounds
per pair at ma-
turity.

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CAYUGA DUCKS.

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AMMONIA!

For Washing and Cleaning Purposes.

For Sale by all Grocers.

This article is universally used in Europe, and recently
introduced for general family use in San Francisco and
neighborhood, is already in great demand. It is now the
intention of the manufacturers to introduce it all over the
Pacific Coast, at prices which will bring it within the reach
of every household.

It is unequalled for cleaning Woolen Fabrics, Outlets,
Carpets or Crockery; for Scrubbing Floors, Washing Paint,
Removing Grease Spots, Shampooing or Bathing.

It renders water soft, and imparts a delightful sense of
coolness after washing.

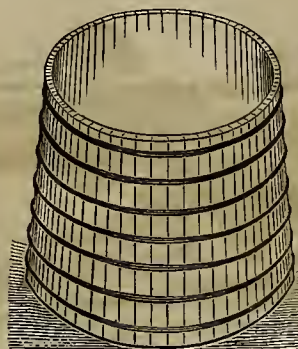
DIRECTIONS.—For Laundry, use two to four table-
spoonfuls to a wash tub of water. For bathing, use one
tablespoonful in the bath tub. For removing grease spots,
apply with a brush, undiluted, and wash with water after-
ward. For stimulating the growth of plants, use a few
drops in every pint of water used in watering.

PRICE.—Per Pint Bottle, 25 cents; per Quart Bot-
tle, 40 cents; per Half Gallon, 75 cents.
Also, SULPHATE OF AMMONIA for chemical pur-
poses, fertilizing, and the preparation of artificial manures
AMMONIACAL PREPARATION, for the prevention and
removal of boiler scale. CRUDE AMMONIA, for general
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WATER TANKS of any capacity, made entirely
by machinery. Material the best in use; construction
not excelled. Attention, dispatch, satisfaction. Cost
less than elsewhere.

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Averill Chemical Paint,

MANUFACTURED BY THE

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PURE WHITE, AND ANY SHADE OR COLOR.

This Paint is prepared in liquid form, READY FOR
APPLICATION—requiring no thinner or dryer, and will
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It is cheaper, more durable, more elastic, and pro-
duces a more beautiful finish than the best of any
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It will not Fade, Chalk, Crack, or Peel off, and will
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side use, as we manufacture an Inside White (Flat) for
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Put up in 1/4, 1/2, 1, 2 and 5 gallon packages, and in
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This Dip is guaranteed to cure when used according
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For Diseases of the Throat and Lungs, such
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The few compositions, which have won the confi-
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PRACTICAL AND ANALYTICAL CHEMISTS.

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cording to quality. In ordering state for what pur-
pose the stone is needed.

"I have used one of your grindstones for some time, and
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EMERY STONES, VASES AND FOUNTAIN, GRAY-
STONE, and CEMENTARY WORK. STONE DRESS-
INGS GENERALLY, NATURAL STONE hard-
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The undersigned, owners of LESCHOT'S PATENT
for DIAMOND POINTED DRILLS, now brought to the
highest state of perfection, are prepared to fill orders
for the IMPROVED PROSPECTING and TUNNELING
DRILLS, with or without power, at short notice, and
at reduced prices. Abundant testimony furnished of
the great economy and successful working of numerous
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Its decided merits. Its Beauty, Compactness,
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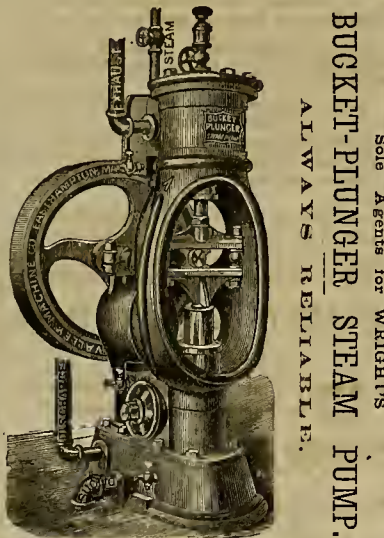
[PATENTED MAY 26TH, 1874.]
Price Reduced to 16 Cents Per Pound.
SAN FRANCISCO, November 10th, 1874.
To Supts. of Quartz Mills and Mining Men generally:
We take pleasure in stating that owing to the rapid
increase in our orders, our Pittsburgh Manufacturers
have been compelled to add largely to their works—
a new gas furnace and heavier trip hammer—and are
thus enabled to reduce the cost of steel and at the
same time produce Shoes and Dies superior to any yet
manufactured. We have consequently reduced the
price to 16 cents per pound and solicit a trial order,
guaranteeing that you will find them at least 10 per
cent cheaper than the best iron. There are no STEEL
SHOES AND DIES made excepting under our patent and
sold at this office, or by our authorized agents, though
certain Eastern manufacturers advertise STEEL SHOES
AND DIES which are only cast iron hardened by the
addition of a composition. They will not out-wear two
sets of common iron, though called steel. They are
very brittle and are not capable of being tempered,
flying from under the hammer like cast iron. Our
STEEL SHOES AND DIES are in use in many of the largest
mills on the Pacific Coast, and all who have used them
pronounce them cheaper and far superior to iron in
every respect, even at the old price of 20 cents per
pound. Their advantages over iron are cheapness on first
cost, increased crushing capacity, time saved in chang-
ing and in setting tappets, increased value of amalgam
by absence of iron dust and chippings, and a saving of
75 per cent. in freight. It takes 60 days to fill orders
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pound shipped at San Francisco. Terms liberal.

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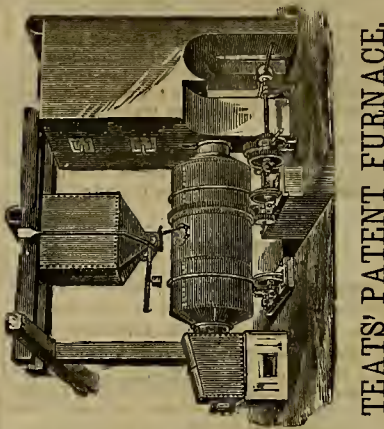
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Mining Machinery.



TEATS' PATENT FURNACE
For Roasting, Desulphurizing, Chloridizing
and Oxidizing Ores, etc. For the reduction of
Gold, Silver, Lead and other ores, saving a larger per-
centage, at less cost, than any other invention now in
use. Chloridizing Silver ore more thoroughly, in less
time, with less fuel, salt and labor; also roasting Lead
ore preparatory to smelting, better and cheaper than
any other invention. The Furnace is so constructed
that one man, of ordinary ability, tends five or more
furnaces; controls them with ease; adding heat or air;
stopping or starting at will; changing and discharging
with ease. Also, Patent "Conveying Cooler," for con-
veying and cooling roasted ores, heating the water for
amalgamation and the rollers at the same time. Saving
the large space in mill (covered with brick or iron),
and the labor of two men per day, exposed to the poi-
sonous chlorine gases. Also, Patent Air Blast "Dry
Kiln," for drying ores direct from the mine or breaker,
saving fuel and labor heretofore necessary in drying
ores for dry pulverizing. For description refer to
MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874.
For particulars address
D. B. MILLER & CO.,
No. 12 West Eighth Street, Cincinnati, Ohio
Circulars, &c., will be furnished, if required.
18v25-3m

OAKES'S PATENT

Quicksilver Strainer.
Patented January 26, 1875.
For description see MINING AND SCIENTIFIC PRESS,
March 6, 1875.
For Cleaning Quicksilver Before Using it
for Amalgamation.
Mill-men are invited to examine the Patent Quick-
silver Strainer at the office of the Agents,
H. J. BOOTH & CO.,
UNION IRON WORKS, San Francisco.

CROCKER'S PATENT
TRIP HAMMER QUARTZ BATTERY.

This machine, complete, weighs 1,500 lbs. Has an iron
frame, five-heel arms with stamps weighing 17 lbs. each,
which strike 20 blows per minute, in a mortar provided
with screens on both sides and crushes FINE 600 lbs. per
hour, requiring one-horse power to drive it. Has been
thoroughly tested, and is guaranteed to give good satis-
faction. PRICE, \$500.
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7v25-4f **JOHN TAYLOR & CO.**

Varney's Patent Amalgamator.
These Machines Stand Unrivaled.
For rapidity pulverizing and amalgamating ores, they
have no equal. No effort has been, or will be spared
to have them constructed in the most perfect manner
and of the great number now in operation, not one has
ever required repair. The constant and increasing de-
mand for them is sufficient evidence of their merits.
They are constructed so as to apply steam directly
into the pulp, or with steam bottoms, as desired.
This Amalgamator Operates as Follows:
The pan being filled, the motion of the muller forces
the pulp to the center, where it is drawn down through
the aperture and between the grinding surfaces.—
Thence it is thrown to the periphery into the quicksilver.
The curved plates again draw it to the center, where it
passes down, and to the circumference as before. Thus
it is constantly passing a regular flow between the grind-
ing surfaces and into the quicksilver, until the ore is
reduced to an impalpable powder, and the metal amal-
gamated.
Settlers made on the same principle excel all others.
They bring the pulp so constantly and perfectly in con-
tact with quicksilver, that the particles are rapidly and
completely absorbed.
Mill-men are invited to examine these pans and settlers
for themselves, at the office, 229 Fremont Street,
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Nevada Metallurgical Works,
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Plans furnished for the most suitable pro-
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Special attention paid to the Mining and
Metallurgy of Quicksilver.
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Mining Engineers and Metallurgists.

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Chemical Analysis, Determination of Minerals, and
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Agent for the Humboldt Company, Manufacturers of
Mining and Concentrating Machinery.
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111 and 117 California St., 17 and 19 Davis St., San Fran-
cisco, and 178 J St., Sacramento. apr-17

Gila Silver Mining Company.

ENTRORS PRESS:—This mine has done remarkably well since date of last writing, and it is now looking better than at any time since its incorporation, with every prospect of improvement largely exhibited wherever opened.

There is now a vein defined in outline and accurate in formation, with the distinctive features that are strongly indicative of permanence and character. The south drift on the main incline is now in on its course about 25 feet, through ore of an excellent quality. The vein is about two feet thick, between walls which are well formed, smooth and clean, and descending at about an angle of 60°, the hanging wall exhibiting the same formation as before, but the foot wall shows quartz, lime and quartzite, at alternate distances with talc, manganese, iron, and other minerals that are well-known companions of silver ore, found in greater abundance than formerly. The vein at the furthest end of this drift was beginning to expand, and I have no doubt that when a few feet more southward it will open out considerably. The ore found here continues rich as formerly. Drifting is continued to the right hand parallel with the main tunnel, and a considerable quantity of high grade ore extracted. The stratum is now about three feet thick, and is descending and leading obliquely across the main tunnel, at a point about midway between the main winze and the end of the tunnel, thus showing its connection with the lode, as does all of the ore on this lead. The inside winze sunk at the furthest end of the main tunnel, where the ore body opened out and gave signs of going down, has attained an incline depth of about 30 feet, all the ore of a very high grade (\$867), susceptible of being easily reduced.

The vein is fully six feet thick between walls at the bottom and is the best formed portion of it which has been thus far uncovered. Here are found every characteristic of a true fissure vein, with walls smooth and perfect, and the ore running in a solid vertical strata, as deposited by nature, thus considerably proving the fissure theory, and establishing the fact that the ore coming from the deep ones is not a new surface deposit as might have been supposed.

The ore is chiefly chloride of silver and quartz highly mineralized and easily worked. The connection from this point to the drift extending from the out-croze will be made by Wednesday, which will greatly facilitate operations, by giving plenty of pure air and passage way for powder, smoke, etc. Work was commenced on the outside tunnel on the 9th of March with three 8-hour shifts, and is steadily progressing, showing excellent ore indications, inside the outer rim of the porphyry formation, oxide of iron and other ferruginous matter impregnating the sides and face of tunnel. A couple of pieces taken for assay test are highly mineralized, and will show well in the precious metal. We'll send result as soon as completed.

A substantial blacksmith shop has been built within the past week, for picks, drills, and other matters. A boarding house has also been set in motion, giving the men a chance to procure good board at \$9 per week; five Indians also are employed as sorting ore as extracted from the mine and one packing water from the spring down at the town for the use of men in the mine in which there are twenty-five at work. The contract for hauling the ore from mine to mill has been let.

The mill is now ready and has been since the 10th, and had steam up to test machinery which is found in proper working condition. Wood contracts have also been let, and already about 40 cords at the mill, and probably 100 cords cut, which will be brought in during the ensuing week.

A few assays have been made, showing 3 per cent. of lead, some iron and copper, but not enough of any of them to interfere with milling. The mill is expected to be in motion on the 17th without fail.

Reveille, March 13, 1875.

California Railroad Items.

A large meeting of the responsible citizens of San Buenaventura and representatives from Santa Barbara was held on the 29th ult. at San Buenaventura, to take the initiatory steps to secure the building of a broad-gauge railroad through Santa Clara valley from San Buenaventura, to connect with the Southern Pacific near Lyon's station. The citizens pledge themselves to do all in their power to accomplish the desired end. Parties who are simply able to build and equip the road have said that if the people along the line would do their duty they would connect us by rail with San Francisco inside of two years. A committee has written to the parties pledging the hearty support of the people. The following named gentlemen constitute the committee appointed: E. A. Edwards, T. Wallace More, L. C. McKeeby, L. D. Chillon, M. H. Gay, N. W. Blanchard and T. R. Baird.

The new railroad from Vacaville to Winters is progressing rapidly. Grading is completed for half the distance, and by means of a new machine which has just come down from Sacramento, the work has been going forward at

the rate of a mile per day. The machine is worked by ten horses, and looks something like a header. By the term of the contract with farmers, the railroad must be completed and cars running on the 19th of September, or \$30,000 of subsidies will be forfeited. The country through which the road takes its way is very level, and there will be no heavy cuts or fills. Sweeney creek will have to be bridged two or three times and Putah once. The former creek is small, but the latter will require a longer bridge than it does where crossed by the California Pacific, near Davisville.

The Santa Clara Echo says that it is rumored that a movement is on foot for the construction of a narrow gauge railroad from San José or Santa Clara to Santa Cruz. The route suggested is by either the Santa Cruz or Stevens' creek passes, either of which is very practicable. Rumor also has it that an effort will be made to have the road constructed by the way of Menlo Park; but the route that way would not be so favorable. The building of this road would be a good thing for Santa Clara county.

The Surveyors of the new Sonoma and Marin railroad commenced work in San Rafael on Tuesday. Subscriptions to the enterprise now amount to \$15,000 per mile, and it is to be pushed forward rapidly to completion. Mr. Wickersham, the President, has informed parties that he had purchased a short road leading towards San Rafael from Petaluma, and would put the remainder of the route under contract at an early day.

The managers of the narrow gauge railroad connecting Salinas valley with the ocean at Monterey, distant 18 miles, have resumed operations, after a suspension of several months, caused by the washing away of the trestle-work piling across the Salinas river. They have now two Baldwin locomotives on the road, weighing twenty-three and twenty-one tons respectively.

A NATURAL grade has been found for a railroad on an air line between Colusa and Chico, without a bridge or filling, and it is said that the road will be built in time to carry the fall crop.

General News Items.

THE great topic of the week has been James Lick's revocation of his deed of trust pertaining to his immense estate, valued at above \$4,000,000, on public enterprises familiar to all Californians. He has, having unexpectedly regained his health, changed his mind, and desires to obtain control of his property. The trustees appointed by him to superintend the disposition of the estate under the trust refuse to resign. How the case will terminate is doubtful. The lawyers, of course, expect a "fat thing" and if it goes into the courts their expectations will be realized.

W. F. STOREY, editor of the Chicago Times, was sentenced to ten days imprisonment by Judge Williams, of the County Court, for constructive contempt. A writ of supersedeas, however, released him after a few hours incarceration.

PLACED in a prominent position in the new Congregational church at Woodland, is a card with this inscription: "Use no tobacco in this church." Attendants at that church are expected to eschew evil.

EMINENT lawyers are of the opinion that if the late decisions of United States judges and United States commissioners on the new Civil Rights bill, be sustained on appeal, that with the exception of the jury clause there will be nothing left of it.

A SHOOTING affray occurred on Los Alamos Rancho, about fifteen miles from Guadalupe last Sunday, which resulted in one man being killed and one badly wounded.

THERE was a fire at Benicia, Tuesday morning, burning the house of William Melrose and destroying the lives of three boarders—Wm. Finnerty and two men named Shea and Hanson.

FIVE hundred trees have been planted in the Court-house square, Woodland,—90 acacia, 90 eucalyptus, 100 pine, 100 cyprus and 20 poplar. They are doing well.

THERE is trouble again on the Mexican border. An additional cavalry force has been ordered to the Rio Grande with orders to arrest all marauders.

VICE-PRESIDENT Wilson has admitted to an interviewer that he was a candidate for the presidency.

THE orthographic mania has reached San Francisco. They had a spell of it at Bethany church, Tuesday evening.

Rumor states that a fine prospect of coal has been discovered within three and a half miles of town.

SIX hundred immigrants arrived by the overland train Wednesday.

TOBY Rosenthal's great painting "Elaine" is on exhibition in this city.

THE Mariposa folks are jubilant over a weekly mail.

GENERAL Spinner, treasurer of the United States, has resigned.

GOON Friday was generally observed by business men in the East.

INNOCENTIARISM is prevalent in Marysville.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

Industrial Items.

THE Pacific Mail steamship company and Union and Central Pacific roads combination have agreed on a new through freight tariff, which went into effect on the 5th inst. The rates per 100 pounds are: First class, \$6; second class, \$5; third class, \$4; fourth class, \$3; class A, \$2.50; class B, \$2; class C, \$1.75; class D, \$1.50. The steamship rates are as follows: First class, \$4.50; second class, \$3.50; third class, \$2.50; fourth class, \$2.25; class A, \$2; class B, \$1.75; class C, 1.50, class D, \$1.30.

THE Central Pacific railroad company have decided to construct a railroad from Galt, in Sacramento county, to Ione city, in Yuba county. The engineers have been instructed to take the field at once, and the orders are to have the road in operation within one hundred days from this date.

THE Reno (Nev.) Journal is talking of the Truckee river as a water power, and asserts that it is peculiarly adapted for the manufacture of paper, on account of the purity of water and freedom from mineral impregnation.

OPERATIONS have been commenced at the upper end of the North Anaheim canal, Los Angeles county, and the workmen are scattered over three miles of ground, pushing the work forward with all rapidity.

THE surveyors for the new Sonoma and Marin railroad commenced work in San Rafael on Tuesday. Subscriptions to the enterprise now amount to \$15,000 per mile, and it is to be pushed rapidly forward to completion.

An organization has just been formed in Santa Clara county, under the name of the "Hay-Growers Co-operative Union of California," which has for its object the producing, buying and selling of hay.

At a meeting of citizens of San Diego on last Saturday evening, it was resolved to organize a joint stock company for the purpose of boring artesian wells throughout the county.

A new steamer line to Puget Sound ports was inaugurated this week by the departure of the Los Angeles, which will call at Victoria with mails and passengers, up and down.

CALIFORNIA tobacco has taken old Virginia by surprise. A sample was generally commended in the Exchange at Richmond, and \$16 was refused for one hundred pounds of it.

GILROY claims to have furnished 2,500,000 feet of the 10,000,000 feet of lumber which was consumed in this country last year.

CASTROVILLE wants a beet agary. The Argus says the lands in that vicinity cannot be surpassed for beet growing.

THE population of San Bernardino county has increased over 500 during the past six months.

P. G. WIGINGTON is planting forest trees on his ranch on Owen's creek, Merced county.

BRICKS are scarce in Bakersfield.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch. Dated Washington, D. C., March 30, 1875.

FOR WEEK ENDING MARCH 16, 1875.

CLAMP APPARATUS FOR CONNECTING STREET CARS, ETC., WITH ENDLESS TRAVELING DEVICES.—William Eppelsheimer, S. F., Cal.

PROCESS OF OBTAINING BORACIC ACID FROM BORATE OF LIME.—Ferdinand Formals, S. F., Cal.

COMBINED PARASOL AND WHIP.—John Perrins, S. F., Cal.

CHARING IRON FOR VEHICLES.—Gilbert Smith, S. F., Cal.

WINDMILL.—Albert H. Southwick, S. F., Cal.

RE-ISSUE.

Pantaloon, etc.—Jacob W. Davis, Reno, Nev.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.

NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

THE building of a tailings flume from the Consolidated Virginia mill to the Carson river is contemplated. The flume would be eight or ten miles in length. After all has been taken out of the ore that can be got out by means of pans, settlers, agitators and blasket sluicing, the tailings still assay \$8 to \$10 per ton.

THERE are several counties in Idaho which comprise more space than many of the Eastern and Southern States.

THE Cloverdale mine has made its first shipment—twenty flasks—of quicksilver.

JUSTICE AT LAST.—The public were far in advance of the medical profession in recognizing HALE'S HONEY OF HOREHOUND and TAR as a specific for consumption, coughs and colds; but at last the Faculty are doing justice to the great antagonist and conqueror of Pulmonary Diseases. The country druggists generally report that the local physicians are prescribing it in preference to all the old plimmonics, and that the result is an immense increase in the percentage of cures. PIKE'S TOOTH-ACHE DROPS—Cure in one minute.

The Mining & Scientific Press.

Started in 1860, is one of the oldest weekly journals now published in San Francisco. It has been conducted by its present proprietors for ten years, during which period it has been repeatedly enlarged and constantly improved. The active and steadfast efforts of its publishers have gained for its conduct an amount of practical experience greater than any other publishers have accumulated on this coast, of a weekly journal.

The sum paid by us for the best editorial talent obtainable for our special class journal; for engravings, for interesting news and correspondence, and for printing a large-sized, handsome sheet, is unequalled by that of any other American weekly west of the Mississippi.

As a PRACTICAL MINING JOURNAL it has no rival on this Continent.

It is the only MECHANICAL, and the only SCIENTIFIC journal of the Pacific States.

Miners, Assayers, Millmen, and Metallurgists in the United States should take it.

Pacific Coast Mechanics, Engineers, Inventors, Manufacturers, Professional Men, and Progressive and Industrial Students should patronize its columns of fresh and valuable information.

Mining Engineers, Smeltermen, Metallurgists, Mine Owners and Mine Workers throughout the world should profit by its illustrations and descriptions of New Machinery, Processes, Discoveries and Record of Mining Events.

Intelligent thinkers throughout the land, in high or humble situation, who would avoid literary trash for genuine information, should SUBSCRIBE AT ONCE.

DEWEY & CO.,

No. 224 Sansome street, S. F.

From an Inventor.

The following letter, which was recently received from an old client of Dewey & Co., now residing in one of the Eastern States, speaks for itself:

GENTLEMEN: It was through your house that I secured my first patent, and although I have since done business here in the Atlantic States with the ablest patent solicitors—gentlemen who have done me justice—yet I have often regretted that you were too far off to advise with me in my cases. It has taken a longer time with every patent I have taken out since I left California and came East, than in the cases you prepared for me in San Francisco, which is certainly very creditable to you.

By the way, one of my patents has passed the ordeal which is the essential test of a patent's value. I mean that of a trial in the courts, and it stood the battling of one of the best lawyers in the country. The specifications and claims were completely made out and there was a perfect comprehension of its principle during the trial. Since giving it this test we thought that we would make it even stronger, if possible, and submitted it to one of the best patent solicitors for advice. After a careful examination of the case he advised us to let it alone as it stood, saying that whoever made up those papers understood their business. I then informed him that they were drawn up by Dewey & Co., of San Francisco, and he replied that he knew you very well by reputation.

Very truly yours,

L. L. SAWYER.

Meriden, Conn., May 16, 1874.

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BY J. S. PHILLIPS, M. E.,

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D. J. JAMES—Australian Colonies.
J. C. EWING—Contra Costa County.
JOHN ROBERTSON—Sonoma County.
W. C. QUINBY—Eastern and Western States.
B. E. LLOYD—Nevada and Placer Counties.
B. OGDWIN—California.
A. C. KNOX—Southern California.
G. W. MCGREW, Santa Clara county.
L. P. MCCARTY, California.
H. D. MORGAN, Santa Cruz County.

Keystone Quartz Mining Company—Prin-

place of business, San Francisco, California. Location of works, Butte Township, Sierra county, Cal. Notice is hereby given that a meeting of the Board

Notice is hereby given, that the meeting of the Board of Directors, held on the 8th day of March, 1875, on assessment (No. 4) of one dollar (\$1) per share, was taxed, assess-

the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the company, northwest corner Pine and Sansome streets, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 10th day of April, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before sale, will be sold on Monday the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

LOUIS VESARIA, Secretary.
Office, Northwest corner Pine and Sansome streets, San Francisco, California.

Manhattan Marble Company of California.—Location of principal place of business, San Francisco, California. Location of works, Oakland, Alameda county, State of California.

Notice is hereby given, that at a meeting of the Directors, held on the 30th day of March, 1875, an assessment (No. 2) of five dollars per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary of the company, at his office, Nos. 13 and 15 Fremont street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of April, 1875, shall be deemed delinquent and advertised for sale at public auction, and unless payment is made before sale, will be sold on Monday the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

L. L. ALEXANDER, Secretary.
Office, Nos. 13 and 15 Fremont street, San Francisco, California.

Oreans Mining Company.—Location of

Location of works, Grass Valley Township, Nevada
County, California.
Notice is hereby given that at a meeting of the Board

Location of works, Grass Valley Township, Nevada
County, California.
Notice is hereby given that at a meeting of the Board

Location of works, Grass Valley Township, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Trustees of said corporation, held on the 16th day of March, 1875, an assessment (No. 3) of one dollar per share was levied on the said corporation, and the same is payable immediately, in gold coin of the United States of America, to the Secretary, at the office of the company, Room 8, No. 316 California street, San Francisco, California. Any person who has not paid said assessment, shall remain in default on Wednesday, the 21st day of April, 1875, will be advertised on that day as delinquent, and unless payment is made on or before that day, the same shall be sold at public auction, on the 1st day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expense of sale.

W. F. NESMITH, Secretary.

Office—Room 8, No. 316 California street, San Francisco, Cal.

Silver Sprout Mining Company—Principal place of business, San Francisco, State of California.

Location of works, Kearsege Mining District, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of February, 1875, an assessment of one cent per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, at the office of the Company, in San Francisco.

Any person who has not paid said assessment, shall remain in default on the 17th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made on or before that day, the same shall be sold at public auction, on the 1st day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expense of sale.

W. F. NESMITH, Secretary.

Office—Room 8, No. 316 California street, San Francisco, Cal.

June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 13, No. 318 California street, San Francisco.

Theresa Mill and Mining Company.

Principal place of business, San Francisco, State of California. Location of works, Contra Costa District, Maricopa County, California.

Notice is hereby given that at a meeting of the Board of Directors, held on the 13th day of March, 1875, an assessment of twenty cents per share was levied upon the capital stock of the corporation, to pay the delinquent assessment on United States gold and silver coin, to the Secretary, at the office of the Company, Room 16, 408 California street, San Francisco.

Any stock upon which this assessment shall remain unpaid on the 14th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before sale, the property will be sold at first sale May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 16, 408 California street, San Francisco, California.

Toulumne Hydraulic Mining Company.

Location of principal place of business, City and County of San Francisco, State of California. Location of works, Toulumne county, State of California.

Notice.—There are delinquent upon the following

described stock, on account of assessment No. 4 levied on the 23d day of February, 1875, the several amounts

described stock, on account of assessment No. 4 levied on the 23d day of February, 1875, the several amounts

No.	Name.	No. Certificates.	No. Shares.	Amount.
00	John Hahn.....	1	25	5
00	E Van Santen, Trustee.....	2	100	20
50	E Van Santen, Trustee.....	3	100	20
00	E Van Santen, Trustee.....	4	100	20
00	E Van Santen, Trustee.....	5	100	20
00	E Van Santen, Trustee.....	6	100	20
00	E Van Santen, Trustee.....	7	100	20
50	E Van Santen, Trustee.....	8	100	20
35	E Van Santen, Trustee.....	9	100	20
00	E Van Santen, Trustee.....	10	100	20
75	E Van Santen, Trustee.....	14	100	20
00	E Van Santen, Trustee.....	15	100	20
75	E Van Santen, Trustee.....	16	100	20
50	E Van Santen, Trustee.....	17	100	20
40	E Van Santen, Trustee.....	18	100	20
50	E Van Santen, Trustee.....	19	100	20
00	E Van Santen, Trustee.....	20	100	20
00	E Van Santen, Trustee.....	21	100	20
00	E Van Santen, Trustee.....	22	100	20
00	E Van Santen, Trustee.....	23	100	20
55	Camilo Martin, Trustee.....	24	100	20
50	Camilo Martin, Trustee.....	25	100	20
75	Camilo Martin, Trustee.....	26	100	20

50	Camilo Martin, Trustee...	27	100	20
60	Camilo Martin, Trustee...	28	100	20

50	Camilo Martin, Trustee...	27	100	20
60	Camilo Martin, Trustee...	28	100	20

60	Camilo Martin, Trustee...	37	100	20
60	Camilo Martin, Trustee...	28	100	20
60	Camilo Martin, Trustee...	28	100	20
60	Camilo Martin, Trustee...	30	100	20
65	Camilo Martin, Trustee...	31	100	20
00	Camilo Martin, Trustee...	32	100	20
00	Camilo Martin, Trustee...	33	100	20
00	Sidney Buckingham...	42	500	100
00	Sidney Buckingham...	43	500	100
50	Sidney Buckingham...	44	100	20
60	Sidney Buckingham...	45	100	20
65	Sidney Buckingham...	46	100	20
as	Sidney Buckingham...	47	100	20
60	Sidney Buckingham...	48	100	20
et,	S D R Stewart...	62	1,000	200
60	S D R Stewart...	59	1,000	200
60	S D R Stewart...	58	1,000	200
60	S D R Stewart...	55	500	100
60	S D R Stewart...	55	500	100
60	E. Weisag, Trustee...	88	3,000	600
60	Isaac T Milliken...	84	100	20
60	Charles Baun, Trustee...	86	750	150
60	WGT Aalbertberg, Trustee...	89	2,000	580
60	George W Clark...	not issued	6,000	1,200

E Kindmannot issued	100	100
J T Macbannot issued	3,000	600

E Kindmannot issued	100	100
J T Macbannot issued	3,000	600

E Kibbanannot issued
J T Macbannot issued 3,000 800

And in accordance with law, and an order of the Board of Directors, made on the 23d day of February, 1875, so many shares of each parcel of such stock may be necessary, will be sold at public auction at the office of the company, Room 14, 302 Montgomery street, San Francisco, California, on Saturday, the 1st day of April, 1875, at the hour of 12 o'clock, M., on said day to pay delinquent assessments thereon together with costs of advertising and expenses of sale.

I. T. MILLIKEN, Secretary

Office—Room 14, 302 Montgomery street, San Francisco, California.

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San Francisco Boiler Works,

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High and Low Pressure Boilers of all Descriptions.

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CAPITAL.....\$1,000,000.

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James D. Walker.

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JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary

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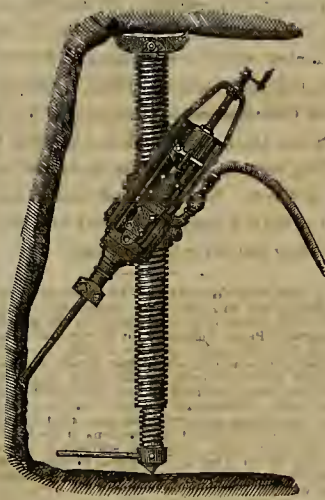
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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

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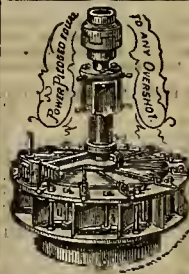
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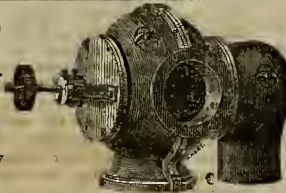
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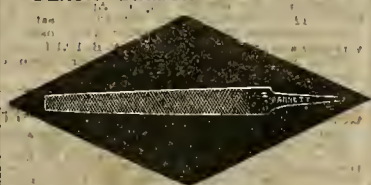
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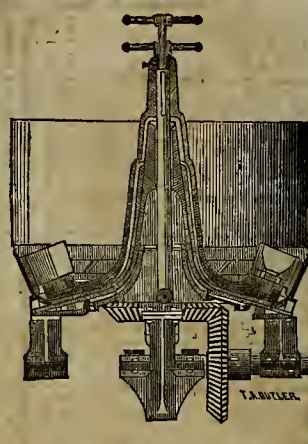
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Established for the Manufacture of

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Standard sizes of railroad Car Wheels, with special patterns for Mining Cars. These small wheels are one of the best Car Wheel Iron, properly chilled, and can stand up with the improved axle and box—introduced this company, and guaranteed to outlast any other wheels made in this State.

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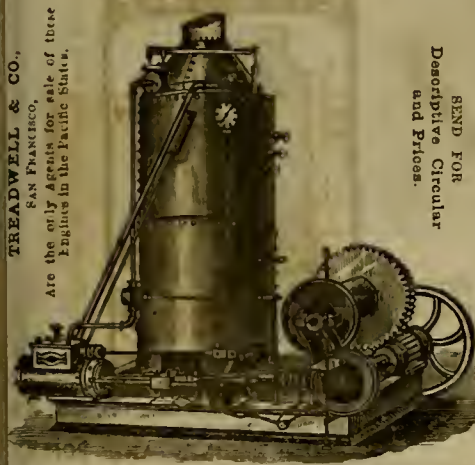
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IMPROVED HOISTING ENGINES.

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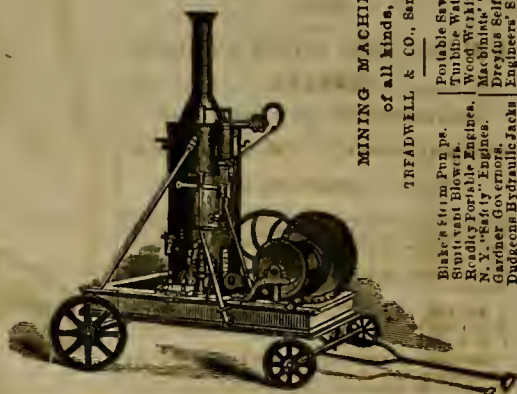
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Ever built. Their advantages will be seen at a glance by any one familiar with the necessities of a mine. One of these engines may be seen at work in the Belcher mine, and one in the Ophir, on the Comstock lode, to both of which we refer. We have all sizes of these engines constantly on hand. For sale only at

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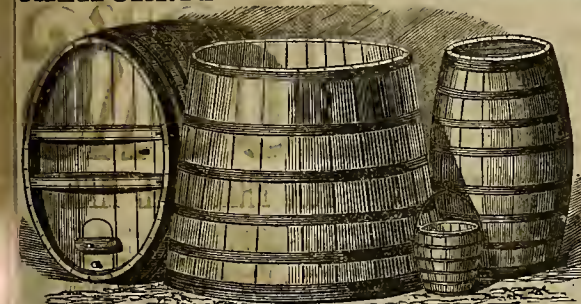
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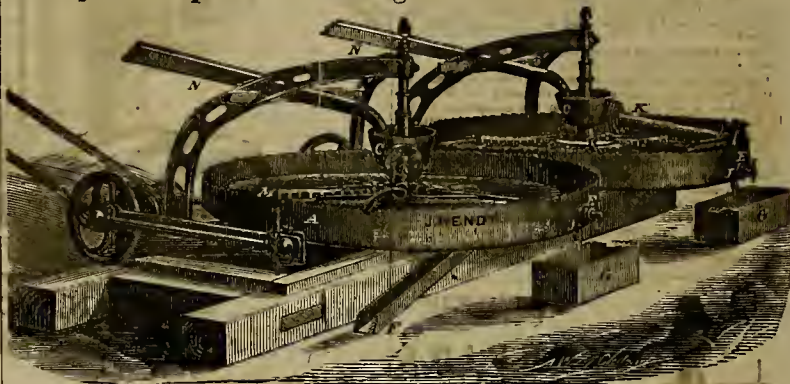
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OVER \$3,500 PER MONTH SAVED

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Hendy's Improved Amalgamator and Concentrator



Can be seen at the Manufactory, No. 32 Fremont Street, San Francisco.

SAN FRANCISCO, April 27, 1875.

JOSHUA HENDY, Esq.—Dear Sir:—As a practical miner and millman, I take pleasure in recommending the use of your Concentrators in all mills where gold or silver ores are reduced. No mills should be without them, for the following reasons:

- 1st. They are good sizers (no perfect concentration in pulverized ores can be effected without first sizing).
- 2d. The best Concentrator I have ever known—(the concentrated stuff only containing 5 per cent. of sand).
- 3d. They are good amalgamators, light (feathery) particles of amalgam and particles of coated gold by attrition are brightened, and from their specific gravity and the action of the pan, fall to the bottom and adhere.
- 4th. They require but little power and attention to run them, and with ordinary care will last for years.

I have been familiar with the workings of your Concentrators for four years past; have run them myself in the North Star Mine, Grass Valley; am familiar with their practical workings on the Empire Mine, Grass Valley; St. Patrick, Placer Co.; St. Lawrence, El Dorado Co.; Oaks and Reese, Mariposa Co., and most cheerfully give you this testimonial. For further information you are at liberty to refer to,

Yours respectfully,

JAS. H. CROSSMAN, M. E.

409 California street, or Cosmopolitan Hotel.

SAN FRANCISCO, February 10, 1874.

OFFICE SUPERINTENDENT OF KEYSTONE CON. M. CO., AMADOR, AMADOR COUNTY.

MR. J. HENDY—Dear Sir:—In answer to your inquiries as to your Concentrators furnished our company last July, I would say that I am more than pleased with them; and the saving to this company has been over \$3,500 per month more than with the blankets and buddles formerly in use.

O. C. HEWITT, Supt.

OFFICE SUMNER MINE, KERNVILLE, April 27, 1874.

J. HENDY, Esq.—Dear Sir:—Having four of your Concentrators in use at our Mills for four or five months, which for saving Amalgam and for concentrating Sulphurets, are a success, beyond a doubt, I feel it a duty due you and those interested in Quartz Mills, to recommend them.

As further evidence of their worth, I now order TWELVE more of your Machines for our new Mill, now in course of erection.

E. R. BURKE, Superintendent.

For description send for Circular.

JOSHUA HENDY, San Francisco.

Office and Works, 32 Fremont street.

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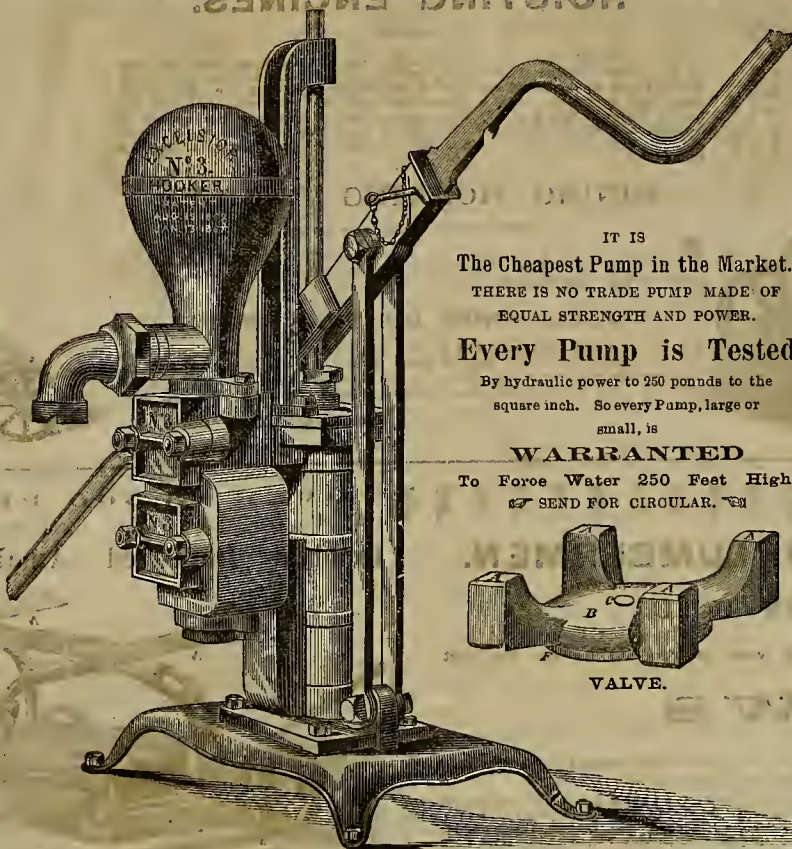
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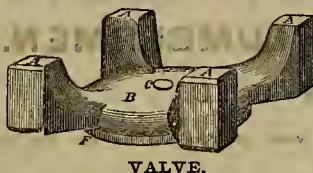
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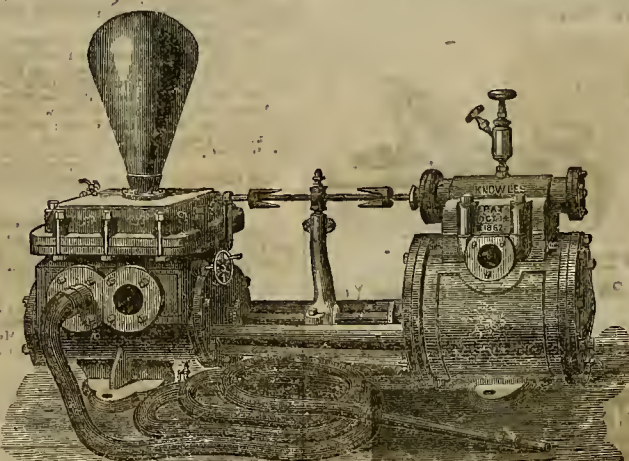
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO., Patent Solicitors. SAN FRANCISCO, SATURDAY, APRIL 10, 1875. VOLUME XXX Number 15.

Details of Operations of Burleigh Drills at New Almaden Mine.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	TOTAL
Day Shift—9 men.																													
Number of holes drilled.....	14	14	9	18	16	13	16	16	18	12	9	8	8	8	9	8	14	17	12	10	13	16	11	8	8	8	8	8	293
Number of holes fired.....	25	19	22	22	28	25	29	14	14	21	18	12	10	9	8	14	12	13	14	16	17	24	8	8	8	8	8	8	407
Number of holes missed.....	20	20	24	22	31	30	33	18	20	21	28	24	1	20	6	3	3	23	30	23	21	24	21	25	4	4	4	4	490
Giant Powder used, pounds.....	8	5	6	5	5	4	5	6	6	8	9	9	13	10	8	9	7	5	8	7	7	7	7	11	5	5	5	5	3
Black Powder used, kegs.....	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	170
Car loads removed.....	22	22	22	22	28	26	28	14	14	14	12	19	12	12	12	12	12	12	12	12	13	15	13	13	13	13	13	13	324
Feet driven.....	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	44
Exploders.....	22	22	22	22	28	26	28	14	14	14	12	19	12	12	12	12	12	12	12	12	13	15	13	13	13	13	13	13	324
Fuse, feet.....	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	337
Night Shift—7 men.																													
Number of holes drilled.....	14	14	13	13	16	14	13	11	18	13	11	13	14	12	12	10	11	10	14	14	10	12	12	14	14	14	14	14	308
Number of holes fired.....	24	20	23	17	18	15	17	18	14	13	12	13	14	13	12	12	9	9	11	11	17	12	12	13	13	13	13	13	349
Number of holes missed.....	24	20	23	17	18	15	17	18	14	13	12	13	14	13	12	12	9	9	11	11	17	12	12	13	13	13	13	13	5
Giant Powder used, pounds.....	8	5	6	5	5	4	5	6	6	8	9	9	13	10	8	9	7	5	8	7	7	7	7	11	5	5	5	5	327
Black Powder used, kegs.....	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8
Car loads removed.....	7	6	8	8	8	8	6	6	10	7	8	9	4	8	10	13	10	9	8	6	10	6	7	10	10	10	10	10	188
Feet driven.....	5	5	5	5	5	5	5	4	4	4	5	7	14	12	12	12	4	4	4	4	4	4	4	4	4	4	4	4	80
Exploders.....	22	22	22	22	28	26	28	14	14	14	12	19	12	12	12	12	12	12	12	12	13	15	13	13	13	13	13	13	108
Fuse, feet.....	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	870
Cords of wood.....	1 1/2	1	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	31 1/2
Oils, gallons.....	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	35

Hydraulic Mining in California.

No. 20.

Loss of Gold and Quicksilver.

It is difficult to arrive at a correct estimate of the loss of gold in hydraulic washings. In mines where coarse gold predominates the loss cannot be so great as where gold in fine particles, commonly called flour-gold, constitutes the principal yield. Hydraulic mines, however, must chiefly depend on the latter gold, which is diffused through the hills and mountain sides.

The loss of quicksilver in the best conducted hydraulic mines is from 12 1/2 to 15 per cent., and the loss of gold, in many cases, can hardly be less. Even if almost all the heavier particles of bright gold are saved, still there is in all mines a proportion of rusty gold, which is not attacked by quicksilver, and is very liable, on account of the reduction of its specific gravity by the adherence of foreign matter, to be carried off in the sluice-stream.

In most cases the tailings of a hydraulic mine become public property, and are, therefore, a total loss to their original owners. How great this loss is may be evidenced by the yield of only a small portion of these tailings under subsequent working.

There can be no doubt whatever that generally too much gravel is washed for the supply of water. We need only to argue from the most primitive mode of gold-washing, namely, the washing with the pan, to gain the strongest proof that by the washing of enormous quantities of gravel in a stream of thick and muddy water, great quantities of the finer particles of gold are lost. To save such gold in a pan requires not only a skillful hand, but a change of water, so as to offer the least resistance to the settling of the particles at the bottom of the pan. Considering, then, how easy it is to carry on certain mechanical operations on a small scale, which are altogether impracticable on a large one, we must conclude that the difficulties of saving the flour-gold in enormous sluices, running rapid streams of thick and muddy water, must be increased, though not, perhaps, in direct proportion to the difference between the quality of material washed. That it is desirable to extract the gold as completely as possible from the gravel-deposits, which, though immense, are nevertheless exhaustible, needs no demonstration; the only means will be a greater supply of water. With an ample supply of water a system of sluices could be introduced which would separate the finer gravel, black sand, etc., from the main stream and carry this finer stuff, with a new supply of pure water, alongside the main sluice. A medium grade of six inches to twelve feet of the main sluices would suffice not only to carry out such a system of separation, but to establish under-currents and drops for finer gravel, even to a greater extent than the present system of sluice-washing permits.

We will suppose that sluice-boxes on a grade of six inches per twelve feet and for a distance of 5,000 feet are established; that, furthermore, the natural fall of the main outlet permits no higher grade.

At the point where main sluices leave the tunnel (the length of which is immaterial), a grating, such as described under the heading of under-currents, is inserted in the bottom, flush with the pavement of the sluices. The bottom of the main sluice, below this grating, which may be from fifteen to eighteen inches in width, forms the bottom of the box which receives the water, fine gravel, etc., falling through the grating. To give fall to this box, a false bottom on a grade of one-half inch per foot is inserted. This box leads into (or is continued in the form of) a smaller sluice box, running alongside the main sluice and on a grade of only four inches per twelve feet.

To facilitate the flow of this strained material, and to make up for the loss of grade, a jet of pure water is injected by a small pipe into the receiving-box below the grating, assisting thus in keeping this box clear and in washing the strained gravel, etc., in a pure stream of water.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner in Mining Statistics.

A nugget of pure gold, weighing eight ounces, was last week discovered in the Granite Tunnel mine, El Dorado county.

Work Done by Burleigh Drills.

We give herewith a detailed account of the results accomplished with the Burleigh drills and air compressors during the month of February at the New Almaden mine, in the tunnel near the "hacienda." The report is made by J. B. Rudol, manager of the mine. The dimensions of the tunnel are seven feet six inches by seven feet six inches, and the rock passed through has been a strata of hard rock of a limestone class, interspersed with thin seams of quartz. The seams cross the tunnel at right angles. The operations for February (24 days) were as follows: Holes drilled four feet deep, 300; average per day, 25.04. Holes forced, 786; average per day, 32.75. Holes missed, 9. Hercules and Giant powder used, total, 818 pounds; average, 34.08; average per foot, 6.59. Black powder, total, 287 pounds; average per day, 12 pounds; average per foot, 2.31. Car loads removed, 358; average per day, 14.91. Cords wood, 31 1/2; average per day, 1.29. Feet driven, 124; average per day, 5.17. Hercules or Giant powder is used for the cut as shown in the diagrams and fired by electricity, driving out the wedge of rock. Side holes are then charged with black powder, which squares the drift.

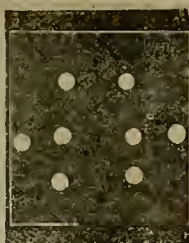
The cost per foot was \$21.90, in which account is included all expenditures, as follows: Labor, including repairs, \$1,418.56; material, including fuel, track, pipe, explosives, etc., \$1,307.89. Total, \$2,726.45. The tabular statement herewith gives the details of daily work for the month. We publish it to show that the account has been systematically kept, and also as a guide to others keeping similar accounts. It should be stated that the day shift each day commences work at 7 A. M., and stops at 5:30 P. M. The night shift goes on at 5:30 P. M., and is off at 5:30 A. M.

Previous to the introduction of these drills the tunnel was run 7x7 in size—by hand labor. Nine men on contract in October made 40 feet at \$23.29 per foot, and the same number of men in November made 33 1/2 feet, at a cost of \$18.49 per foot. Work with the drills on measurement 7 feet 6 inches by 7 feet 6 inches was commenced in January, when 108 feet was made at a cost of \$22.89. It will be seen from this that even at an equal cost the amount of work done by the drills in a given time is more than trebled.

FURTHER EAST.—The new hoisting machinery of the North Consolidated Virginia mine is completed, and everything is in line working condition. The Gold Hill News thinks that the company has shown good judgment in the starting of their shaft to the eastward, on the line of the C & C and Chollar and Savage shafts, it being evident that nearly all the mines on the Comstock will eventually have to shift their hoisting works further to the east.

Blaisdell's Improved Railway Tie.

The invention illustrated herewith is an iron tie, designed as a substitute for the wooden tie originally employed, and also to provide a strong and elastic support for the rails, while constituting a portion of a permanent way.



Face.



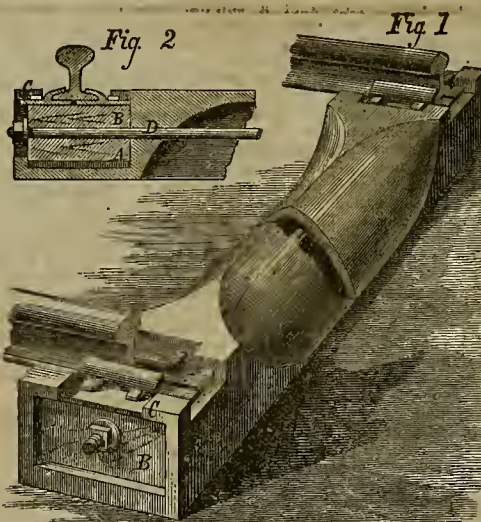
Section.

The peculiar form of the cast iron body of the tie, clearly shown in Fig. 1, is calculated to give strength and stability, and, at the same time, to insure economy of material. At each end are formed rectangular sockets, open at the top and at the outer extremities. The lower parts of said sockets are flanged in order to retain rubber blocks, A, in the sectional view, Fig. 2, above which wooden blocks, B, are laid. On top of each of the last, the rail chair is placed. The chair is made in two parts, so as to be adjusted readily to grasp the rail between the lip and foot plate. Overlapping portions of the body, C, together with the bolts entering the wooden block, securely hold the chairs in position. Passing longitudinally through the entire tie is a truss rod, D, which is set up outside the wooden blocks with nuts and washers. The apertures through which this rod enters the metal part of the tie are made sufficiently large to allow the depression of the blocks when the rubber yields to superincumbent pressure.

It will be seen that the rubber blocks give an elastic support to the track, tending to nullify the results of jarring and compression. The wooden blocks serve a similar purpose, and may be used alone when any great degree of elasticity is not required. The chairs may be adjusted to hold rails having flanges of varying

width; and owing to the firm bearing afforded by the abutting surfaces, they are retained in position with the least possible number of spikes.

The sloping contour given to the surface of the tie enables, it is claimed, the wheels of a train, in event of running off the track, to mount and pass over, the ties, instead of crushing the same, as might otherwise occur. For



IMPROVED RAILWAY TIE.

Further particulars address the inventor, Mr. George D. Blaisdell, Cambridge, Vt.

THE mining fever has spread into Maine. Penobscot county now boasts its silver mine, and is ready to compare ugggets with Newburyport. Ore is said to have been discovered in Dexter, which careful scientific analysis shows will pay out \$360 silver and \$12 gold per ton.

H. J. Booth & Co. are at work on a mill for the California mine, which will be the largest mill on the Comstock, and, consequently, in the world. It will have 70 stamps (10 more than the big Consolidated Virginia mill), 42 pans, and will be run by an engine of 1,200 horse-power.

A FIRE broke out in the San Bruno mine at Mosquito, Calaveras county, March 29th, and to extinguish it the mine was closed, the shaft and all other openings stopped. It had not been opened at last accounts, and the damage is not known.

IMMENSE deposits of coal have recently been discovered in East canyon, of Utah, within five miles of the Utah Western railroad, causing considerable rush and excitement.

CORRESPONDENCE.

The Treatment of Ores of the Precious Metals.

EDITORS PRESS:—The constant efforts made to improve the methods in use for the reduction of ores of the precious metals demonstrates the fact that considerable inconveniences are experienced in the economical treatment of these ores. The careful study of the chemical and physical condition of the metals, and their peculiar behavior under external and adventitious circumstances, may help to explain what appear as discrepancies in many metallurgical operations. The observance of those laws that govern disposing causes, that frequently interfere in chemical reactions, may also lead to the establishment of rational hypothesis. While great caution is necessary in discussions of subjects of difficult solution, yet some latitude may be allowed to the student searching for data to base technical operations. Numerous experiments have been made to determine the relative force of chemical actions of various reagents with a view to solve some of these difficulties, constantly met with by the metallurgist. Slight causes often turn the scale when the opposing forces do not greatly differ. To narrate the result of a long list of inquiries to base the present case upon, would exhaust the patience of the reader; therefore, only such matters will be mentioned that may be of practical value, which this paper is intended to treat.

Concerning the decomposition of antiferrous sulphides by roasting; the question has been asked, if amalgamable gold can be obtained. We answer, no. The so-called desulphurized ore is far short of the theoretical requirements of the law, even when conducted by the most improved methods in use. A smelting heat would be fatal for the purpose of amalgamation. If we examine some of the elements that the metallurgist has to contend with, there may be found some explanation that may lead to the solution of some of the difficulties frequently met with. One of the most insidious of these bodies is that of sulphur; this substance bears great resemblance to that of oxygen in its chemical relations, the basic character of the proto and intermediate oxides and sulphides, and the great attraction existing between that body and most of the metals. The less oxidizable metals frequently hold sulphur with great obstinacy. Long continued roasting reduces the sulphides to a lower condition to a proto salt, which has strongly marked basic qualities. The metals possessing strong attraction for oxygen, an oxide is formed; the complete removal of the whole of the sulphur by the ordinary calcination may be questioned, more particularly in presence of hydrogen vapour. The rationale of the chemical changes induced by treatment of sulphurets by the Statefeldt and Bruckner furnaces has been given; to some the explanation is not wholly satisfactory, yet sufficient evidence is given to show that a double interchange of elements is necessary to effect complete decomposition. The laws of substitution regulating the formation of compounds are of sufficient importance to merit careful consideration. The complex changes brought about by the action of variable quantities of compound bodies often present great difficulty to the student in search of data; he finds it necessary to pause to examine such disposing causes that would otherwise lead to the belief that the order of things was reversed; nor is it surprising when passages are met with in chemical writings to this effect: that oxygen replaces chlorine, hydrogen, bromine, etc., to form oxides; again, chlorine draws out oxygen from metallic oxides to form chlorides, etc. An example is seen in the relative force of chemical attraction existing between hydrogen and iron for that of oxygen. A slight alteration of temperature is sufficient to cause a change of state. The more negative metals, even in excess, similar effects take place. The application of a solution of hydrochloric acid to the photographic image offers an example. Further, here is a multitude of curious phenomena and indirect actions connected, to be considered before satisfactory formulae can be arrived at. These slight allusions to important chemical changes as they occur in the treatment of ores of the precious metals, it is hoped, will prepare the way to render that process intelligible.

This new method is dependent on the fact that the incandescent sulphuret particle, if placed in an equivalent of glowing atmospheric oxygen, decomposition will immediately ensue. The resulting bases are acted upon in a manner which is determined by their respected attractions for the elements employed.

Ores containing sufficient sulphur for heap roasting may be stacked and roasted in the open air. Sulphur will be expelled, together with arsenic and volatile bases, and an intermediate sulphide produced. This is a cheap method which greatly aids the subsequent fine grinding. Ores containing less sulphur, unfitting them for this treatment, should be finely ground and heated to redness in a reverberatory furnace of especial construction, that consists of several hearths, placed one directly above the other; also inclined or zig-zag and communicating air chambers or pipes are made to traverse through the interior, then proceeding to a coil or pipes heated to redness by a separate furnace, and so arranged that it can

be detached when necessary. This hot chamber receives air from the blast, which, circulating through the heated pipes, attains a high temperature, this being brought to the vicinity of the bridge of the reverberatory. The ore is fed from the top; it soon attains some degree of heat, and is then pushed to the second floor, and so on until it arrives at the lowermost, in a state highly incandescent, and falls into a hopper near the bridge. This is supplied with a feeding apparatus which allows the ore to fall gradually on the current of glowing air, that carries it immediately into a chamber a few feet high, striking against the upper end or hood. It is deposited in the outer chamber. Thus it will be seen that a complete decomposition of the sulphuret particle is dependent, not on the time of contact with atmospheric oxygen, but the necessary equivalent for that purpose. It is always well to have an excess, which guards against any tendency to cinder.

The end of this last chamber communicates with a dust condenser. This, too, has some important features which must be described: This condenser consists of a cylindrical or other form vessel, with a sieve at one end, and of sufficient dimensions to hold a quantity of irregular shaped pieces of metal scraps, waste tin, or even stoke or coke that will allow gas or water to pass through it. This vessel is charged with these materials and placed in a tank with an inclined bottom, and the whole put under a chimney or in communication with it. A fine spray is allowed to play upon the top of these pieces of metal. The draught from the chimney draws the dust and permanent gases up from the bottom, sufficient space being allowed between the cylindrical vessel and the tank for the purpose. The large surface of wet material, constantly irrigated, rapidly condenses the dust, which is carried by the current to the tank, and is discharged outside and collected, if necessary, while the gases pass up the flue. This simple condenser occupies but little room, and giving place to more costly condensing chambers, and may receive the appellation of the "dust trap."

The red hot decomposed ore deposited in the above chamber enters a feeding hopper and falls on a current of chlorine generated from a retort outside, that keeps a small chamber charged with that gas. A small aperture will keep up circulation, and will regulate the pressure. The addition of a little nitrate of potassa to form hyponitric acid will greatly aid the chemical action. With ores containing less sulphur or base material this method is highly advantageous. Silt may be employed in the hopper instead of the gas, and some advantage may be obtained by using, in conjunction, the hyponitric acid.

It is necessary to take a retrospective glance of the chemical changes induced by this method of treatment of the sulphides. By roasting in heaps in the open air a lower sulphide is formed, analogous probably to the black oxide, and containing qualities of a sulphur base. This is in contact with atmospheric oxygen in excess, and incandescent ignition immediately takes place, with the formation of sulphurous and sulphuric acids, and oxides of the more oxidizable metals and bases. Those possessing less attraction for oxygen form a sulphur base. There are a number of complex changes brought about by disposing causes. Their nature and action will be omitted, as they do not greatly interfere in practical operations; yet mention must be made of one of the most potent, namely, heat. This determines chemical action with great avidity. This is seen when an equivalent of atmospheric oxygen and sulphur are brought in contact with the sulphuret particles and blast, while an excess of the latter prevents any tendency to scarification by acting on the metal and bases. Ores containing zinc, lead and copper, readily yield in smelting by employing the appropriate fluxes. Simple roasting amalgamable gold is not obtained, no doubt from the condensation of sulphuretted hydrogen on its surface, generated by the decomposition of the metallic sulphides. The contact of chlorine or the hyponitric acid used as suggested is sufficient to remove this evil. It owes its existence to the decomposition of water, the hydrogen combining with the sulphur and oxygen with the metals. The second treatment or chlorination has some advantages; the ores are acted upon in a manner which is determined by their respective attraction for oxygen and chlorine; giving rise to a method employing approximate equivalents of chemical bodies used in their reduction.

Something might be said here regarding the subsequent treatment and reduction of the chlorinated silver ores, but will be deferred for a future opportunity. J. TUNBANOX.
Nevada City, Cal.

Capital Wanted in Utah.

EDITORS PRESS:—Well knowing and fully appreciating the untiring energy and enterprise of Californians, I would call their attention to the consideration of two opportunities for the investment of capital in this vicinity, which it would seem are first-class in all respects. The first and most urgent want for successful smelting in Utah, is the procuring of fuel at a reasonably low price. All the coke used here is obtained at St. Louis or beyond, at the enormous cost of \$35 per ton, delivered in Salt Lake City. The draft on our smelters for this item in the past year was something near one million dollars, and making the cost of smelting approximate closely to \$25 per ton. In West Mountain mining district, of which Bing-

ham is the center, we have a vast amount of argentiferous galena, of too low grade to be worked at so high cost and return a satisfactory profit. And there is no necessity for this state of things continuing. There is an abundance of coal within a short distance, shown by analysis to be adapted to cooking as well as that from which we are procuring our supply. Henry S. Pool, F. R. S., to whom specimens of San Pete coal were sent for analysis, reports:

Volatile matter and ash.....35.50
Coke.....64.50
By Fred. Clusdet, of London, England:

Coke.....62.10
Ash.....10.64
Volatile matter.....27.36
With scarcely a trace of sulphur. Analysis in New York and Philadelphia equally favorable. The Southern Utah railroad is completed to within forty-five or forty-six miles of the mines that are opened, and the road is being extended; yet there are known to be undeveloped mines much nearer the route.

Here is a chance for the profitable employment of capital that ought not to go begging. The business is capable of an indefinite expansion, the twenty-five or thirty smelters already in operation, with the certainty of great increase of the number, would give a surance of success to a large investment. A reduction of only twenty-five or thirty per cent. in the cost of coke would enhance the output of ore in this and the adjoining districts to at least double the present quantity in a year. The facilities are first-class in the San Pete region for the purpose under consideration. A feeble attempt was made in this direction last year, but whether relinquished or not we are not informed.

Equally certain of successful returns would be investment in concentration works, situated at intermediate points between the mines and the great number of smelters in Salt Lake valley. Two or three failures have been made, or if not failures, only partial successes, have been made in that line. No reason can be assigned why there is any peculiar difficulty in concentrating our ores, and we must look for the cause of the failure to defective manipulation.

This business also would be susceptible of enlargement to an unlimited extent, and would be second to none in importance as a paying investment. It should be mentioned in this connection that concentrating works on a huge scale were erected near Salt Lake City two years ago, that would have been of infinite benefit to the country as well as profitable to the owners, but by an unaccountable blunder the location was so ill-advised as to defeat the entire purpose. WILLIAM TEAL.

Biogham, Utah, March 27.

Yosemite.

Cost of Travel and Roads to Yosemite and the Big Trees.

The time for tourist travel to the above named places will probably soon commence, and some idea of the cost of the trip and the routes and distances will be interesting. Perhaps no one knows any more on this subject than Mr. J. M. Hutchings, of Yosemite Valley; fame, and he writes as follows to the *Bulletin*: "There are now two excellent wagon roads completed to the Yosemite, so that persons can ride in a carriage to the hotel doors, if they so elect. One is via Big Oak Flat, and the other via Coulterville. Another, between Clark and Moore's (now known as the Big Tree station) and the Valley, is in course of construction, and will probably be completed to the 'Hermitage' early this season.

Routes, Distances, Etc.,

Will indicate the starting point and general course to be taken.

First—Via Stockton and Big Oak Flat to Yosemite:

San Francisco to Stockton, by rail..... 91 miles
Stockton to Milton, also by rail..... 28 "
Milton to Chinese Camp, by coach..... 28 "
Chinese Camp to Hotels in the Valley..... 69 "

Total, (by rail 119 miles, coach 88 miles),.....207 "

This route lies directly through the Tuolumne Grove of Big Trees.

Second—Via the Calaveras Grove of Big Trees to Yosemite:

San Francisco to Stockton and Milton, by rail, 119 miles
Milton to Murphy's Camp, by coach..... 30 "
Murphy's Camp to Big Tree Grove, 15, and back 15, by coach..... 30 "
Murphy's Camp to Sonora, by coach..... 14 "
Sonora to Chinese Camp, by coach..... 14 "
Chinese Camp to Hotels in Valley..... 60 "

Total, (by rail 119, coach 145 miles).....264 "

This route is through a portion of the mining districts, and a very picturesque country, and, like the former, embracing the Tuolumne Grove of Big Trees.

Third—Via Merced and Coulterville to Yosemite:

San Francisco to Lathrop, by rail..... 82 miles
Lathrop to Merced, also by rail..... 67 "
Merced to Coulterville, by coach..... 43 "
Coulterville to Hotels in the Valley..... 43 "

Total, (by rail 139, coach 96).....235 "

The Merced Grove of Big Trees is directly on this route.

Fourth—Via Merced and Mariposa to Yosemite:

San Francisco to Lathrop and Merced, by rail, 139 miles
Merced to Mariposa (mail route), by coach..... 46 "
Mariposa to Big Tree Station, by coach..... 26 "
Station to Big Trees and back, horseback..... 12 "
Big Tree Station to Hotels in the Valley, by coach and on horseback..... 27 "

Total, (by rail 139, coach and horse 111 miles) 260 "

There is an excellent trail constructed down the wild canon of the Merced river, and which, being generally below the snow line, opens the great valley to the tourist in winter, and prevents the "snow blockade" of former years. This route would be by Mariposa and Hitt's cove; or by Coulterville and Brewar cove to the valley, and gives about thirty miles of horseback riding.

Admonitory Suggestions.

The following, the result of experience, if kindly taken, will be found valuable:

Go in by one route and out by another. The reasons for this will be obvious to every one.

Avoid "round trip tickets," for if they save a trifle (and there is really little if anything saved) they often put you to trouble that is not trifling. And it frequently happens that you meet friends in the valley whom you would like to journey with, but who may be going one way while your ticket takes you another. When private teams are preferred to stages, have your agreement in writing and clearly expressed. Of course, take this with you.

Select genial companions, leaving all "growlers" at home, as one such will destroy the comfort of a whole party.

Do not hurry, especially when going. Any one whose time is limited should go alone, or with others similarly situated.

Eschew large trunks (unless you are intending a long visit) and all needless articles. Take inexpensive yet comfortable clothing, including one change of underclothing (there are laundries there,) strong boots, not necessarily heavy, well broken to the feet before starting. Ladies should carry an extra pair. They should also provide themselves with one short dress—a neat Bloomer would be found the best.

Add twenty-five per cent. to your carefully considered estimate of the expenses of the trip.

Be and keep jolly, taken even any little mishap good-naturedly.

Take the best, and make the best, of everything.

If any man tells you, "I am the only authorized agent for the sale of tickets; the route I represent is the only one," don't you believe him—in anything.

Probable Expenses of the Trip.

Fare from San Francisco and back, say, about.....\$60
Board, \$3.50 per day, by the week..... 20
Horse hire, guides, tolls, etc., about..... 20

Total.....\$100

Horse hire in the valley is generally about \$2.50 per day. Guide, which includes his horse, wag-s and board, \$5 per day to the party. To insure careful attention and safety on mountain trails, large parties should have one guide for every five or six persons.

As several excellent horse trails have been made by private persons to picturesque points that were formerly inaccessible on horseback, tolls are charged as follows:

To Glacier Point.....\$1 00
To Nevada Fall (Snow's)..... 75
Nevada Falls to Glacier Point..... 75
Foot of the Upper Yosemite Fall..... 50

Total Tolls in and around Valley.....\$3 00

There is also a charge of \$1.50 each person on both of the new roads opened last season; but this toll is included in the fare charged. The information is for those only who drive in their own private teams.

Lastly, stages will commence running early in April. Private teams at any time desired. Ed. Harrison, 140 Montgomery street, is agent for the direct route via Chinese Camp, also for that via Calaveras Big Trees. Thos. Houseworth, No. 9 Montgomery street, Lick house, is agent for the McClellan & Co. stage via Merced and Coulterville. S. Miller, No. 3 New Montgomery street, under Grand hotel, is agent for the route via Mariposa and the W. Shuburne, Chapman & Co. stages via Coulterville. Private teams can be had of Doak & Dunning and Captain Johnson of Stockton, and of M. McClellan and Washburne, Chapman & Co., Merced. Each of these will have their agents—all duly authorized, I presume—in this city.

NEW PROCESS FOR WORKING GOLD ORES.

"We do not know anything officially," says the *Grass Valley Union*, "about a new process of working gold bearing quartz, which has recently been put in operation in this county. We only know that works have been established, and are in operation, between this place and Nevada City, which will treat ores in a new way. The works are located near Glenbrook race-course, half way between this place and Nevada City, and have been in operation some three or four weeks. It is said the process there used will work quartz in lumps, without crushing and without concentrating sulphurets, in the simplest manner. Not a color of gold escapes the new process. The lumps of quartz put into the works are dissolved, so to speak, in a few moments, and all the gold and other metals are extracted and returned, less cost of working, to the man who carries quartz to that place. And the cost of working, it is said, is much less than by mill process. This we give as a rumor, and we do not know that the rumor is correct. If the new process is all that rumor says it is, then the millenium has about arrived. At all events, the new operators are paying their own way and are asking no one to put up a cent for them. We noticed, yesterday, several sacks of quartz going up to be turned into gold. It may be, in the course of time, that we can catch a definite idea about the new manner in which quartz here is to be hereafter worked by this new process.

MECHANICAL

PROGRESS.

Big Guns and What They Will Do.

The London Standard has an article about big guns, which gives some startling facts. It says: "England is now building a ship to carry twenty-four inches of armor, and she is making a gun which will be eighty-one tons in weight. Unquestionably, the ship is splendidly designed. So also is the gun, which we are to have ready some time about next July, and which will doubtless turn out to be a wonderful weapon. Artillerists speak of the coming monster as 'an awful gun.' Crowds assemble at the forge whenever one of the huge coils is to be pummeled by the new steam hammer at Woolwich arsenal. Even in the making of this 33-ton gun, masses of iron weighing twenty-eight tons, at a welding heat, have to be laid under the hammer. For the larger gun, an incalculable mass of forty tons has to be fetched out of the fire and duly hammered. The furnace has the capacity of a cottage, and the tongs by which the glowing cylinder is lifted out of its burning bed, weigh no less than thirty tons. A steam crane bears the whole weight of tongs and coil, and everything proceeds without accident or hitch of any kind. At night the sight is truly grand, and well repays those spectators who take the trouble to be present.

"This great gun, which is being constructed at Woolwich arsenal, has a bore of sixteen inches diameter, and twenty-four feet in length. It will fire a ball weighing one hundred and sixty-six pounds, propelled by three hundred pounds of powder, the range being over six miles." But the Standard says this is not all that can be done, and after speaking of the practicability of a twenty-inch bore, it asks: "Why should we stop short of that which might be gained at some period or other? Let us contemplate the further step at once. Why not have a gun with a bore of twenty-four inches—simply two feet. The weight would be two hundred and seventy-five tons, the charge of powder would be one thousand pounds, the weight of the projectile nearly two tons and a half, and the range eight or nine miles! This is not a mere dream, but a perfectly practicable piece of work. The cost would probably be a trifle less than \$500 per ton, or about \$125,000 for the entire piece. In weight of projectile, such a gun would probably be something more than a 5000-pounder. Perhaps, when we had made such a gun, we might think we had gone far enough. As for the armor, the projectile of the 275-ton gun would penetrate three feet of iron, with corresponding backing. The length of its bore would be thirty-six feet. That of the 'Woolwich Infant,' of thirty-five tons, is thirteen and a half feet, the bore of the thirty-eight ton gun being three feet longer. The eighty-one ton gun, as already stated, will have a bore of twenty-four feet. The 'Woolwich Infant' has a maximum external diameter of rather less than five feet. The eighty-one ton gun will measure in this respect six feet. But the two hundred and seventy-five ton gun would measure nine feet. Such would be its full height if lying flat on the ground. A tall man would come a yard short of the top of the gun, the latter simply lying on the bare earth without a carriage." The Standard intimates that this will be the most popular gun ever to be used.

Plumbago—Preservation of Iron.

In these days of general diffusion of chemical knowledge, it is scarcely necessary to state that the "black lead" or "plumbago" of commerce, is not lead at all, or any compound of its composition. Neither is it a carburet of lead, and it includes no lead whatever in iron, as is sometimes stated. It is simply carbon. Pure plumbago is pure carbon, impure plumbago is impure carbon. Its proper name is graphite, that is, writing stone. We may venture to describe it as the softest of all true solids, and have often pondered wonderingly upon the apparently unnoticed, but very curious chemico-mechanical paradox that the hardest and softest of all the solids existing upon the earth are, chemically speaking, the same substance, graphite and the diamond being both carbon.

It is this wonderful softness, combined with persistent solidity, that enables us to smear it over any other solid surface, and thus obtain a solid paint, all body and no medium. For the uses of casting, to which it is commonly applied where its application can be readily repeated and where it is not exposed to the direct action of water, it is unrivalled as a protecting film for iron. Its chemical action, so far as it does act when cold, is reducing or anti-oxidizing. Its color and tone are so familiar to iron that Mr. Ruskin himself could scarcely make any aesthetic objection to its use, and the film is so marvelously thin that it obliterates nothing. There does not appear to have ever been any attempt to estimate the thickness of a well-brushed film of graphite, but it would seem that if a hundred strata of such films could be piled in contact with each other, their combined thickness would fall short of that of the thinnest oil leaf.

Graphite or plumbago is also extensively used for the lubrication of machinery, and for crucibles, being entirely incombustible through being pure carbon. It is, when pure, a true metallic carbon, and the iron of four to twelve per cent. that it contains is purely a mechanical combination.

A New Plan for Heating Dwellings.

SCIENTIFIC

PROGRESS.

Is the Earth Approaching the Sun?

Heating by hot air or steam is a wasteful use of fuel. It is poor economy to heat air or water and rely upon the cooling of those elements for our supply of warmth. We overlook the fact that heat will travel quite as well alone as in company.

Radiant heat, says the *Scientific American*, the sort required for perfect heating, obeys the same laws as light. By proper arrangement of reflectors and lenses, heat radiations can be massed into beams of parallel rays, and sent where we will, with little or no wasting. It is not until the radiations are arrested that they become manifest as heat; a fact put to practical use two thousand years ago, when Archimedes burnt the fleet off Syracuse with mirrors. A stream of heat vibrations, intense enough to fuse gold, would pass through a stream of ice without effecting it, provided the air in the tube be sufficiently pure and dry. There appears to be no good reason, therefore, why we should not warm our houses by the direct distribution of pure heat, and so gain all the benefits of an open fire in each room, with none of its disadvantages.

Briefly described, the plan would involve a central furnace; a system of tubes leading to the different rooms terminated by radiators in each room; a system of reflectors to throw the heat of the furnace into the conducting tubes in parallel rays, with other reflectors of the bends and angles of the tubes to direct the course of the radiations properly. The radiators in the rooms might be placed so that every portion would be flooded with light, yet no part be heated beyond what would be enjoyable. As nothing would enter the room from the furnace save pure heat, the effect would be like that of a room warmed by direct sunshine. The surplus heat of the furnace might be utilized in warming an abundant supply of fresh air let in from outside doors; a steady circulation being kept up, from the ventilating chamber through the rooms, by the draft of the furnace. We should have then (theoretically) perfect heating combined with perfect ventilation, and at the same time the most economical combustion of our fuel.

Possibly there may be mechanical difficulties to prevent the successful carrying out of a plan of house heating of this sort. We do not anticipate any, and the advantages it promises, on the score of health, comfort and economy, certainly justify its trial by any one possessing the requisite means. The plan could be easily tested in the laboratory of any institution having a few lenses and reflectors. These suggestions might afford a good opportunity for inventors to exercise their ingenuity.

Photographic Parasols and Wearing Apparel.

We have already alluded to the use of the photographic art for the ornamentation of parasols. A late number of the *Photographic News* contains an article upon the same subject in allusion to its more extended application. The same process, says that journal, is now being further employed for printing handkerchiefs and shirts; and we were fortunate in seeing the other day some examples of what can be done in this delicate fancy printing process. Some handkerchiefs shown us had at the corner two or three butterflies most charmingly impressed, the images having evidently been taken direct from the insects themselves. Other fabrics bore sketches, evidently reproductions from woodcuts and engravings, obtained and printed by a photo-mechanical process, all of them being of a most delicate nature, such as could hardly be secured from blocks or lithographic stones. Photographic portraits of various kinds were also to be seen impressed upon fabrics in the same way; but these, perhaps, can scarcely be called novelties, neither was the result so successful as in the case of the other objects we have mentioned. The prints were undoubtedly all produced by fatty ink, and, would, no doubt, be very permanently printed upon the fabric. This method is much simpler and more satisfactory than printing in the ordinary way by silversalts; for very great care has to be exercised in the latter case, and failures are far from infrequent, the dressing in the fabric being most difficult to remove and apt to discolor the silver print. Moreover, there are the troublesome operations of salting and albumenizing, and flattening the stuff, which is by no means an easy proceeding, any more than the examination of the print in the pressure frame. This photo-mechanical printing upon fabrics is certainly an art to be cultivated.

THE BAXTER CANAL STEAM-BOAT.—Experts and the public are becoming more and more convinced of the eminent practicability of the Baxter canal steamer. It has been determined to put on a daily line of these boats to go through from Buffalo to New York. These boats will have twice the speed of carriage by horse boat, and each steamer will carry the tonnage of a full railway freight train, and will deliver in quick time, say three or four days at most, in New York.

A NEW BELTING MATERIAL.—In engineering shops in Germany a new kind of belting is being adopted. It is made from hair, presumably that of the alpaca, and is delivered by the makers in a single piece without seam. It has a coating which consists principally of minium. It is spoken of as most satisfactory, and as being more durable than either gutta-percha or leather.

Gases Evolved by Molten Iron.

SCIENTIFIC

PROGRESS.

The Universal Diffusion of Heat the End of All Energy.

The author considers that gases evolved from molten iron come from three sources. 1. They were dissolved by the iron while melting in the furnace. 2. They were dissolved by contact of the molten iron with the air. 3. They were dissolved by contact of the molten metal with the mould.

1. The evolution of gas from gray iron is small; the gas consists chiefly of hydrocarbons or carbon iron oxide. From white iron more gas is evolved, together with little particles of iron, which are oxidized in the air. Spiegeleisen evolves a peculiar white fuming gas, which contains silica, and is probably silicon fluoride.

The author thinks that the poorer an iron is in combined carbon, the more readily does it absorb gases containing carbon, while the richer it is in carbon the more readily does it dissolve gases containing hydrogen. The primary cause of the evolution of those gases which have been dissolved in the furnace he traces to the diminished pressure under which the iron exists, as compared with the pressure in the furnace.

2. By the action of the air, the surface of the molten iron becomes oxidized. In iron containing much carbon the oxygen is transferred from the air by means of the metallic surface to the carbon, which it oxidizes to carbon monoxide, which again bubbles up through the molten mass; hence it is in such irons that we find the greatest amount of blisters on the surface after cooling. White irons show fewer of these, and spiegeleisen solidifies with a smooth surface.

3. As the mould into which the molten iron is run always contains water, this water is vaporized by contact with the liquid iron, the steam thus generated is partly given off as gas, and partly decomposed, hydrogen being evolved and iron oxide being formed. Again, if the iron contains sulphur, this, by reacting on the steam, will form sulphuretted hydrogen, which is often formed in the cooled iron.—*A. Ledebur, Chem. Central, 1873.*

The Universal Diffusion of Heat the End of All Energy.

Professor Belfour Stewart recently delivered a very interesting lecture in Manchester, England, on the "Energies of Light and Heat." The lecturer explained the two great laws of thermodynamics, one of which, determining the quantity of mechanical energy necessary to produce one degree of heat, had been discovered by the eminent Mr. Joule, and the other, being the law according to which heat might be converted into work, the establishment of which law was greatly due to the labors of Sir William Thomson.

This latter law showed that no work could be obtained out of heat unless we had a fall of heat from a higher to a lower degree, just as we could get no work out of water unless it fell from a higher to a lower level. Upon this principle the uses of the boiler and condenser in a steam engine were explained, and in the work done by the globe, it was shown that the heat passed down a great boiler in the shape of the equator to condensers in the shape of the poles. Our winds were due to the passing, in obedience to this principle, of the heat from the equator to the poles. While all work, as in the boring of a cannon or in friction, could be changed into heat, all heat could not be changed into work. According to this principle of the universe, the universal diffusion of heat would ultimately be the fate of all energy.

While the principle of the conservation of energy was quite true, there was also another principle equally true called the dissipation of energy. That was, as it were, the great communist of the world. It tended to distribute itself equally in such a way that no work could be got out of it, and would ultimately bring the visible universe to an end, at least, so far as available energy was concerned. Heat denoted two kinds of energy, namely, absorbed heat and radiant light and heat. Hot bodies parted with their heat to cold bodies by three processes—conduction, convection and radiation.

COMBUSTION.—The heat produced in "slaking" lime is due to the intensity of the chemical action. It is in reality combustion. The lime has a strong affinity for water, and unites with it to form a hydrate. Chemical combination is regularly attended with the evolution of heat. This is illustrated in our ordinary methods of obtaining heat by the burning of fuel, which is simply a process of oxidation. If a piece of iron is ignited in a jar of oxygen gas, it burns quickly with a great heat. If the same piece of iron is allowed to rust away in the air, it is none the less burned, though slowly; and the whole amount of heat produced is precisely the same as in its quick combustion in oxygen gas.

DARWINISM.—There is one objection to Darwinism, says a late writer, to which little, if any, attention has been given: For example, the nearest creatures to man in form are not the nearest in intellect. The elephant, and dog and horse, which have no affinity to man have a far closer intellectual affinity than those pets of Darwinism, the gorilla and chimpanzee. Again, men is omnivorous—the stronger races of men, from the Greeks before Troy to the English of to-day, are primarily carnivorous. But no monkeys are carnivorous. If a man is to be developed from a lower creature, he is nearer to the monkey in form, but to his faithful friend the dog in mind.

deap mining in that district will pay. Rock which will pay \$180 per ton, and such as two men can take out at the rate of not less than one-half ton per day, is pretty good.

LONE STAR.—Ore from this mine is now being reduced at Carleton's mill. The immense body of good ore now opened, renders this the king mine of the district.

MADRA.—Henry & Son have a portion of their milling machinery running on rock taken from the mine—good ore too—while the balance of the reducing works are devoted to onstom services.

JOSEPHINE.—Operations are industriously prosecuted, and a good mine developing. Goldson and Herbert are taking out ore above the bottom of the shaft, and as soon as finished they will commence sinking. At the lowest depth attained, the ore "horas" an ounce to the osrgo.

EL DORADO.

FINE NOOCT.—*Mountain Democrat*, (Placerville), April 3: At the Granite Tunnel claim, Smith's Flat, Messrs. Partridge, Lucas & Co. last week took out a very handsome nugget of pure gold which weighs a fraction over eight ounces and may be seen in the show-window at the jewelry store of F. F. Barss. This oldsiu is being worked very systematically, and ever since it fell under the present management has been paying handsomely, the yield frequently including handsome specimens of coarse gold, though we believe the nugget above referred to is the largest they have yet obtained.

CINNABAR.—H. T. Turnbull was in town one day last week, having with him some very fine specimens of cinnabar which he reports to have been taken from the claim in which he is interested, located a few miles from Shingle Springs. These are not merely "tracings," they are the genuine article, and yield as high a percentage of quicksilver as any of the celebrated Napa discoveries. We also received, but have somehow mislaid, a communication from a correspondent located further toward the Amador claim than the location in which Mr. Turnbull is interested. This correspondent reported a four to six inch seam of very rich cinnabar, and very encouraging prospects for a valuable discovery. He also sent and criticized a notice from the *Amador Ledger*, in which, because of its name, the best development of cinnabar in that vicinity is claimed as in Amador county, while in fact it is considerably this side of the line between the two counties. All reports from that region count in sanguine confidence that a rich quicksilver district is in course of development.

FRESNO.

DISCOVERIES.—*Mariposa Gazette*, April 3: For some time past we have heard rumors of the discovery of a vein of gold-bearing quartz in Fresno county, near the boundary line of Mariposa county, some two or three miles below Crook's ranch, and near what is known as Indian Peak. The discoverers of this hoanza are J. Floyd Dodds, John Bye, Thomas Collins and James Lewis—most of whom were former residents of Mariposa county. They made the discovery some time in December last, since which time a shaft 6x8 feet has been sunk on one side of the vein to a depth of 30 ft. The vein is about 35 ft in width. The rock taken out was worked in an erastra, and yielded from \$275 to \$515 per ton. After about three months work, our informant says, the owners passed through Merced, on route for San Francisco, with the product of their labor, it being forty pounds and ten ounces of gold. It is said the parties have been offered from \$40,000 to \$100,000 for their mine.

INYO.

PANAMINT ITEMS.—*Inyo Independent*, April 3: We are indebted to Judge J. M. Murphy, Mining Recorder of Panamint, for the following interesting items:

There is a great excitement in Panamint over the discovery of an immense lode, called the Juno, of free milling ore, four miles south of Panamint city. The ledge is 40 feet wide, and from 40 assays made, the lowest went \$40 and the highest \$420. The fortunate discoverers are James A. Parker, James Bruce, C. D. Gill and Mr. Stinberger. It is at the Happy valley side of the mountain. The owners would not dispose of their interest for less than \$200,000.

The Stewart's Wonder mine, at a depth of 250 ft, struck an immense body of ore, the richest yet found in any of the company's mines.

The Jacobs mill is working successfully at concentrating. It is said that the tailings from ore running to \$150 will not assay more than \$6 per ton. This success in reducing ore insures a most prosperous future for the camp, for there is no lack of the ores, refractory as they may be.

The 20-stamp mill is rapidly approaching completion. An order arrived at Panamint, from the company, for the erection of a Stetefeldt furnace.

The tramway to the Wyoming mine is under way, and 50 more men were placed on the line to complete it as soon as possible.

Panamint is recovering from dull times, and inside of six weeks the Surprise V. M. & W. Co. will have in their employ not less than 500 men.

J. J. Dolan has been working the Jessie May lode, and now it takes rank with the Wyoming. Gen. Evans has a ruck 7 ft of ore in the Ocean Queen mine, and is about permanently locating in this country.

KERN.

DISCOVERY.—*Kern county Courier*, April 3:

We hear of an important mining discovery that has recently been made a few miles north of Kernville. For more than twelve years past prospectors have been in the habit of finding rich gold and silver-bearing float rock on an extensive flat near an affluent of Kern river, called Bull Run, but without meeting with success in their efforts to trace it up. This piece of good luck was reserved for John Dunn and Albert Bunnell. The ledge averages 15 ft in thickness, and has been traced upward of two miles. The specimen shown us is rich in free gold and chlorides and sulphurets of silver. Seven claims of 1500 ft each, besides those of the discoverers, have been located. It is in the same mineral belt—an upheaval of the primitive strata and igneous rocks—to which the Sumner mine, of Kernville, belongs, and that has been traced north and south nearly a hundred miles. The lead is called the "Albanel." An assay of the ore, made at Kernville, shows \$225.90 in gold, and \$143.35 in silver, or a total of \$369.25 to the ton.

NEVADA.

PITTSBURG MINE.—*Gross Valley Union*, April 1: The Pittsburgh mine, in the Deadman's Flat neighborhood, is sending out splendid ore from the shaft. The ledge is now from two and one-half to three feet in thickness, and shows well in metal, plenty of free gold being in the metal. The new hoisting and pumping works give entire satisfaction. The main shaft is now being put down in the direction of China.

EMPIRE MINE.—Yesterday two fine looking gold bricks were brought in from the Empire mine. They were the fres gold products, excluding sulphurets, of a four weeks' run. The two bars aggregated in value the sum of about \$22,000. This is very good for the oldest working mine in the district. We can remember that on several occasions the Empire managers, when things looked a little blue n' der ground, started in to pull up the pumps and to close down the mine. That was not done, however, and the Empire is now looking better than she ever did before in all her history.

DARTMOUTH MINE.—*Grass Valley Union*, April 4: We think that the Dartmouth mine, on the east part of the Alta hill, is doing pretty well; we can say excellently well. Yesterday a pan of dirt, from the north drift of the mine, was washed out by Captain Miller, the Superintendent. The dirt was not selected, although it was well known that the dirt in that part of the drift is very rich. The pan of gravel yielded the sum of \$25.25 in the prettiest washed gold we have seen since the days of the famous Alta company No. 2. The Dartmouth is doing well.

SIERRA.

STROCK GRAVEL.—*Mountain Messenger* (Downieville), April 3: Word comes to us that the South Fork company, at Forest City, have struck gravel that prospects, in their tunnel. The company raised a shaft about fifteen feet in their tunnel, strock gravel, and found the bed rock pitching. They will now run the tunnel ahead to strike the bottom of this lead. There was considerable excitement over the strike.

SONOMA.

QUICKSILVER ITEMS.—*Russian River Flag*, April 1: The Calistoga silver mine mill resumed work last Monday, with a full force of men.

The Sonoma furnace was lately fired up, and is now roasting good ore. The mine looks well. The Socrates has 23 men at work, and is getting out fifty tons of ore per day. The mine is in fine condition. A small bunch of retorts for testing ore is in operation. Geo. Maylone is superintendent.

T. B. Sleeper informs us that the New York, a mile and a half south-east of Pine Flat, is now being worked by four men. The main tunnel was in, last Friday, 240 feet. From the pitch of the ledge it is believed that the tunnel must run 60 feet further to reach the ore body. Fifteen tons of high grade ore have been taken from a face cut.

We believe the following to be a correct list of all the furnaces in this county:

Name of Company.	Pattern of Furnace.
Rattlesnake	Lockhardt
Scorpion	Lockhardt
Annie Belcher	Knox & Osborn
Geyser	Knox & Osborn
Ida Clayton and Yellow Jacket	Knox & Osborn
Excelsior	Winterburn
Livermore	—
Cloverdale	—
St. Jackson	Almaden

The Missouri & Oakland have retorts. In Lake county the Redington has Knox & Osborn furnaces; the Great Western, a Green and a Lockhardt; the Sulphur Banks, a Lockhardt and a Knox & Osborn.

The Live Oak mine, near Cloverdale, is working seven men (night and day shifts); the lower tunnel has advanced 370 feet, the last fifteen feet in ledge matter. The Ray tunnel is 205 feet long, with side drifts and a shaft.

TRINITY.

PROSPECTS IMPROVING.—*Trinity Journal*, April 3. Later developments in the Mountain Laurel cinnabar mine, on Canon creek, are favorable and indicate the existence of a large body of ore in that neighborhood. By way of experiment, 16 ounces of ore from the Mountain Laurel tunnel was reduced in a common gold retort and produced over 5½ ounces of quicksilver—about 35 per cent.

WILL BE WORKED.—Flowers & Lang will reopen and work the Wilt mine on Canon Creek. Although this claim did not pay last season, it is thought to contain some good ground.

CINNABAR.—Hawlett & Lytle are still getting out good ore in the Altona mine. The retorts will be fired up and the manufacture of quicksilver begin next week. The ore will be assorted at the mine and the best shipped to the retorts. A ditch is being dug from Crow creek to the Altona, the water to be used in concentrating the low grade ore. Several new cabins are being erected at the mines, and lively times are expected during the Summer.

TUOLUMNE.

CINNABAR.—*Tuolumne Independent*, April 3. Some little excitement has prevailed the past week in consequence of cinnabar ore being found on the east side of Tuolumne river, about a mile west of Madame Watts' house, on Marsh's Flat. The locations are in a belt of country bearing cinnabar, which was discovered high on the ridge, some 1,000 or 1,500 feet above the river. It is a serpentine rock, or rather vein matter, of greenish color, with strings of quartz, the whole being thickly stained with vermillion, the metallic luster showing plentifully therein. The original claim, the Great Eastern, relocated by W. G. Long, on the 16th ultmo, was partially prospected in 1862, quicksilver having been found in the gulch below. A tunnel 60 feet in length was run toward the vein, when a difference of opinion arising among the proprietors as to the mode of working, a general dissatisfaction ensued—a premature blast frightened the parties and put an end to the work and the claim was abandoned.

WORK BEGUN.—*Union Democrat*, April 3. A company of capitalists commenced work this week on the old Chandler and Beals claim, in the gravel range on the middle fork of the Tuolumne river, about 16 miles above Garrote. They recently bought the claim with an area of several hundred acres and will spare no effort to develop it. Men are being sent up and large orders for lumber have been given. If it proves to be profitable it will be the commencement of opening up a large extent of gravel mining.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—*Gold Hill News*, April 1: The face of the north drift to connect cross-cuts Nos. 1 and 2 on the 1500-ft level is still in rich ore. Cross-cut No. 3 east is also running in ore of the finest possible character. Cross-cut No. 4 on this level is making good headway, the face in good milling ore. Sinking the winze from the 1400 to connect with the 1500-ft level is making good progress, the bottom still in fine ore. The face of the east cross-cuts on both the 1400 and 1500-ft levels are still in ledge material of a favorable character. Sinking the C & C shaft is making rapid progress. Repairing and retimbering the main north drift on the 1550-ft level is about completed.

OPHIO.—The ore breasts on the 1465-ft level are all looking well and yielding the usual amount of ore. Daily yield 150 tons of ore. Sinking the northeast winze on the 1465-ft level, is making good headway, the bottom still in ore. The face of the northeast drift at the 1600 ft station, in the north winze, is still in fine ore. Cross-cutting on the 1700-ft level is still vigorously prosecuted, with some favorable indications of better ore developments to the eastward.

JULIA.—The face of the main south drift on the 1000 ft level is still in vein material of a fine encouraging character. The flow of water from the face continues about the same.

SILVER HILL.—The prospecting drifts north on the third station level continue to show improvement as the work progresses. Work on the new machinery is progressing finely.

CONSOLIDATED VIRGINIA.—Daily yield 460 tons of ore, keeping the mills steadily running. The ore breasts on the 1300 and 1400-ft levels are looking splendidly and yielding the usual amount of rich ore. The east cross cut on the California line on the 1400-ft level is in 184 feet, the face still in quartz and porphyry mixed. The north drift on the 1300-ft level, to connect with the east cross-cut on the California line, will have about 50 feet yet to run to reach the point at which it is expected that the two drifts will meet.

JUSTICE.—Owing to the very hard rock met with at the bottom of the main incline, below the 800-ft level, sinking continues to be slow. The south drift at the 800-ft level is now in 65 feet from the incline, with the face still in hard vein material and very wet. Burchleigh drifts are soon to be brought to bear in both incline and drift.

CALIFORNIA.—Sinking the main incline shaft at the old works is making excellent progress. The main incline is now down 110 feet. Sinking the new shaft is making splendid progress, it being necessary to put in a set of timbers almost every day. It is now down 67 feet, the bottom in excellent working ground. The new hoisting engine is working splendidly.

SAVAGE.—The south drift from the 2200-ft station of the main incline has completed a connection with the north drift from the south winze, thus securing a splendid circulation of pure air, cooling off the level and greatly facilitating the prospecting in that portion of the mine. The main drifts on that level are now being enlarged and car tracks laid, preparatory to cross-cutting the ore vein.

SIERRA NEVADA.—Sinking the old shaft is making excellent headway, the rock in the bottom working quite soft. Driving the north-east drift on the 700-ft level of this shaft is making fine progress.

LEO.—This ground in the face of the main tunnel is working better again. The ledge matter is getting softer and shows improvement in character. Good headway continues to be made in driving the northeast drift, fine buncbes and stringers of ore being met with daily.

UTAH.—There is little or no change in the flow of water at the bottom of the shaft. Prospecting, both north and south, on the 400-ft level, still continues, with no material change to report except a strong increase in the flow of water from the face of the north drift.

CROLIAR-POTOSI.—The main south drift on the 1150-ft level, during the week, cut some favorable looking quartz, with seams of clay interspersed, but has not yet found anything of value, the highest assays obtained being \$2 to \$3 per ton.

YELLOW JACKET.—The 1840-ft level is still flooded with water, and all work suspended in that portion of the mine for the present.

BULLION.—The prospects of finding pay ore on the 800-ft level is looking more favorable than at anytime in the past. On the 1700-ft level of the Imperial a cross-cut has been started 100 feet north of the south line, which is now passing through the mixed vein matter on the west side of the ledge.

AMERICAN FLAT.—The prospects on the 750 and 850-ft levels for valuable developments are steadily on the increase, and now that the new pumping and hoisting machinery is about completed, are being looked forward to with a great amount of interest and confidence. As soon as the pumping machinery has been thoroughly tried the development of the lower levels will be commenced in good earnest.

BALTIMORE CONSOLIDATED.—The new pumping machinery will be in good condition to commence draining the lower levels of the mine by Monday next, everything, so far as tested, working with the utmost perfection. Once the machinery is all in good running order, work at all points in the mine will be resumed, when some valuable ore developments are confidently expected.

NIAORA.—An average assay of the ore in the bottom of the shaft, yesterday, gave a result of \$14.13 in silver and \$87.89 in gold, making a total of \$102.02. The arrival of the new hoisting works machinery is expected daily.

PHIL SHERIDAN.—More stringers of quartz of a reddish brown character have been passed through since last week's report, and these increase in size and favorable appearance as the drift progresses.

OVERMAN.—The 1100-ft level has been reached by the incline, and a drift started east to connect with the main west drift from the shaft on the same level.

ROCK ISLAND.—The shaft is down to the 450-ft level, at which point a station is being opened for the purpose of cutting and prospecting the ore vein.

GOULD & CURRY.—The enlargement of the main shaft to the fourth station level was completed yesterday, and the putting in of the new pumping machinery is making all the speed possible. Nothing is doing on the 1700-ft level, owing to the strong flow of water.

CROWN POINT.—Daily yield, 550 tons of ore. The ore breasts on the old upper levels are all looking well, and promise a goodly yield for many weeks yet to come. Prospecting on the 1600-ft level is still carried forward with all the energy possible. Work progressing well at the 1700-ft station.

WOONVILLE.—All work in the mine is suspended for the present, with the exception of driving the north drift and sinking the south winze below the 300-ft level. Sinking the new shaft is progressing finely. It is now down 215 feet.

LADY BRYAN.—Sinking the winzes in the ore body below the 80-ft level is making good progress, the bottom still in fine milling ore. Driving the main south drift on the same level is still continued, the face also in good ore. A west cross-cut has been started on the 180-ft level, which is now in a distance of 24 ft, in a fine body of whitish blue quartz, containing spots of rich ore. The main west drift on the 250-ft level is still driven vigorously ahead, through a fine body of favorable looking quartz and low grade ore.

KOSUTH.—The south drift from the main west cross-cut, on the 350 ft level, is in a distance of 60 feet in as fine a ledge as is to be found on the line of the Comstock. The ore vein is much better defined and more promising than it was on the lower levels above.

FLORINA.—The foundation work for the heavy new machinery is going ahead as expeditiously as possible.

ORIGINAL GOLD HILL.—From the main south drift the cross-cut has run into the continuation of the excellent ore body found in the upper above that level, and it is found to be of the same good quality.

DAYTON.—The erection of the new pumping machinery is making excellent speed. Sinking the main shaft is making rapid headway, with strong indications of soon cutting the main ledge.

BUCKEYE.—The water is again drained, and good work is being done opening the 550-foot station. The prospects of finding pay ore on this level are very favorable.

IOWA.—Preparations for the erection of the new hoisting machinery are making good progress.

NEVADA.—Cross-cutting now in the ledge, from the tunnel, to see what good ore developments can be discovered at the lower level. Prospects excellent.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Tenth Lecture Delivered before the University of California College of Agriculture, on Monday, February 1st, by Prof. C. E. BAKER.

The Nightshade, Star Apple, Tobacco, Etc.

The nightshade family, *Solanaceae*, are herbaceous or woody plants; in all about 1,000 species, of these a very few species are found all over the world, but the most of the species are tropical, so that speaking of it generally we must call it a tropical order. Although some when prepared are wholesome, yet the whole family is more or less poisonous and this poison is a narcotic. Several plants, however, are of the greatest value for food and, outside of the order of *gramineae*, I doubt whether there is another single plant which has as much general value as the potato, *Solanum tuberosum*, a native of the higher regions of South America and also found to a certain extent in Mexico and one very nearly allied species is found growing in portions of California. The potato was originally very small, but culture has changed it. In this change, it seems as if the size of the potato was increased, while the amount of poisonous matter in it was not increased, so that it is considerably diffused and probably this is due largely to culture. It was first introduced into England in 1597, by Sir Walter Raleigh; but for fully a century it was very little esteemed. In fact, only within the last hundred years, it has come into general use. Not only does it furnish food, but it furnishes starch for use in the arts. From it also there is produced, in some parts of the country, a spirituous liquor somewhat resembling brandy. I should say, whenever these tubers are exposed to the sun, they are

Pervaded by This Narcotic Poison;

So, of course, it is unhealthful to make use of them.

The egg plant, *Solanum melongena* is another South American plant. [Fig. 1.] It bears large egg-shaped fruits which are used in cooking. It has never come into general use. Further, it has so much of this poisonous matter that unless taken at the proper time there is danger in it.

The tomato, *Lycopersicon esculentum*, also from South America, is now largely grown for its delicious fruits, though for many years after its introduction it was supposed to be poisonous and was grown only for ornament under the name of love apple. Almost any of the old people will tell you of seeing it grown years ago just for an ornament. Now, in these the poison is still present when they are green, but in ripening the sun seems to eliminate the poison from them. If eaten when they are green they are injurious, unless prepared in vinegar or in some manner so as to remove the unwholesome tendency. [A student. "The sun seems to have an opposite effect upon them from that it has upon potatoes."] [Professor explained this, saying]—When the sun shines upon a potato, it changes the tuber into a stem, and it is therefore poisonous. I suppose if the fruit of the potato when ripe could be eaten we would find little poison in it. As long as the fruit is green there is a great deal of poison in it which can only be dissipated by the sun or the heat of cooking.

Another plant is the ground cherry or cherry tomato. It belongs to the genus *Physalis*, and is a little, low plant, with yellow, or orange-colored fruit, not unpleasant to the taste, enclosed in the enlarged calyx. It grows in the United States. The winter cherry, *Physalis alkekengi*, is a native of Southern Europe; now considerably grown for ornament.

Cayenne pepper is the product of *Capsicum annuum*, a South Asiatic plant, coming from India, now largely grown in all warm climates. In this case the narcotic matter or poison seems to be changed into this pungent matter found in pepper. What we call Cayenne pepper is the variety which grows large, long pods. These being annuals, of course can be grown very far north, and can also be grown well to the south.

Stramonium, or thorn apple—you see we are passing from the food plants to the medicinal ones—*Datura Stramonium*, is a large ill-scented weed, with very large, trumpet-shaped flowers and prickly pods. Its seeds [Fig. 2], contain an alkaline principle considered valuable in medicine. When taken in considerable quantity they produce raving and in excess profound stupor. Stramonium is kept in the shops in considerable quantities. It is said to be one of the ingredients of

Drugged Liquors.

When any one is put into a stupor through taking certain liquors, generally stramonium has been used in the liquor. It is, however, used quite considerably in legitimate practice.

Belladonna is a product which has a better reputation and is derived from the perennial herb, *Atropa belladonna*, a native of Europe. The whole plant in this case is exceedingly poisonous, and from it we get the drug known as belladonna. Like henbane, which is derived from a nearly allied species, it has the power of dilating the pupil of the eye. If a drop is allowed to fall upon the eye, upon the pupil, it will

dilate greatly and it is from this fact it gets its common name.

[Belladonna is derived from two Italian words *bella*, beautiful and *donna*, lady; according to Webster.]

The Spanish and Mexican ladies have long made use of this to try to lighten the beauty of their eyes. Our oculists now put it to a better use.

Tobacco, *Nicotiana Tabacum*, is a native of the warm portions of America. [Fig. 3.] It was used by the original inhabitants of this continent long before the Europeans came here, but it was very soon introduced into Europe. In 1589, Sir Walter Raleigh took the tobacco to England and some eight years afterwards the potato also. At first, it met with great opposition, throughout all Europe; kings, priests, popes, everybody opposed it; nevertheless, its use spread rapidly over all the countries of the civilized world. Some of the authorities say that on an average

Every Fourth Man

Makes use of tobacco. A greater part of the product is derived from the United States. There is a strip of country including Virginia, Ohio, Pennsylvania and running down into New England, also including portions of Tennessee, Indiana, Illinois and southern Iowa—all through that belt of country is a very important district engaged in tobacco growing. Certain varieties are grown very far north. I have known its very profitable cultivation up

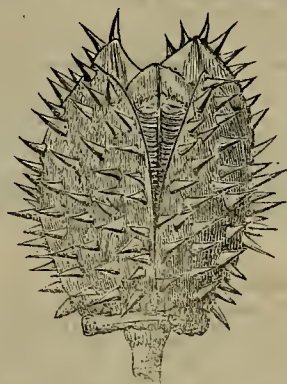


Fig. 1. Seed Pod of Thorn Apple—*(Datura Stramonium)*.

near Lake Erie. It probably will become of more and more importance.

Among the weeds we name black nightshade, which is a remarkable plant botanically, from the fact that it is found running as far north as a plant will grow, up into the frozen regions; and also in the southern temperate zone, it extends as far as plants will grow. This is an anomalous case, because as a general thing the plants of the north temperate zone are hardly found in the south temperate zone at all. Second, the "jimson weed" or thorn apple. It grows abundantly in almost all cultivated places. It grows in California. Both of these weeds are poisonous.

Among the flowering plants only one is worth mentioning, and that is petunia. This, within the last six or seven years has been considerably improved, although a few years ago it was called old-fashioned. Its ease of growth and delightful fragrance place it very deservedly quite high among the ornamental plants.

Referring again to tobacco, I just want to make one remark: You will find the statement frequently in our agricultural journals that tobacco is not an American plant. I think that remark comes from this: there are a great



Fig. 2. Egg Plant.

many species of *Nicotiana*, some of which are not native of America, and I think it is from this we get the statement that the Chinese were acquainted with tobacco long ago. The tobacco largely used all over the world for smoking and chewing is an American plant.

The second order, the

Mints

Of the order *Labiatae*, are herbs or small shrubs, never trees; mostly with square stems, very abundantly distributed, but most abundant in the temperate zone. There are upwards of 2500 species, throughout nearly all of which is to be found a highly aromatic and pungent property which has caused them to be long held in high repute as possessing medicinal virtues. At the present time this medicinal use has nearly passed away, and they are restricted almost entirely to a few strong scent d plants which make up the medicines of quacks and herb doctors. In fact, this order furnishes the perfume or odor for the quack medicines more than any other we have. A few, how-

ever, are harmless plants, used in domestic practice, and called, generally, herbs. This aromatic principle is of importance as furnishing some very useful oils and essences.

First, is lavender, from the *Lavandula vera*, which is a little shrubby plant found in South Europe, grown for its leaves; from these by distillation is obtained oil of lavender. This, dissolved in alcohol and mixed with water is what is known as lavender water, and is used largely in perfumery.

Rosemary, (*Rosemarinus officinalis*), also a shrubby plant found in Southern Europe, and to some extent in Western Asia; is grown for its oil, used in the manufacture of all sorts of perfumes; also very largely used in the manufacture of cologne water—one of the more important ingredients in the latter.

There are a great many others. I simply will mention a half dozen or more of them in testimony of this fact, that the order is an order of perfume. Peppermint, pennyroyal and sage are European; sweet basil is from India; hor-hound and catnip are European. You can hardly mention a plant of this order but that it is more or less aromatic.

Some of these, as peppermint and pennyroyal, are used in domestic practice. It is my opinion that they are quite harmless, but as to their real virtues, I don't whether they possess any. If we must take something whenever we have a little pain, I suppose we might as well take these. I do not want to put myself on record as against taking medicine when pre-



Fig. 3. Tobacco Plant.

scribed by a physician. If we wish to dose ourselves, without knowing anything about their properties, these things may be taken.

A few plants of the order are of ornamental value. Two are in quite common use—*Coleus* and *Perilla*; these are the generic names. They run off into false species or varieties. These, here, have a brilliant, red color. They grow erect, in hot-houses; here, out of doors. Sage, an Indian species, and oestropetal, are grown for ornamental purposes. When these three are mentioned, you have about all. It seems a little strange that an order of so many species should not furnish more, more valuable for ornament. None furnish food for man or beast, though a few are used as substitutes for tea, very poor at that. None furnish textile materials or materials which can be used in any way in building—no woods.

There are but few bad weeds. I do not call to mind a single one but that can be readily driven out. As soon as you use the plow or hoe they disappear. It is possible that in some localities there are some of more weedy habits. The group may be considered as yielding medicines of a poor order, and perfume of a high order; and it illustrates perfectly how one predominant character may determine the position of an order or group in the list of economic plants. The aromatic property which it possesses determines its position.

Next we take up several small groups of but few species, but of considerable importance, and first is the

Ebony Family,

Ebenaceae, a small group of only a hundred and sixty species; found chiefly in the tropics. It derives its name from the ebony tree of the East Indies, and of the surrounding countries there. The Ceylon ebony, *Diospyros Ebenum*, is from Ceylon. A second one, *D. Ebenaster*, is from India, as is also *D. melanocylon*. *D. reticulata* is from the island of Mauritius. The tree is large, and very slow in their growth, as you will expect from the nature of the wood. In the largest, the wood is of a light color, but after a while it begins to turn dark, and takes on the very dark, almost black, color to which it has given a name. This is labeled here as a true ebony. I have some very grave doubts whether it is, but then it will show you, however, what ebony is—its general appearance. I think if a bit of that specimen was taken out and boiled in water a coloring matter might come out. It is probably white-wood stained and

Sold as True Ebony.

The true ebony should not have the appearance which you will see if you hold it up to the light in the proper way. True ebony blackens in the center, and from the center outward. It is, therefore, difficult to account for any such whitening on the inside. Then again, it is not hard enough. True ebony should be jet black, considerably hard and quite brittle. The best is that coming from Mauritius. Ceylon and India are not so valuable.

There are a few allied species which furnish some woods of a good deal of value in certain

localities, but so far, their values are only local. In China and Japan, one of the species of this same genus *Diospyros*, furnishes a very valuable and very delicious fruit. It is called there the *Kaki*, or Chinese date (*Diospyros Kaki*), and so in giving it a name, botanists very wisely gave it the same specific name which it has for a common name. You understand that it is not the date spoken of in literature generally; but this is a fruit about the size of an apple, said to be exceedingly delicious. It is eaten from the tree and also preserved—makes a sort of fig-like preserve. Can be

Grown in Southern California.

If not already introduced, it could very profitably be brought into the United States.

In the eastern United States and running up, I hardly know how far, into the Rocky Mountains, we have what may be called the American date, or the American date palm.

It is known in the East and, probably all over the country, as the Persimmon, *Diospyros Virginiana*; the American date palm, or Persimmon, is a tree growing from twenty to sixty feet high. It produces a plum-like fruit, which, when green, is exceedingly pungent. When ripe it is sweet and edible. Now, from the fact that this closely allied species produces such a very delicious fruit, and a hardy one too, it is very likely that this same Persimmon, if taken into nurseries and cared for, might, in a short time, be developed into a very good fruit indeed; notwithstanding that the same Persimmon is one we almost always smile at, as not worth thinking much of. It abounds through almost all of what might be called the interior States, including Ohio, Indiana, Illinois and southward. There are some in this extreme southern portion of Iowa. I think there is no part of Southern California as cold as Southern Iowa. However, as this *Kaki* could be grown in the southern part of California, there is no need of introducing it, the Persimmon, there. Taking it wild, we, of course, expect it to be a poor thing; but grow it, selecting the best varieties wherever it sports, and no doubt in a very short time we might get from it valuable fruit.

The Star Apples

Form softer small order, the order *Sapotaceae*, which includes about two hundred species, mostly tropical, and they are all either shrubs or trees. Throughout the whole order, the plants are possessed of a milky juice, and this upon drying becomes more or less glue-like. In gutta percha, or, the gutta percha tree, this becomes of very great economic importance. The gutta percha tree, *Isopandra gutta*, is a tree from sixty to seventy feet in height, found in Southern Asia, and on the islands of Borneo and others near by. The juice is secured by cutting the trees. The natives there seem not to know how to get the juice in any other way. They cut the tree and peel off the bark and by so doing obtain the juice, but this results in rapid destruction of forests. As the juice dries, it is made up into little cakes and is exported. When brought to the United States, or England, or any of the countries on the continent, it is manufactured into all sorts of utensils and is applied to a great variety of uses. As the trees only produce from twenty to thirty pounds apiece and as the consumption requires a very large quantity annually, there is great danger that it will become extinct. No steps have been taken, except by the British government within the last few years, for the purpose of replanting these trees, and as the policy adopted by the natives is suicidal, we ought to be looking out for something to take its place. Its uses are very many. One peculiarity it has, is that when heated it softens up and can be molded into various forms and when it cools becomes hard and retains its form; so it can be very largely used for any purposes required. Then again, it is used for the telegraph cables. Very likely, if gutta percha had not been found just when it was

Should Not Have Had Atlantic Cables.

At least, for some time yet. In order to prevent the great waste resulting from the present method, the trees could be tapped or partially girdled and their juice thus utilized for six, seven or eight successive years. This method, though not giving so large immediate results as cutting down the trees, would give a larger aggregate.

Now, Europeans pay no attention how the natives get the material together at the seaports. In some species, this milk is used for food by the natives. I suppose in such species the juice does not coagulate or dry up as soon, and in some cases the juice is used just as the natives of South America use that of the cow tree, and as the Pacific islanders have always used that same tree.

The star apple and the sappedilla plum, of the West Indies, are large trees bearing delicious fruits about the size of an apple, which are said to be second only to oranges. Here, we know nothing at all about them. In fact I never saw a star apple or sappedilla plum. They are difficult of transportation. They could be grown, almost to a certainty, in certain parts of this State. A few species furnish valuable woods, but they are not of general importance as yet, being known only in certain restricted districts, so we pass them by.

SPONTANEOUS COMBUSTIBILITY OF CHARCOAL.—Andrew F. Haller says: Charcoal absorbs its maximum amount of oxygen from the atmosphere within three days after carbonization and that after that time no danger need be apprehended in using it, while up to that time its use may be attended with danger.

GOOD HEALTH.

Washing the Inside of the Body.

There is no cavity in the body which water is not fitted for if you get it in properly. Why, one of the best things you can do is to wash your blood, and the great folly we commit in going through our lives from childhood to the grave, is that we do not wash our blood as we ought. Infusions of coffee, tea, chocolate, or cocoa, or elder, or beer, do not wash the blood, because, with the fluid so taken in, something is carried in also which befouls and defiles the blood. Let a man say to himself, "It is Saturday night; I have worked hard all the week, and Sunday shall be a day of rest to me. I am going to give my whole system, between this and Monday morning, a good, thorough washing." So he begins to drink, and drink, and drinks but little at a time, yet between Saturday night and next Monday morning, a healthy man can drink without producing any disturbance a gallon of water. Now let this come into and go through his circulation—through his lungs, and skin, and kidneys, and bowels—and waste materials are carried out; and when Monday morning comes, if he jumps out of bed and gives his external skin a good washing, the water that he washes in will be foul. Or, if he prefers to test the question even more thoroughly, all he has to do is to take a clean sheet, and then wetting it in good, soft, pure water, he wrapped up in it for forty-eight or sixty minutes, and then have the sheet washed in a tub of water, and it will color that water so it will look dirty. The man has been washed inside—his blood has been washed. When you have washed his blood, tissues, bones, nerve, muscle, sinew, membrane, and brain, and everything in him, he can defy all pestilence for that week. The washing of a person's outside is twice as necessary as the washing of a person's clothes, yet there are those who are very particular to have their clothes washed, who seldom take a bath.

DOGS AS PROPAGATORS OF DISEASE.—Among the many agents for the spread of infectious diseases, are, it seems, "our domestic pets." For the propagation of fever a dog is sometimes as bad, or worse, than a drain; and a case is referred to in the *Sanitary Record*, in which scarlet fever was carried from one child to another by a favorite retriever. The dog had been reared in a house where scarlatina prevailed, and was subsequently given to a friend of the family. Shortly after, one of the children in the dog's new home was attacked with malignant scarlatina, and died. Disinfectants were used plentifully, and every precaution taken to prevent a recurrence of the malady, but in two months' time a second child took the same disease, in its worst form, and died. As the dog had been the constant companion and playfellow of these children, its woolly coat, it is alleged, became so charged with contagious matter as to render it a source of disease and death. Although it is only fair to the dog to admit that the children may have caught the fever from other sources than his woolly coat, yet there is reason to fear that both dogs and cats, especially the latter, do exist in the circulation of infectious illnesses; and where fever prevails the sooner they are lodged out of the house the better. They are, however, probably not more dangerous in this respect, than books. No one who takes up a book from a library ever troubles himself or herself as to the antecedents of the volume; it may have just left the hands of the fever patient.—*Pall Mall Gazette*.

AIR REQUIRED FOR RESPIRATION.—The average amount of air inspired and exhaled at each respiration is 30 cubic inches, and the average number of respirations 20 per minute, so that 500 cubic feet of air pass through the lungs in 24 hours. The amount of carbonic acid exhaled is variable, and is interesting as an index of the rate of internal change. The more energetic the circulation, the larger the quantity of carbonic acid; it is less during sleep than when awake, and less during fasting than after a full meal. A sleeping apartment should always have adequate ventilation while in use.

DUST-SPECTACLES FOR THE PROTECTION OF THE EYES IN VARIOUS OCCUPATIONS.—Spectacle-frames, furnished with fine wire gauze instead of glass, carefully fitted to the eye, and fastened to the head by a gum band, have been found by Kuhn to answer perfectly for the protection of the eyes from dust, solid particles, &c., in various occupations, as threshing, stone-cutting, &c., while they, at the same time, permit the necessary access of air to the eye, and produce no inconvenience whatever to the wearer.

HEALTHY OLD AGE.—The brains of people advanced in years would be greatly strengthened by habits of study. Old people should have their lessons, their mental culture, like children, to keep their brain in a healthy condition. Moderate study is almost a sure guarantee against decaying of the mind as age advances.

QUICK RELIEF FOR BURNS.—Apply a layer of common salt, and saturate it with lanolin. Hold it in position a few hours with a simple wrapper. The colonel says the smarting disappears almost immediately, and the sore gets well with incredible rapidity.

TO DETECT BRIGHT'S DISEASE.—Urine when mixed with nitric acid and boiled should coagulate if the person is suffering from Bright's disease of the kidneys.

When to Get Up.

The Duke of Wellington always slept on an iron camp bedstead eighteen inches wide. "When a man wants to turn over," he said, "it is time for him to turn out." The Emperor Nicholas did the same, Mr. Owen says. The principle is well enough; but I think the detail is wrong. Sleep is far too important to be made uncomfortable. My old friend Rossiter fixed his alarm so that, at the fore-dawned moment, the bed clothes were dragged from the bed, and Rossiter lay shivering. I have myself somewhere the drawings and specifications for a patent (which I never applied for), which arranges a set of canvas and wheel-work under the bedstead, which, at the moment appointed, lift the pillow-end six feet, and deliver the sleeper on his feet on the now horizontal foot-board. He is not apt to sleep long after that.

Rossiter found another contrivance which worked better. The alarm clock struck a mitch, which lighted the lamp, which boiled the water for Rossiter's shaving. If Rossiter staid in bed too long, the water boiled over upon his razor, and clean shirt, and the prayer book his mother gave him, and Coleridge's autograph, and his open pocket-book, and all the other precious things he could put in a basin underneath when he went to bed; so he had to get up before that moment came.—*Old and New*.

USEFUL INFORMATION.

Wheeled Vehicles.

The history of locomotion on wheels is one which takes us back to the very origin of all history. The horse was undoubtedly the animal whose labor was first utilized by man; but no doubt he was employed many centuries before the wheel was known as a vehicle of locomotion or transportation. Carrying loads was the first occupation of this useful animal; next he was probably employed as the Indians on this continent still use him, to drag loads or poles—one end of said poles being secured to the flanks of the animal, while the other rested upon the ground, the load being placed near the middle.

The next idea was to rest the ground end of the poles on wheels, from which the transition to the two-wheeled cart and the ancient chariot was a very natural step. No doubt the ancient Egyptians and Assyrians were content, for many ages, to travel upon two wheels; yet it was an inevitable necessity—that a four-wheeled vehicle should ultimately have been suggested. In the first attempt to build such a vehicle, the second axle was no doubt fixed to the body rigidly, in the same way as the single axle had been. The inconveniences attending the working of such a rigid four-wheeler, and its obstinate tendency to move in a straight line, no doubt condemned the early wheelwright to much mortification and disgust, and his contemporary Jehu must often have heaped anathemas on his head in the vain efforts to gracefully turn the corners of the gay avenues of their city drives. No doubt such disgust led for a time to the utter condemnation of the new-fangled vehicle and a return to the use of the more easily managed two-wheeled chariot.

But necessity was then, as now, the mother of invention, and the perch-bolt must have been soon devised, as the only means of making a four-wheeled vehicle a really practical thing on a common road. Once introduced it was sure to survive, and the carriage-maker of to-day who should propose anything for an substitute would be considered a fit candidate for an insane asylum. The railway car-builder, however, has gone back to the original construction. His practically straight road allowing the possibility of such a device. But this is only another case of history repeating itself. The modern iron road being entirely novel in its design implies a similar novelty in all its appurtenances. But the car-builder of a century hence will wonder that such a barbarous running gear could have been endured on a railway in 1875. The audible grinding of a rail road train on a short curve, and the wear and loss of power consequent upon the wheels being dragged out of their natural curve, assure us that we have not yet reached perfection in railroad gear. The perch-bolt or its equivalent must be eventually employed upon the iron as well as on the common road, and that, too, without sacrificing the steadiness of the vehicle or any other essential condition of safety and comfort.

THE EXCLUSION OF DAMP FROM BRICK-WORK. It is stated that one of the most effective methods of accomplishing this object is the following:

Three quarters of a pound of mottled soap are dissolved in one gallon of boiling water, and the hot solution spread steadily with a flat brush over the outer surfaces of the brickwork, care being taken that it does not lather; this is allowed to dry for twenty-four hours, when a solution formed of a quarter of a pound of alum dissolved in two gallons of water, is applied in a similar manner over the coating of soap. The soap and alum form an insoluble varnish, which the rain is unable to penetrate, and this cause of dampness is thus said to be effectually removed. The operation should be performed in dry, settled weather.

Another method is to use eight parts of linseed oil and one part of sulphur, heated together to 278° in an iron vessel.—*Scientific American*.

The Omnibus Not a New Invention.

The omnibus is not, as is generally supposed, a modern device. Its history is traced back to the year 1662, when Louis XIV. authorized a line of them for the special benefit of the middle classes. Seven omnibuses were started, each constructed to hold eight people. The terms of concession to the company provided that they should run at fixed hours, whether full or empty, to and from different quarters of the city, for the benefit of the infirm and those engaged in lawsuits, as well as for all who could not afford to hire a carriage. But before long the new conveyances were converted from their original purpose and became extremely fashionable. The Grand Monarque traveled in one to St. Germain, and his example being followed by the aristocracy generally, the class for whose benefit they had been introduced were completely excluded. This fashionable whim appears, however, to have lasted only a short time, followed by the failure of the company, owing to the subsequent refusal of the poorer classes to patronize the new vehicles.

Nothing more was seen of omnibuses in the French capital until 1828, when they were again introduced by a leading banker, who made a large fortune out of the speculation. It was not until two years after this date that they made their first appearance in the London streets, when two were started by an enterprising citizen, running between the Bank and the western extremity of the New-road. These ponderous vehicles carried twenty-two passengers inside. But in some respects they appear to have been superior to the modern omnibuses. The first conductors were sons of gentlemen, and the periodicals of the day were provided gratis, by the proprietors, for passengers to read en route.

Restoring Burnt Iron.

Many are the ideas that have been presented toward the above end, but so far, we believe, nowhere is the method carried on extensively. Many establishments that accidentally or otherwise meet with such incidental loss contrive to work off the iron so burnt by a proportionate mixture of new iron, and perhaps some use certain chemicals. But to restore burnt iron in large quantities by any systematic method we do not know to be followed. Such material we know to be a common product incident to the manufacture and working of iron; sufficiently great in quantity to justify special facilities for its redemption, but beyond the small efforts of those who meet with such loss in a comparatively limited way, no well-directed and special method toward making it a business has been done.

Quite large quantities of burnt metal are to be found at various foundries, which is not wholly "slag," as many suppose, left from the "charge" of a foundry air furnace or cupola, but in the majority of cases is burnt metal. One of our city founders pointed to a lot of several tons as "burnt iron, not slag." In our mills a common way of disposing of burnt wrought iron is to work it off in small quantities with new iron; either with scrap or by re-piling with puddle bar.—*American Manufacturer*.

A THREE-WHEELED OMNIBUS.—The *Carriage Builders' Gazette* furnishes an illustrated description of quite a novelty for the road, in the shape of a three-wheeled omnibus. It is claimed that by this construction, economy in cost and draft, as well as comfort for riders is secured. Dispensing with a truck or under-carriage and one wheel, admits of economy in construction; while the triadic bearing of the wheels on the ground favors the draft. The bulk of the load is placed upon the pair of wheels, which are large and forward, and is partly suspended beneath the line of the axle. The axle of the single wheel is in the rear of the body of the vehicle. There is an entrance, placed diagonally upon each rear corner, which may be reached more readily than the rear entrance of the omnibus as commonly constructed. A stairway also leads to the roof of the vehicle from the rear. The total weight of an omnibus, as ordinarily constructed, to accommodate 28 passengers, ranges from 20 to 24 hundred-weight. A three-wheeled vehicle to accommodate the same number can be constructed to weigh from 14 to 16 hundred-weight only. The construction is very simple—the hind wheel turns freely in an upright axle-box, filled with a coil spring around the spindle. The body forward rests upon elliptic springs.

THE LIFE OF LOCOMOTIVE WHEELS.—It is seen by the returns of the London and North-western (Eng.) Railway, made to Parliament in the year of 1873, that their locomotives average a run of about 15,000 miles a year, and that the usual term of service of a set of chilled wheels is about seven years,—or a run of 105,000 miles,—a little more than four times round the world. Passenger cars traverse about three times the distance each month or year that an engine does. First-class cars are not subjected to such continuous wear as inferior ones; more rest is given to the wheels. Such cars are heavier, and consequently bear harder on the axles, and hence are more liable to heat.

CAR WHEELS.—A St. Louis company are producing car wheels with steel tires, which are said to be as much superior to iron wheels as steel rails are to iron rails. The distance an ordinary wheel will run is said to be about 50,000 miles, while it is claimed for the steel tired wheel that it will have a life of about 400,000 miles.

DOMESTIC ECONOMY.

How to Roast Beef.

Somebody recently sent a receipt to the *Ohio Farmer* for roasting a sirloin of beef. Another correspondent—"An Old Housekeeper," takes correspondent No. 1 to do after the following manner: "The receipt furnished by your correspondent of the 9th instant, for roasting a sirloin of beef, is not the way that I or any experienced housekeeper would attempt to cook it. It first recommends a 'joint weighing from fourteen to fifteen pounds from a young and fat beef.' Now, everybody knowing anything about good beef would say, 'old and fat beef.' Young beef is neither so tender, juicy or rich as old beef, as the fat and the other flesh on the latter is newly put on. The writer goes on: 'having laid it in the dripping pan, tenderloin downward, we dredge it slightly with flour.' Doesn't this writer know that all 'doctoring' of beef helps to deteriorate its quality? To go on, the meat is then put down in the pan, in which a little water is poured, and then put in the oven, not to roast, but to stew. The writer then adds: 'As soon as the surface of the meat is so browned that the juices of the meat will not readily escape, allow the oven to cool to a moderate degree of heat.' This is remarkable. 'When the beef is done, sprinkle with salt and pepper. Empty the pan of all its drippings; pour in some boiling water, slightly salted, stir it about and strain over the meat.'

"This is one way, truly, and it may suit some people who have never eaten really good roast beef; but it will not do for me or my family. Why, beef, to roast it in the best manner, should not be tampered with in any way—not even touched with water before putting in the oven. Instead of laying it broadside in the water of the pan, it should be elevated on a 'meat stand' placed in the pan. A quarter of an hour to a pound of beef is the correct period to roast. No dredging, peppering, salting or pouring over of gravy, etc.; they destroy the sweetness, deliciousness and relishment of the beef."

English Dishes.

"An English Woman" furnishes the *German-town Telegraph* with the following recipes for preparing certain English dishes:—

BULLOCK'S LIVER.—Cut the liver in scores, and salt it with two pounds of salt for a fortnight, then let it drain dry for three days, then rub in two ounces of several kinds of spice, according to your judgment, and all sorts of sweet herbs chopped very fine; also a good seasoning of onions and shallots. Then hang it in a dry cellar for a time, and then put it in a bag for use. A small piece is sufficient to make gravy for hares, ducks, &c. It will keep many months, and be useful to use in the summer.

FRI-CASSEEN TRIPE.—Cleanse tripe well from the fat, cut it into pieces about two inches broad and four long, put it into a stew-pan and cover with milk and water; let it boil till tender. Slice two Spanish onions and put in a stew-pan with a quarter pound of butter; salt, pepper and nutmeg to flavor, and let them brown; put this sauce with the tripe, add the juice of a lemon, and serve very hot.

YORKSHIRE PARKIN.—Two and a half pounds of oatmeal, two pounds of treacle, a quarter of a pound of moist sugar, half a pound of butter rubbed into the oatmeal—a little ginger or finely cut candied peel may be added if liked; mix all well together, put into tea-cake tins, and bake.

WINTER SALAD.—Boil some potatoes and some onions, and when cold cut them into slices, together with some beetroot. Dress as any other salad. The onions should be cut so as to fall apart in rigs.

To Mend Tinware.

Every housekeeper may not know of what they are capable in the line of keeping their tinware in order. For the benefit of such we will say that it is easier to solder such things than to pay a traveling tinker two prices for mending them. Take a sharp knife and scrape the tin around the leak until it is bright, so that the solder will stick. Then sprinkle on a little powdered resin, (they have liquid solder to sell, but resin will do as well), lay your solder on the hole, and with your solder-iron melt it on. Do not have the iron too hot or the solder will adhere to that. After two or three trials you can do a job that you will be proud of. If you do not own a soldering iron procure one by all means; but when hard pressed I have used the knob on the end of the fire-shovel, or a smooth piece of iron, or held a candle under the spot to be mended. Anything is better than stopping leaking pans with beeswax or rags. Try it, young housekeepers, and see how independent you will feel. Your pans should be dry when you take them in hand.

RICE JELLY.—Boil one pound of flour with half a pound of loaf sugar in a quart of water until the whole becomes a glutinous mass, strain off the jelly and let it stand to cool. This is nutritious and light.

CANDY.—Two cupfuls of sugar, two large tablespoonfuls of vinegar, and half a cupful of water. Boil together, and add vanilla or lemon for flavor. It must be worked before it is very cold.

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Society of Engineers of California.

A meeting of this society was held on Monday last. Mr. G. W. Dickie in the chair. Papers presented by W. J. Lewis, C. E., "On Calculation of Earthworks," and by W. W. Hanscom, M. E., "On the Screw Propeller." The paper of the former gentleman was altogether too technical to be of general interest, and was drawn out to too great length. We might suggest a conformity to the customs of similar societies elsewhere, on the matter of papers of this character. They are simply interesting as matters of reference to those pursuing that branch of the profession to which the paper relates and should be submitted by title and referred to the publication committee. Even those to whom the paper is valuable would prefer to have it in print where they could refer to it at leisure. But when the author thinks proper to read the paper he should at least carefully arrange his manuscript, models, etc., in such a manner as to have everything in proper order before he goes on the platform; otherwise the audience are under the necessity, as was the case in this instance, of impatiently waiting every now and then for five minutes or so to elapse, while the reader was trying to find the right page. In the present case brevity is a valuable adjunct to a paper and the more condensed the information the more chance there is of its being read or listened to.

The paper on the Screw Propeller, by Mr. Hanscom, was brief and pithy, and advanced some new views, to which others in the profession take exception. Owing to the lateness of the hour, discussion on the paper was postponed, although Mr. Dickie, of the Risdon Works, appeared anxious to give his reasons for dissenting with Mr. Hanscom's views. The paper will be discussed at the next meeting of the society, and as the members will have time to post themselves on the subject, a lively and interesting discussion may be expected. Mr. Hanscom's paper will appear in our next issue.

ALL of the mills in Six and Seven Mile canyons are running to their full capacity.

Watchmaking in San Francisco.

Watchmaking has now become a prominent manufacturing industry in San Francisco. The large building recently fitted up on Fourth street for the Cornell Watch Manufacturing Company is now quite well filled with machinery. Something over one hundred operators—about one-quarter of whom are females—find constant employment there. Still the works are not yet in full and complete operation. Their completeness requires time, and it is really wonderful to see what has been done in so short a time as has elapsed since the project was first set on foot.

When the project of starting this factory was first broached, the idea was received by the public with many misgivings. But the skill and enterprise of the founders and experts, and the public spirit of several of our prominent capitalists has brought the scheme into full realization, with a resolution and dispatch which is highly creditable to their spirit and energy, and we have no doubt that it will also meet with the full financial success which it so richly deserves.

The officers of the company are as follows: Paul Cornell, President; Oliver Eldridge, Vice-President; Bank of California, Treasurer; H. Cox, D. D., Secretary; Charles R. Bacon, Superintendent. Directors, John Parrott, Peter Donohue, William Norris, Paul Cornell and Oliver Eldridge. It would be difficult to combine a better or more substantial set of men for the head of such an establishment in this or any other city.

A Visit to the Factory.

We took occasion, a few days since, to visit this interesting scene of industry. We found Superintendent Bacon—who is evidently the right man in the right place—at his post, and, on making known to him the object of our visit, he very politely and kindly invited us to a thorough examination, and offered to accompany us through the various departments.

The building is a three-story brick, and well adapted to the purpose. Everything appears to be in perfect order and admirably arranged for the purposes in view. To describe all we saw would be a task which we are not prepared to undertake—in fact, such a description could not be prepared from the observations of a single visit.

The Machine Shop

Was the first room visited, and, as the foundation of all, is located upon the ground floor. This department is under the special supervision of Mr. G. S. Kendrick, master mechanic, who has had many years' experience in designing and constructing machinery of this description, and is thoroughly competent to fill so important a position. A large portion of the machinery was brought from Chicago, where, it will be recollected, the factory was first started, and removed here mainly on account of the superior fitness of our climate for such delicate workmanship. It is the policy of the company to manufacture their own machinery, tools, implements, etc., which is nearly all of such a delicate and peculiar character as to necessarily involve the closest personal inspection of the experts of the factory itself. The motive power is also placed in this room, and consists of a steam engine of 15-horse power.

The Various Departments

Are mostly confined to separate rooms—the rooms being so arranged as to secure the fullest advantage of sunlight—for which purpose the building is admirably located. The departments are fifteen in number, divided and named as follows:

The machine shop, the pattern room, the draughting room, the plate room, the pinion-forwarding room, pinion finisher, the escapement department, flat steel and screw department, the motion department, the balance department, the jeweling, the gilding, the dial, finishing and the case departments. The latter is quite separate from the others, being, in fact, a business or department of itself. Both silver and gold cases are manufactured here, of various styles and prices. In addition to the various departments there is also the

The Material Room.

The latter is near the center of the building on the second floor, and is in charge of a lady, who receives and hands out all the fine stock and material which passes into any of the departments, or from one department to another. By this system every item of material, finished or unfinished, is carefully accounted for, and can be readily followed by those in charge from day to day; and from one department to another. This is the center and heart of the whole establishment, from and to which everything flows in continually recurring currents.

Both key and stem-winders are turned out by the Cornell company. The latter though simple in construction, nevertheless require more labor in their manufacture than the former. Their great convenience, however, makes them especially desirable, particularly for the ladies. Among the various kinds of delicate workmanship to which our attention was called, was that of a lady who was provided with machinery and tools to drill holes one eighteen-thousandths of an inch in diameter—to our eyes, at least, absolutely microscopic in size.

The pinion department is very interesting for its minuteness, and it is upon the perfect execution of this work that the excellence of the watch largely depends. The pinions are turned out of the best steel wire. About one

hundred pieces are made from a piece of wire about a foot long, in an almost incredible short space of time, and with a precision which is absolutely astonishing. These pinions work in jewel sockets, which last have also to be adjusted with the greatest nicety and exactness.

Among the minutiae of the various portions of the watch, we were shown a small box containing what appeared to the eye to be small granules or particles of iron. A magnifying glass was subsequently placed in our hands, by the aid of which we were enabled to perceive that we were examining a lot of most perfectly finished screws, so infinitesimally fine that it requires nearly 190,000 to make a pound troy! We were informed that some of the pieces that go to make up a watch were subjected to 20 distinct operations before they were ready to be put in place.

The balance department interested us much, not on account of its minuteness, of course, but on account of the great care taken in its construction to render that important piece of mechanism as far removed as possible from the evil effects of expansion and contraction by change of temperature. In most watches but a single metal is used in the construction of the balance-wheel; hence variations of temperature cause much inequality in such time-pieces. All the Cornell watches are provided with balance-wheels consisting of two metals—steel and brass—so peculiarly and carefully combined as to reduce their possible variation in size to the minimum quantity.

And right here we may stop to remark a noticeable and important feature in all the watches turned out at this establishment, and that is the rapidity of the balance-wheel movement. A slow motion is much more largely affected by jars than a quick movement. This is an important consideration in these days of railroad travel. It is impossible for a slow movement to be kept regular on a railroad car, and proportionally so under any other condition of travel or constant concussion.

A watch is rated at this establishment chiefly by the value and perfection of its movements, which vary in price from \$16 to about \$150. Any desired class of movements can be placed in any style of case, silver or gold.

As a Home Institution

The Cornell watch factory may now be referred to with pride. Its future will no doubt be grand and important. It will in time become the most successful and extensive establishment of the kind in the world. There are several reasons for this conclusion, which any intelligent person cannot fail to foresee. Watchmaking is a business which from the delicacy of its manipulations requires a mild and uniform temperature. The extremes of heat or cold are equally injurious to its successful prosecution. There is not another locality in the world which so well meets these conditions as San Francisco. The company starts as a progressive institution. It has fitted up its own machine shop, which it proposes to continue in constant operation, adding to and increasing its power for turning out work as fast as the growing market for its productions shall demand.

The factory is located directly at the gateway of the great Pacific ocean, through which the travel of its islands and hording continents must continue to move with constantly increasing volume, until this city shall become the great commercial center of the world. New York has nearly reached the climax of its possibilities—henceforth it must surely divide its growth with its sisters on the seaboard and in the interior. London and other great cities of Europe are much in the same condition. Climate is against them, the tide of travel and of empire is against them all, as compared with San Francisco, the population of which is doubling with every decade. Our industrial enterprises and institutions are also bound to keep full pace with our growth. Our mines and our enterprise makes that a fact beyond doubt. Japan and China are just opening up an immense market for watches and a large line of other industrial products, and is building up a current of travel which will soon convert our semi-monthly steamers into a daily ferry line across the Pacific. The chief part of the industrial supplies for these peoples must reach them from this city.

When American Watches

Were first talked of, very few people believed in them. It was thought that the skill which two or three centuries had given to European operatives would have to be of similar slow growth here—especially as this considered certain when our capitalists were unable to buy foreign machinery at any price or induce for eign laborers to come here to any extent. It was probably well that we were thrown upon our own resources. The Yankee never does better than when he is reduced to just that extremity. That was his opportunity in the watch business, and he went to work in his own way, invented machinery after his own ideas, and can now discount, by large odds, the best machinery and the best workmanship which Europe can produce. The American watch, and watch manufacture is to-day as far in advance of that of Europe as is our skill in the manufacture of the revolver or the sewing machine. And so it will ever be with any class of instruments which are made by what is technically called "assembling"—when any part of one machine is made to answer the same purpose in any other machine of the same pattern and size. This is, as it ever will be, the result of the superiority of machine work over hand labor, which last enters into every department of construction, much more largely in Europe than here.

But we have extended this article altogether beyond the limits intended, and that too, we fear, without giving our readers what they probably expected at the outset—something of a mechanical idea of what a watch factory is. The fact is, we found there was too much to learn and describe in a single visit, and if the patience of Superintendent Bacon and our readers both hold out, we propose to repeat our visit at some future time, and so inform ourselves as to be able to tell more of what the Cornell watch factory really is—leaving its future to its own practical demonstration. Mr. Cornell is determined to make the enterprise a success in every particular. By the partiality of his associates, his name has been indissolubly connected with its existence, and he is resolved to make the institution his life's monument.

A Disastrous Explosion.

A fearful explosion of Giant Powder occurred on Hathaway's wharf, at Rincon Point, on Wednesday afternoon, by which several lives were lost and a large amount of property was destroyed. About 150 pounds of Giant Powder had been brought from the factory in the morning, for blasting operations in removing Rincon Rock, in the bay, and this powder caused the explosion which resulted in such loss of life and property. The rock is very near the wharves, and Clark, the foreman, went to the office on shore to prepare the cartridges for a blast. While doing this the explosion took place.

The most probable reason for the explosion is given in the following statement by George Green, a blacksmith who worked on the rock:

I went into Risdon's office with Mr. Clark and Joe Corran to have a talk. I used to work for Mr. Risdon. Mr. Clark went into the office to get the cartridges ready for blasting. He took the loose powder out of a box filled with powder and put this powder into tin cans with a wooden scoop through a hole about one and a half inches large. He had filled one can and placed it on the table and placed two empty cans near the box and commenced filling them. The box with powder was standing on the floor from which he filled the cans. He then lighted his pipe and sat down on an empty box alongside the powder. He was crossing his legs which jarred his pipe in his mouth, from which dropped some fire into the box of powder. He then tried to extinguish this spark of fire with his finger pressing on it, when after a moment the powder in the box blazed up, on seeing this I ran out to a distance of about 50 feet, when I heard an explosion take place.

He had a number of fuses prepared with the caps on the end of them. These were some three or four feet from the can of powder on the table. There were two more cases of powder in the room; also, two small tin boxes, which I think contained caps, standing on the table. There were also some paper cartridges, with powder, in a box in the room.

I only saw one can filled and two commenced on, but I do not know if there were other cans filled or not.

Exactly how the explosion took place will never be known but this statement is probably nearly the truth. Still, in all probability, some of the cans on the table had the fuses on them or the caps and fuses were nearer the powder than Green thought, and their discharge fired the powder. The Giant Powder company have made experiments in this direction and find that by firing 100 caps within six inches of a box of powder it would explode; but a foot and a half away it would not. These experiments have been numerous and exhaustive, and with 100 caps each time. When the powder which caught from the spark of the pipe blazed up it probably set off the fuse and caps and discharged one can of powder, which in turn set off the rest. With such a blaze as so much powder would make, the fuse might be easily fired close to the lower edge and discharge the caps and powder. People smoking pipes around powder might expect accidents and it shows Clark's confidence in it that he should do so. Black powder under such conditions would not have allowed Green to get away but would have exploded, not burned. Clark has been handling this powder for some years and was probably careless with it. Corran, his assistant, may have also prepared other cans or cartridges, which exploded at the same time. Fuses with caps prepared, boxes of open powder on the table and floor, and a lighted pipe were good materials for an accident and this was a fearful one.

Hathaway's large bonded warehouse was destroyed with its contents, as were also a number of smaller buildings. The loss of property tops up about \$600,000. The killed were Frederick Hasse, James McIntyre, Clark, Brown and Jesse Langdon, and a boy of the injured will probably die. Besides those injured by the explosion, numbering ten, four firemen were badly hurt; one having his leg broken, another his shoulder and knee dislocated, another his arms and ribs fractured, and the other badly burned. The firemen will probably recover. But Richard Richard, B. Thompson and Wm. Knight, of the wounded, are not expected to live. The accident was a most awful and fatal one, and should warn others not to be careless with dangerous explosives. If the burning powder had been thrown into the street before it ignited the fuse and exploded the other cans no harm would have ensued; but in such cases people almost always lose their presence of mind.

Reduction of Quicksilver Ores—Patera's Process.

There is, perhaps, no other ore, the reduction of which is attended with such a proportionate loss, as ore containing quicksilver. Patera, in describing his new method for the reduction of cinnabar ore states that in Idria (Austria), the loss of quicksilver used to amount to from 46 to 48 per cent. in the reverberatory furnaces, 59 to 74 in the shaft furnaces, and 7 to 9 per cent. in retorts. He explains the causes of this great loss as follows:

1. The ore is fed into the reverberatory furnaces as coarse sand and in small pieces; into the shaft furnaces in larger and even very large pieces. There remains, therefore, in the furnaces some of the cinnabar which is not properly roasted.
2. The temperature applied is always very high, and in consequence the quicksilver fumes become very much expanded, and are therefore difficult to condense.
3. The temperature and draft in the reverberatory and shaft furnaces cannot be properly regulated; and an excess of atmospheric air with the products of combustion of the fuel and carbonic acid of the ore, mixed with the already much expanded quicksilver fumes, pass through the condensers, preventing, to a great extent, the condensation of the fumes.
4. The porous masonry-work of the reverberatory and shaft furnaces absorbs much of the quicksilver, which can only be recovered when the furnace is torn down.
5. The above conditions demand very large condensing chambers, which again entail considerable loss.

Having ascertained the causes of loss, the remedy can be found according to Patera, as follows:

1. Reduce the ore into smaller particles.
2. Select a furnace which allows the regulation of the temperature and the admission of air, and
3. In which the products of combustion have not to pass through the condensers.
4. The furnace selected should not absorb any quicksilver fumes, and then
5. We shall not have any necessity for such a large and complicated condensing apparatus.

On these principles Patera has devised his process, and constructed the furnace with which he made his first experiments, and which is shown in the accompanying engravings.

The furnace A (Fig. 8) contained a cast iron tube $2\frac{1}{2}$ inches in diameter and $1\frac{1}{2}$ feet long. It was open at a and was connected at b with a glass tube of equal diameter and two feet long. Then followed several Wolf's apparatuses (which need no detailed description) and last came an exchanger, E, which drew the air slowly through the whole apparatus. About three inches from the furnace a thermometer, t, inserted in a glass tube, to observe the temperature during the whole operation; on several other parts of the apparatus were other thermometers for the same purpose. The first experiment was to ascertain how small the ore pieces have to be, so that the ore will be completely roasted, or all the quicksilver expelled at a low temperature. To this end samples of ore of different sizes, which contained from one to two per cent., were heated moderately in a porcelain cup, so that the cup did not get red hot. After two hours heating the ore was pulverized in an agate mortar, and assayed.

The most suitable size for the ore is that of pretty fine grains of sand, because after one hour's heating, no more trace of quicksilver could be found. The ore reduced to this size was put in the pipe or sheet iron saucers; the temperature was kept low, say from 400° to

500° C., so that the pipe did not get red hot. The thermometer three inches from the furnace rose from 70° to 80° , and here occurred the greatest condensation; at the end of the tube less was noticed. The thermometers at the other parts of the apparatus did not indicate any rise in temperature. It sometimes happened, particularly in treating rich ores, that small quantities of fumes passed in an op-

low temperature. It is easily kept tight, and the draft is easily produced by connecting the outlet of the condensing apparatus with the fireplace, and regulating it by valves or dampers. Patera was unable to introduce his process until he himself constructed a furnace made like the one shown in the engraving.

The apparatus represented by Figures 1 to 7 consists in a cast iron retort, M, with condens-

ranged in the usual way, as can be seen from the drawings.

The front of the retort is closed by an iron cover, which has two openings, a, a, one inch in diameter, from which lead iron pipes which admit air and allow the operator to look inside during the operation. To protect the laborers from the fumes which might escape through these openings, a hose, b, is attached to the end of the iron pipe, which leads into an open vessel, c, wherein the escaping quicksilver may be collected. This vessel may be of iron, or of brick and cement, whichever is most convenient.

At the back end of the retort, at c, the first condensing pipe is attached. It has there exactly the same incline as the retort, but towards c the bottom forms a kind of trough, slanting towards c'. At the deepest point is a pipe for the outlet of the quicksilver, and opposite is another one, to admit of the first being cleaned. The condensing pipe is closed by a cover, which has two openings; the one E is two inches in diameter and leads to the other condensing apparatus; the other opening is closed, as it is only a spare one. In the top of the condensing pipe is a hole, T, for a thermometer, by which the temperature of the passing fumes can be noticed. At E the connection with the other condensing apparatus is made. This consists in a system of clay pipes, of two inches in diameter, which terminate, finally, in the fire-place. At several points in the system of pipes, holes are provided, which can be closed, so that the operator can see whether complete condensation has taken place.

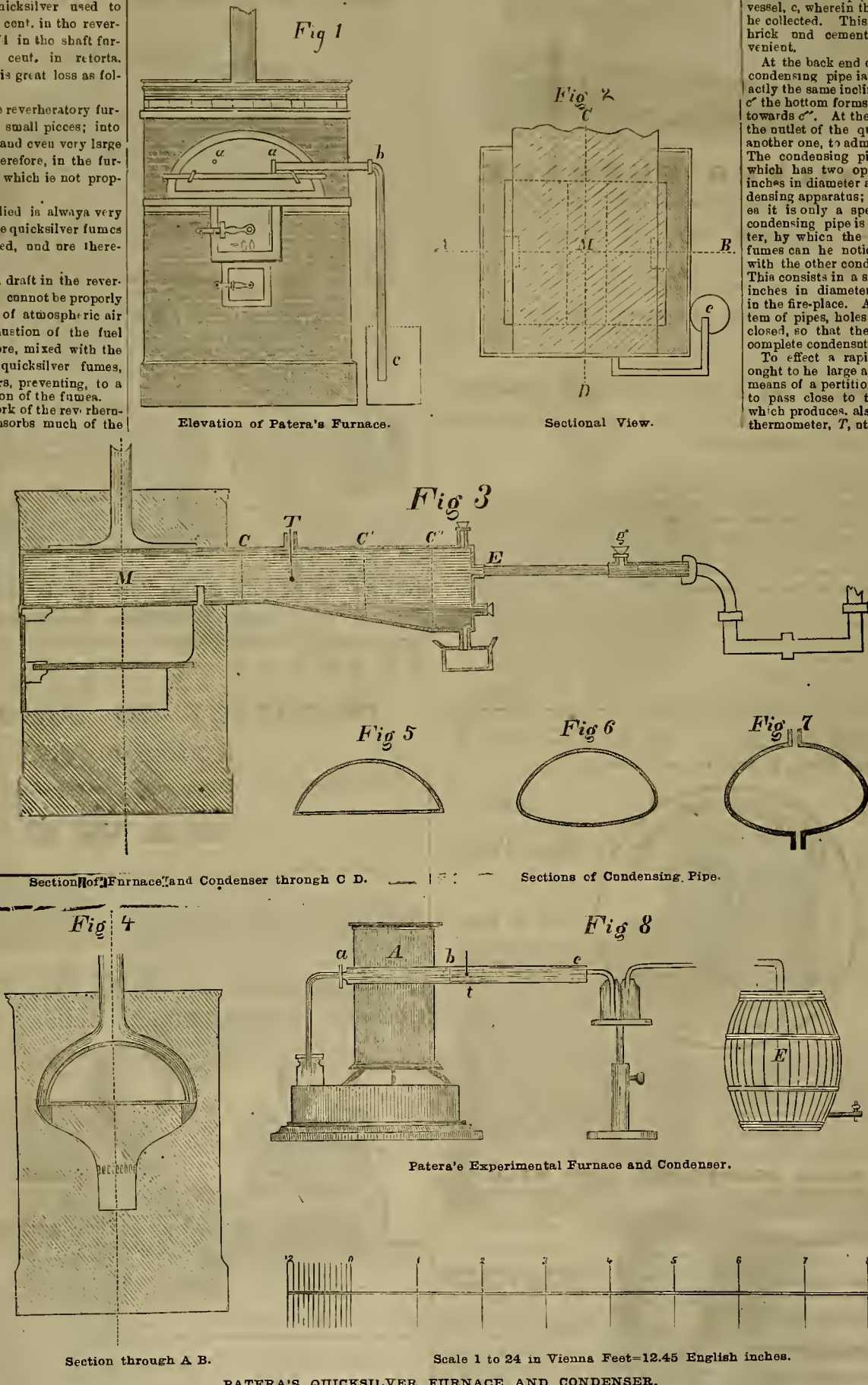
To effect a rapid condensation the pipes ought to be large and kept cool by water; by means of a partition the fumes are compelled to pass close to the side of the condenser, which produces, also, a very good effect. The thermometer, T, at the condenser near the retort, showed a temperature from 210° to 230° C, whereas, it showed at the other end, say about three feet distant, hardly 30° . The length of the first large condensing pipe for different sized furnaces is somewhat difficult to determine. For Patera's experimental furnace the pipe was four feet long, and he found, at the end of the operation, most of the quicksilver in the part near the retort. He therefore thinks it advantageous to contract the condensing pipe suddenly after the first wide one. It is difficult to determine the length of this part of the condensing apparatus. In working 100 pounds of ore of 1.50 to 3.06 per cent., he had a condenser nine feet long, and found that considerable fumes passed in the fire-place. He then lengthened the apparatus to 12, and finally to 24 feet, and could find only small traces of quicksilver where the fumes passed into the fire place.

The manufacture of such small clay pipes is not difficult. Patera considers sheet iron the best material for the first large condensing pipe; further on, clay pipes are preferable. The whole operation takes about two hours, and at the beginning the fires should be very slow. The residue of ore of 3.06 per cent. contained .05 per cent., and the pure quicksilver amounted to from 88 to 90 per cent. The sheet iron condensing pipe is coated inside with "hartenlack" (a hard varnish), and outside with platinum paint.

The advantages claimed for this process are: the greater percentage obtained; the purity of the product; and prevention of the formation of soot.

AN IMMENSE FLUME.

The Fresno lumber and flume company, in Fresno county, are constructing under the supervision of George H. Perrin a flume which when completed will be fifty-four miles in length and is what is known as a V flume. It will be thirty-eight inches across the top. It starts near the Fresno Big Trees and will end at some point on the Southern Pacific railroad. It is intended to carry sugar-pine lumber to the railroad from the mills of the company. Twenty-four miles of this flume are already completed. The entire cost of this flume will be near \$250,000.



posite direction to the current of air out at the end, a, of the pipe, when the temperature rose. To prevent this and to protect the laborer, the pipe was closed at a, and a pipe applied to the middle of the cover. With this apparatus the ores were tested as to quantity. In this manner Patera got 85.07 of the quicksilver contained in 2.08 per cent. ore; in richer ore he got from 91 to 94 per cent.; the quicksilver contained very little soot.

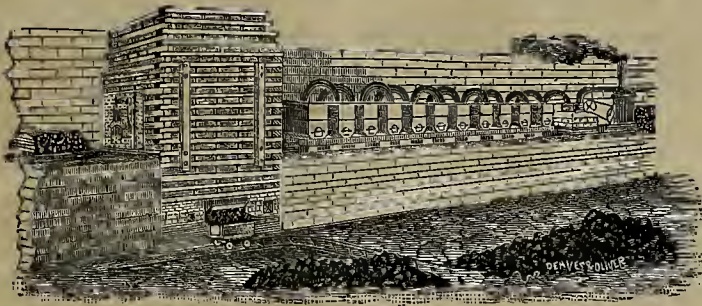
Encouraged by the results of these experiments, Patera obtained a patent in 1871. The furnace is a very simple one, on account of the

ing apparatus. The bottom of the retort is two feet wide; it is nine inches high, and ten feet long; three inches of each side rest on the brick wall, and three inches project beyond the rear wall, to connect with the condensing apparatus. Therefore, it gives four square feet heating surface of the retort bottom, available for the spreading of the ore to be retorted.

As 100 pounds of quicksilver ore of two to three per cent., and reduced to that fineness, occupy one cubic foot, there may be spread 100 pounds of ore on the heating surface in a layer three inches thick. The furnace is ur-

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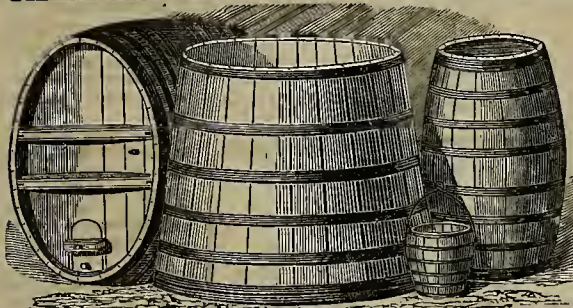
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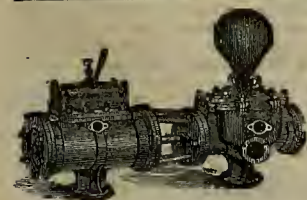
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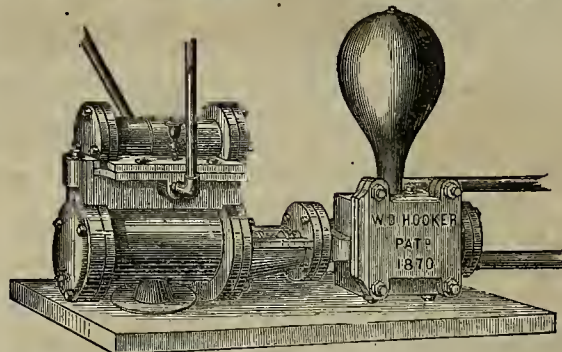
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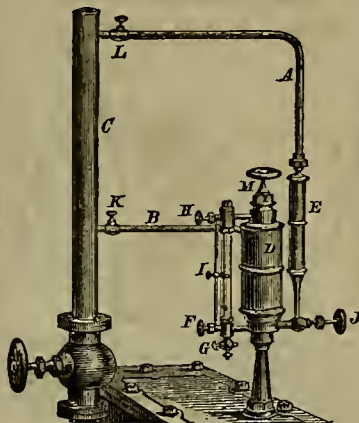
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thus enabled to reduce the cost of steel and at the
same time produce SHOES AND DIES superior to any yet
manufactured. We have consequently reduced the
price to 16 cents per pound and solicit a trial order,
guaranteeing that you will find them at least 10 per
cent. cheaper than the best iron. There are no STEEL
SHOES AND DIES made excepting under our patent and
sold at this office, or by our authorized agents, though
certain Eastern manufacturers advertise STEEL SHOES
AND DIES which are only cast iron hardened by the
addition of a composition. They will not out-wear two
sets of common iron, though called steel. They are
very brittle and are not capable of being tempered.
Sizing iron under the hammer like cast iron. Our
STEEL SHOES AND DIES are in use in many of the
mills on the Pacific Coast, and all who have tried them
pronounce them cheaper and far superior to iron in
every respect, even at the old price of 20 cents per
pound. Their advantages over iron are cheapness on first
cost, increased crushing capacity, time saved in chang-
ing and in setting tappets, increased value of amalgam
by absence of iron dross and chippings, and a saving of
75 per cent. in freight. It takes 60 days to fill orders
from the manufacturing East. Price 16 cents per
pound shipped at San Francisco. Terms liberal.



Address all orders, with dimensions, to
1729-3m
CAST STEEL SHOE & DIE CO., Room 1, Academy Building, S. F.

N. Seibert's Eureka Lubricators.



THE HIGHEST PREMIUM
Awarded by the Mechanics' Institute Fair, San Fran-
cisco, and State Fair, Sacramento, 1871.

These Lubricators are acknowledged by all engineers
to be superior to any they have ever used; feed con-
stantly by pressure of condensed water, supplied by
pipe A, regulated under the oil by valve J, and forced
out through check valve and pipe I into the steam pipe
C; it then becomes greasy steam, passes to all the
valves and cylinder at every stroke of the engine; glass
tube I indicates amount used per hour. Packing on
rods and stems lasts longer, and the rings on the piston
will not corrode. One pint of oil will last from three
to six days, according to speed and size of engine; I,
sliding gauge; K, valve to shut off when engine stops;
H, F, valves to shut off in case of frost; stem does not
enter the cup; it is always cool; warranted to give satis-
faction. Patented February 14, 1871. Manufactured by
California Brass Works, 125 First Street, S. F. 24v23

PACIFIC MACHINERY DEPOT
H. P. GREGORY
SOLE AGENT
FITCHBURG MACHINE CO'S
MACHINISTS'
TOOLS
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MACHINERY.

Iron and Wood-working Machinery, Wood Planers,
Lathes, Mitre and Cutting-off Saws, Iron Turning and
Screw Cutting Lathes, Planers, Shapers and Drilling
Machines, Screw and Scroll Chucks, from the best
makers, always on hand and for sale cheap by

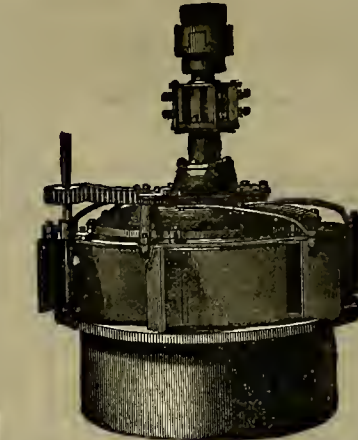
NEYLAN & YOUNG,
mar27eow 18 & 20 Spear Street, S. F.

Mining Machinery.



OAKES'S PATENT
Quicksilver Strainer.
Patented January 26, 1875.
For description see MINING AND SCIENTIFIC PRESS,
March 6, 1875.
For Cleaning Quicksilver Before Using it
for Amalgamation.
Mill-men are invited to examine the Patent Quick-
silver Strainer at the office of the Agents,
H. J. BOOTH & CO.,
UNION IRON WORKS, San Francisco.

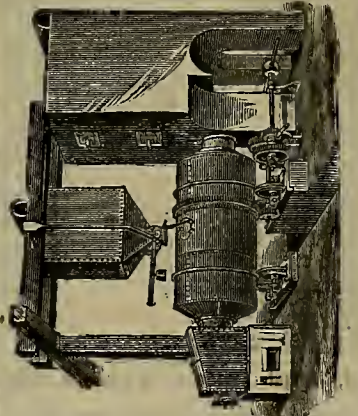
THE AMERICAN TURBINE WATER WHEEL



Recently improved and submitted to thorough scientific
tests by James Emerson, showing the following
useful effect of the power of the water utilized, being

THE HIGHEST RESULTS EVER KNOWN.
Percentage of part sets, $\frac{1}{2}$ 50.08; $\frac{3}{4}$ 59.64; $\frac{5}{8}$ 78.73
 $\frac{3}{4}$ 82.63; $\frac{1}{2}$ 82.90. Percentage of whole gate, 83.14.
Mr. Emerson says: "These are the best average
results ever given by any Turbine Wheel
in my experience."
A splendidly illustrated descriptive catalogue, or any
further information desired, furnished on application to

TREADWELL & CO.,
SAN FRANCISCO, CAL.
Sole Agents for the Pacific States and Territories.
18v29-cow-tf



TEATS'S PATENT FURNACE

For Roasting, Desulphurizing, Chloridizing
and Oxidizing Ores, etc. For the reduction of
Gold, Silver, Lead and other ores, saving a larger per-
centage, at less cost, than any other invention now in
use. Chloridizing Silver ore more thoroughly, in less
time, with less fuel, salt and labor, also roasting Lead
ore preparatory to smelting, better and cheaper than
any other invention. The Furnace is so constructed
that one man, of ordinary ability, tends five or more
furnaces; controls them with ease; adding heat or air,
stopping or starting at will; charging and discharging
with ease. Also, Patent "Conveying Cooler," for con-
veying and cooling roasted ores, heating the water for
amalgamation and the boilers at the same time. Saving
the large space in mill covered with brick or iron,
and the labor of two men per day, exposed to the poi-
sonous chlorine gases. Also, Patent Air Blast "Dry
Kiln," for drying ores direct from the mine or breaker,
saving fuel and labor heretofore necessary in drying
ores for dry pulverizing. For description refer to
MINING AND SCIENTIFIC PRESS, No. 18, October 31, 1874.
For particulars address

D. B. MILLER & CO.,
No. 12 West Eighth Street, Cincinnati, Ohio
Circulars, &c., will be furnished, if required.
18v23-3m

CROCKER'S PATENT TRIP HAMMER QUARTZ BATTERY.



This machine, complete, weighs 1,500 lbs. Has an iron
frame, five steel arms with stamps weighing 17 lbs. each,
which strike 2,500 blows per minute, in a mortar provided
with screens on both sides, and crushes 500 lbs. per
hour, requiring one-horse power to drive it. Has been
thoroughly tested, and is guaranteed to give good satis-
faction. PRICE, \$500.
G. D. CROCKER,
17v26-tf 815 California Street, San Francisco.

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS OF AND DEALERS IN
ASSAYERS' MATERIALS

Chemical Apparatus and Chemicals,

Druggists' Glassware and Sundries,

PHOTOGRAPHIC GOODS, ETC.,

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ASSAYERS' MATERIALS

—AND—
Chemical Apparatus,

Having been engaged in furnishing these supplies since
the first discovery of mines on the Pacific Coast.
Our Old and Silver Tables, showing the value
per ounce Troy at different degrees of fineness, and val-
uable tables for computation of assays in Grains
Grammes, will be sent free upon application.
7v25-tf **JOHN TAYLOR & CO.**

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they
have no equal. No effort has been, or will be spared
to have them constructed in the most perfect manner
and of the great number now in operation, not one has
ever required repairs. The constant and increasing de-
mand for them is sufficient evidence of their merits.
They are constructed so to apply the stamp directly
into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pen being filled, the motion of the muller forces
the pulp to the center, where it is drawn down through
the aperture and between the grinding surfaces.—
Thence it is thrown to the periphery into the quicksilver.
The curved plates again draw it to the center, where it
passes down, and to the circumference as before. Thus
it is constantly passing regular flow between the grind-
ing surfaces and into the quicksilver, until the ore is
reduced to an impalpable powder, and the metal amal-
gamated.

Setters made on the same principle excel all others.
They bring the pulp so constantly and perfectly in con-
tact with quicksilver, that the particles are rapidly and
completely absorbed.

Mill-men are invited to examine these pans and set-
ters for themselves, at the office, 229 Fremont Street,
San Francisco

Nevada Metallurgical Works,

21 First Street.....San Francisco.

Ores worked by any process.
Ores sampled.
Assaying in all its branches.
Analysis of Ores, Minerals, Waters, etc.
Plans furnished for the most suitable pro-
cess for working Ores.
Special attention paid to the Mining and
Metallurgy of Quicksilver.

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C. A. LUCKHARDT,
Mining Engineers and Metallurgists.

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COMMISSION MERCHANTS,

ADVANCES MADE

On all kinds of Ores, and particular attention

PAID TO
CONSIGNMENTS OF GOLD, SILVER,
4v16-3m

Instructions in Assaying,

Chemical Analysis, Determination of Minerals, and
use of the Blow-pipe.

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Will receive a few pupils at his new laboratory, 617
Montgomery Street, up-stairs. TERMS MODERATE

LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical

CHEMIST,
No. 611 Commercial Street,
(Opposite the U. S. Branch Mint
SAN FRANCISCO CAL. 7v21-3m

OAKLAND REAL ESTATE.—No city in this State equals Oakland in its general improvements and rapid growth. The building of the State University upon its very border, the large court house for Alameda county, several large and new churches, together with the \$200,000 appropriation by the Government for the improvement of its inland channels, stimulates great confidence in the future of San Francisco a sister across the bay. Oakland may well be proud of her public and private educational institutions. Its population is, in a great measure at least, now composed largely of people who choose a quiet home rather than the clatter and bustle of a great city. It has more advantages than we can stop to name, and people in the mines and agricultural districts are constantly investing in real estate in Oakland and vicinity for present and prospective homes. We think men are prone to make less wise investments. Parties who wish to post themselves further on the future prospects of Oakland, and to learn of the best chances offering for the sale of lots in Oakland and land in Alameda county, are confidently referred to the advertisement of Messrs. Bigelow & Rowell in the RURAL PRESS. These gentlemen, long residents of Oakland, are among its most enterprising and respected citizens.

WATER PIPE.—The necessity, in many sections of the State, for utilizing the water supply in the most economical manner, causes the demand for water pipe to increase with the development of our agricultural and mineral resources. While the mild and equable character of the climate renders the expensive and laborious method of laying pipe needed to guard against the severe winters of the Eastern States unnecessary here, the wants of the agriculturalist and miner have made it highly profitable to them to make use of this means for conveying water from the base of supply to points where it is required for use. So general has this now become that there is hardly a farmer but uses more or less water pipe, while in the mining districts miles of iron tubing conduct the reserved floods of the mountain streams to aid man in unveiling earth's hidden wealth. Prominent among the different qualities of pipe in this market is that of the Graff Tube Works, at Pittsburgh, Pa. The pipe of this company has achieved an excellent reputation, and loses nothing by being offered to the public through the agency of Mr. James L. Barker, 406 and 408 Market street. The grades most in demand on this coast vary from 1/2 inch to four inches in diameter and weigh from .42 to 18.77 pounds per foot. Mr. Barker keeps a large quantity of wrought and galvanized pipe of these dimensions in stock, and offers it at prices which compare favorably with those of other dealers.

General News Items.

A FEW days ago, in Gilroy, Mrs. Anna Bahh's little boy, three years old, drank a pound of quicksilver, which he found in a bottle in an old trunk, while playing. A physician was sent for, who administered some light remedy. The child gave no other indication of having taken the mercury than drowsiness. The metal did not leave the stomach for ten days.

A WRITER in the Visalia Delta states that Tulare lake contains twice the area usually ascribed to it, its length being seventy-five miles and breadth thirty miles.

A MARE belonging to Asa Butler, of San Benito, California, gave birth, a few days since, to two colts, one having five legs and the other but three.

THE San Diego World has changed hands. It still remains Democratic in politics.

THE waste dump of the Virginia City coal company, in El Dorado canyon, is on fire, and has been burning for about three days. It is supposed that it took fire from clinders thrown out from under the grates of the engine furnace. The dump is composed of a mixture of coal and dirt. The fire burns in a smoldering way and can do no damage, as the dump is at a distance from where the vein crops out.

A NEW double working shaft has been started in the Carolina mine, 150 feet east of the old prospecting shaft. The mine is 850 feet east of the Wells-Fargo, on the Comstock. The ledge is from 40 to 50 feet wide, and assays average from \$15 to \$20 in silver and gold—about two-thirds in silver.

A SUFFOCATING COUGH.

In a letter from Mrs. Charlotte Lisle, of Chicago, a lady well known as a contributor to the Western press, she ascribes the cure of a dangerous cough, accompanied by bleeding at the lungs, to HALE'S HONEY OF HOREHOUND AND TAR. "My cough," she says, "threatened to suffocate me * * * * * but the HONEY OF HOREHOUND AND TAR has removed every trace of it." The letter was to a lady friend in this city, who has placed it at the disposal of C. N. CRITTENTON, 7 Sixth avenue. PINK'S TOOTH-ACHE DROPS—Cure in one minute.

SANTA CLARA, CAL., April 6th, 1878.

MESSEHS. DEWEY & Co.—Gents:—We have just received Patent No. 160,535, for J. T. Watkins & Co's Mammoth Road Grader, which was patented through your Agency. It is the nearest and best that we have ever received. We feel proud of it and thankful to you for the care and attention that you have given it, and when we have anything to do in that line of business we will surely give you a call. Very respectfully, J. T. WATKINS & Co.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Galleries, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

GEORGE WILSON, formerly contributor of the MINING AND SCIENTIFIC PRESS, will please address this office.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & Co., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch. Dated Washington, D. C., April 6, 1878.

FOR WEEK ENDING MARCH 23.

TOOL FOR TURNING METAL.—Chas. Cummings, Virginia City, Nev.

BED-BUG TRAP.—John L. Hawkins, San Quentin, Cal.

WAGON-BRAKE BLOCK.—William Hendrick, Modesto, Cal.

WATER-WHEEL AND HYDRAULIC GOVERNOR.—Frederick G. Hesae, Oakland, Cal.

HYDRAULIC ENGINE.—William L. Smith, S. F., Cal.

VACUUM RELIEF VALVE FOR WATER PIPES.—Philip Hinkle, S. F., Cal.

GRAIN SEPARATOR.—Michael O'Brien, S. F., Cal.

AMALGAMATOR.—John Rutherford, S. F., Cal.

FRUIT JAR.—Pierre F. Darche, S. F., Cal.

DEMIOHON CASE.—Carlton Newman, S. F., Cal.

BAND SAWING MACHINE.—Olpha Bonnsy, S. F., Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & Co., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

METALS.

[WHOLESALE.]

THURSDAY M., April 7, 1878.

American Pig Iron, 4 ton	46 00	46 00
Scotch Pig Iron, 4 ton	46 00	46 00
White Pig, 4 ton	46 00	46 00
Oregon Pig, 4 ton	46 00	46 00
Refrain Bar, bad assortment, 3/4 in	5 3/4	5 3/4
Refrain Bar, good assortment, 3/4 in	5 3/4	5 3/4
Boiler, No. 1 to 4	5 3/4	5 3/4
Plate, No. 5 to 9	5 3/4	5 3/4
Sheet, No. 10 to 15	5 3/4	5 3/4
Sheet, No. 16 to 20	5 3/4	5 3/4
Sheet, No. 21 to 27	5 3/4	5 3/4
Horse Shoes, per keg	7 50	8 00
Nail Rod	10	10
Norway Iron	10	10
Roller Iron	6	6
Other Irons for Blacksmiths, Miners, etc.	6	4 1/2
Copper	35	40
Copper Tin'd	40	40
O. Kie's Pat.	40	40
Sheathing, 1/2 in	40	24
Sheathing, Yellow	40	24
Sheathing, Old Yellow	40	12 1/2
Composition Nails	24	24
Composition Bolts	24	24
Plates, Charcoal, 1/2 in x 6 in	14 00	14 50
Plates, 1/2 in Charcoal	12 00	12 50
Plating, 1/2 in	12	12 50
Plating, 1/2 in	12	12 50
Roofing Plates, 1/2 in	11 00	11 50
Rancho Tin, 1/2 in	32 1/2	33
STEEL—English Cast	20	20
Anderson & Woods' American Cast	20	20
Drill	18	16 1/2
Flat Bar	18	22
Zinc	9	10
Zinc Sheet	11 00	11 50
NAILS—Assorted sizes	4 25	8 00
QUICKSILVER, per lb	70	50

LEATHER.

[WHOLESALE.]

City Tanned Leather, 3/4 in	26 25	26 25
Santa Cruz Leather, 3/4 in	26 25	26 25
Country Leather, 3/4 in	26 25	26 25
Stockton Leather, 3/4 in	26 25	26 25
Jodot, 8 Kil, per doz	50 00	54 00
Jodot, 11 to 13 Kil, per doz	50 00	70 00
Jodot, 14 to 16 Kil, per doz	50 00	70 00
Jodot, second choice, 11 to 16 Kil, 3/4 doz	50 00	74 00
Cornellian, 12 to 16 Kil	50 00	67 00
Cornellian Females, 12 to 16 Kil	50 00	67 00
Simon Ulmo Females, 12 to 16 Kil	50 00	67 00
Simon Ulmo Females, 14 to 16 Kil	50 00	72 00
Simon Ulmo Females, 16 to 17 Kil	50 00	75 00
Simon, 18 Kil, 3/4 doz	50 00	63 00
Simon, 20 Kil, 3/4 doz	50 00	67 00
Simon, 24 Kil, 3/4 doz	50 00	74 00
Robert Oalf, 7 and 8 Kil	35 00	40 00
French Kip, 3/4 in	1 00	1 15
California Kip, 3/4 in	4 00	4 15
French Sheep, all colors, 3/4 in	8 00	8 50
Eastern Calf for Sacks, 3/4 in	1 00	1 25
Sheep Roams for Topping, all colors, 3/4 in	5 00	5 50
Sheep Roams for Linings, 3/4 in	5 00	5 50
California Ramest Sheep Linings	1 75	4 00
Best Jodot Calf Boot Legs, 3/4 pair	5 00	5 25
Good French Calf Boot Legs, 3/4 pair	4 00	4 75
French Calf Boot Legs, 3/4 pair	4 00	4 75
Harness Leather, 3/4 in	30 00	37 1/2
Fair Bridge Leather, 3/4 in	45 00	72 00
Skirting Leather, 3/4 in	30 00	37 1/2
Welt Leather, 3/4 in	30 00	50 00
Buff Leather, 3/4 in	17 00	17 00
Wax Side Leather, 3/4 in	17 00	17 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by CHARLES SUTRO & Co.]

LEGAL TENDERS in S. F., 11 A. M., 8 1/2 to 8 3/4. GOLD BARS, 600. SILVER BARS, 4 and 4 1/2 per cent. discount. EXCHANGE on N. Y., 1/4 per cent. premium for gold; Mexican Dollars, 1/2 and 2 per cent. discount. Currency, 14 per cent. on London—Bankers, 4 1/2; Commercial, 50. Paris, 5 francs per dollar. LONDON—Consols, 93 to 93 1/2; Bonds, 100 1/4; Liverpool Wheat 3s. 3d.; 3s. 7d.; 3s. 7d.; 3s. 7d.; 3s. 7d. QUICKSILVER in S. F., by the flask, per lb, 80c @ 90c.

T. A. McORMICK, OSCAR LEWIS, J. McORMICK.

McCormick, Lewis & Co.,

INDUSTRIAL IRON WORKS.

Manufacturers of Light and Heavy Castings. Particular attention given to Architectural Iron Work.

233 and 235 BEALE STREET,

Between Howard and Folsom Streets, SAN FRANCISCO.

MACHINE WORK BY CONTRACT.

Estimates given, for Special Work of every description. Are fully equipped with first-class Machinery and Tools.

The Hull & Eelden Company, Danbury, Ct.



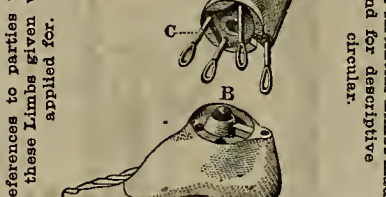
This is a Surs Cure for Scraw Worm, Scab and Foot Rot in Sheep. It also kills Ticks, Lice, and all Parasites that infest Sheep. Prevents scratching and greatly improves the quality of the wool. One gallon of this Dip properly diluted with water will be sufficient to dip one hundred sheep, so that the cost of dipping is a mere trifle, and sheep owners will find that they are amply repaid by the improved health of their flocks. This Dip is guaranteed to cure when used according to directions, and to be vastly superior to Corrosive Sublimates, Sulphur, Tobacco, and other remedies which have heretofore been used by farmers. Circulars sent, post paid, upon application, giving full directions for its use, also certificates of prominent sheep growers who have used large quantities of the Dip, and pronounce it the most effective and reliable known Cure and Preventive of Scab and other kindred diseases in Sheep. mrl3-bp

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166 Tehama Street,

COR. OF THIRD, BETWEEN HOWARD & FOLSOM

References to parties wearing these Limbs given when applied for.



THE "ANATOMICAL LEG" WITH A UNIVERSAL ankle motion; the above cut is its illustration. This artificial leg approaches so much nearer an imitation of the functions of nature than any other, that it stands without a rival among all the inventions in artificial legs, old or new. (The very latest announced new inventions duly considered.) Address MENZO SPRING, 166 Tehama Street, S. F., Cal. 6v30-lam-hp-3m

"THE DANBURY" DRILL CHUCK. The Favorite Everywhere. Send stamp for circular. The Hull & Eelden Company, Danbury, Ct.

P. S.—These Chucks are now on hand and for sale at manufacturers' prices by

H. P. GREGORY, Agent, Nos. 14 & 16 First Street, S. F.

EXECUTRIX SALE.

STODDART'S IRON WORKS.

This old and well established Machine Business, together with the first-class Tools, Stock, etc., for sale, and building to lease. Apply on the premises, 114 Beale Street, San Francisco, Cal.

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WOODBERRY COTTON DUCK.

33, 36, 40, 42 and 45-inch Wide Duck; 8, 10, 12, and 15-ounce Duck.

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Boiler Flues, Gasand Water Pipe, Cast

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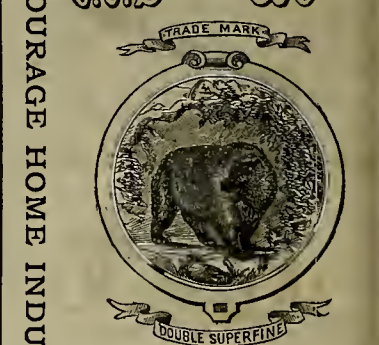
14 & 16 Battery S

San Francisco.



These goods are specially adapted for the use of FARMERS, MECHANIC MINERS, and WORKING MEN in general. They are manufactured of the Best Material, and in the most perfect manner. A trial will convince everybody of this fact. Patented May 12, 1873. USE NO OTHER, AND INQUIRE FOR THE GOODS ONLY.

ENCOURAGE HOME INDUSTRY.



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50 per cent. Better than any

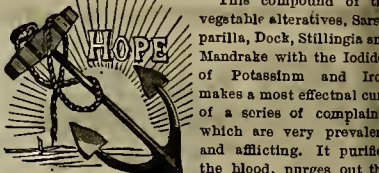
Imported Mustard.

Ask Your Grocer for it.

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Ayer's Sarsaparilla,

FOR PURIFYING THE BLOOD.



This compound of the vegetable alternatives, Sarsaparilla, Dock, Stillinger, and Mandrake with the Iodide of Potassium and Iron makes a most effective cure of a series of complaints which are very prevalent and afflicting. It purifies the blood, purges out the lurking humors in the system, that undermine health and settle into troublesome disorders. Eruptions of the skin are the appearance on the surface of humors that should be expelled from the blood. Internal derangements are the determination of these same humors to some internal organ, or organs, whose action derange, and whose substance they disease and destroy. AYER'S SARSAPARILLA expels these humors from the blood. When they are gone, the disorders they produce disappear, such as Ulcerations of the Liver, Stomach, Kidneys, Lungs, Eruptions and Eruptive Diseases of the Skin, St. Anthony's Fire, Rose or Erysipelas, Pimples, Pustules, Blotches, Boils, Tumors, Tetters and Sal Rheum, Scald Head, Ringworm, Ulcers and Sores, Rheumatism, Neuralgia, Pain in the Bones, Side and Head, Female Weakness, Sterility, Leucorrhoea arising from internal ulceration and uterine disease, Dropsy, Dyspepsia, Emaciation and General Debility. With their departure health returns.

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Sold by all Dealers throughout the World.

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12 Per Cent.
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Interest Payable Monthly, in Gold and Silver.
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Incorporated February 12th, 1875.
Capital Stock, --- \$27,000,000,
IN CONSOL SHARES OF \$1 EACH,
Of which 13,500,000 shares constitute the Sinking and Investment Fund. Interest payable monthly at the rate of 12 per cent. per annum. Certificates of CONSOLS shall be receivable at their par value in exchange for any Mining, Real Estate or Landed Property of the Company.
Directors: W. R. REYNOLDS, J. M. FETTER, L. K. GOODMAN, J. H. BATES.
Certificates of CONSOLS only issued at the rate and proportion of 50 per cent. of the cash valuation of property to be represented in CONSOLS shares. Dividend paid from profits and sales of property, and only on shares of CONSOLS that have been issued for property valued and entered on the books of the Company.
Principal Office, 526 Kearny Street.
Principal Depository Agency, --- Bank, San Francisco.
Depository Agencies for payment of interest on CONSOLS will be established in the principal cities in the United States and Canada, and in London, as when required.
Interest payable on the 5th of each month at any Depository Agency of the Company.
Certificates of Interest-bearing CONSOLS, Class A, First Series, issued for Mining Property in Washoe, Storey and Lyon counties and on the Comstock Lode, in Nevada, will be ready for delivery to subscribers and purchasers on or before April 10th 1875.
Orders for not less than one hundred shares of CONSOLS, with the purchase money required (\$1 per share), may be sent through Wells, Fargo & Co., at our expense. No certificate of stock issued for less than twenty shares. All orders must be addressed, "Office of the CONSOLS M. R. E. and L. Company, 526 Kearny street, San Francisco."
T. PHELPS, President.
W. S. REYNOLDS, Secretary.
apr3-sa-hp

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IMPROVED ADJUSTABLE CRANK PIN.
Strikes Blow Heavy or Light, Fast or Slow.
Prices Reduced Jan. 1st, 1875.
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Minning and Other Companies.
California Consolidated Mill and Mining Company.—Principal place of business, San Francisco, Cal. Location of works, Nashville, El Dorado county, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of April, 1875, an assessment of fifty (50) cents per share was levied upon the capital stock of the corporation, payable immediately in U. S. gold and silver coin, to the Secretary at the office of the company. Any stock upon which this assessment shall remain unpaid on the 30th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 18th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expense of sale.
J. W. TRIPP, Secy.
Office, 408 California street, room 15.
Cincinnati Gold and Silver Mining Company.—Principal place of business, San Francisco, Cal. Location of works, Kelsey Mining District, El Dorado County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of April, 1875, an assessment of ten (10) cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold and silver coin, to the Secretary at the office of the company, 531 California street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the 30th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 17th day of May, 1875, to pay the delinquent assessment together with costs of advertising and expense of sale.
W. M. SMALL, Secretary.
Office, Room 1, No. 531 California street, San Francisco Cal.
Electric Mining Company, Location of principal place of business; San Francisco, State of California.
NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 16th day of February, 1875, the several amounts set opposite the names of the respective shareholders, as follows:
No. Certificate. No. Shares. Amount.
A H Putnam.....531 75 \$3 90
Alfred Wright.....338 50 2 50
Alfred Wright.....339 50 2 50
Alfred Wright.....340 50 2 50
Alfred Wright.....341 50 2 50
Alfred Wright.....342 100 5 00
Alfred Wright.....343 100 5 00
T B Wingard, Trustee.....326 1,000 50 00
T B Wingard, Trustee.....327 100 5 00
T B Wingard, Trustee.....347 2,825 141 25
T B Wingard, Trustee.....358 238 11 90
T B Wingard, Trustee.....359 100 5 00
J B Houghton.....352 897 19 85
O J Rader.....324 1,080 54 00
O J Rader.....330 1,080 54 00
O J Rader.....331 100 5 00
O J Rader.....332 1,200 60 00
O Case.....286 230 11 50
D B Jackson.....285 87 4 35
W W Smyth.....271 100 5 00
A D H Tohy.....258 100 5 00
A D H Tohy.....259 15 75
A D H Tohy.....275 50 2 50
A D H Tohy.....277 8 40
O M Ury.....248 6,250 312 50
Henrietta Grant.....362 20 00
Louisa Thompson.....161 400 20 00
Louisa Thompson.....239 80 3 00
Jas White.....154 250 12 50
Jas White.....155 250 12 50
Jas White.....255 75 3 75
Anna Woods.....280 550 27 50
H M Shaw.....329 100 5 00
H M Shaw.....344 31 1 55
Alfred Briggs.....66 1,334 66 70
Alfred Briggs.....200 100 5 00
G W Terrill.....51 500 25 00
John Mullen.....205 1,000 50 00
John Mullen, Trustee.....364 3,750 187 50
And in accordance with law, and an order of the Board of Directors, made on the 15th day of February, 1875, so many shares of each parcel of said stock as may be necessary will be sold at public auction at the salesrooms of Maurice Dore & Co., No 326 Pine Street, San Francisco, on the 12th day of April, 1875, at the hour of 12 o'clock, m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale. A. B. PAUL, Secy.
Office, No. 318 California street, San Francisco, Cal. (Room No. 13.)
Gold Mountain Mining Company.—Principal place of business, San Francisco, Location of works, Lower Rancheria, Amador county, Cal.
Notice is hereby given that at a meeting of the Board of Directors, held on the 26th day of March, 1875, an assessment of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold and silver coin, to the Secretary, No 118 Leidesdorff street, San Francisco, Cal.
Any stock upon which this assessment shall remain unpaid on the 24th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
AUG. KNAPP, Secretary.
Office, 115 Leidesdorff street, San Francisco, Cal.
Keystone Quartz Mining Company.—Principal place of business, San Francisco, California. Location of works, Butte Township, Sierra county, Cal.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 8th day of March, 1875, an assessment of one dollar (\$1) per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, northwest corner Pine and Sansome streets, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 15th day of April, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
LOUIS VESARIA, Secretary.
Office, Northwest corner Pine and Sansome streets, San Francisco, California.
Manhattan Marble Company of California.—Location of principal place of business, San Francisco, California. Location of works, Oakland, Alameda county, State of California.
Notice is hereby given, that at a meeting of the Directors, held on the 30th day of March, 1875, an assessment of five dollars per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary of the company, at his office, Nos. 13 and 15 Fremont street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 30th day of April, 1875, shall be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 15th day of May, 1875, at 12 o'clock, m., to pay the delinquent assessment, together with costs of advertising and expenses of sale.
L. L. ALEXANDER, Secretary.
Office, Nos. 13 and 15 Fremont street, San Francisco, California.
Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley Township, Nevada County, California.
Notice is hereby given, that at a meeting of the Board of Trustees of said corporation, held on the 15th day of March, 1875, an assessment of one dollar per share was levied upon the capital stock of said company, payable immediately, in gold coin of the United States of America, to the Secretary, at the office of the company, room 8, No. 315 California street, San Francisco, California.
Any stock upon which said assessment shall remain unpaid on Wednesday, the 21st day of April, 1875, will be advertised on that day as delinquent, and unless payment shall be made before, will be sold on Monday, the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
J. F. NESMITH, Secretary.
Office—Room 8, No. 315 California street, San Francisco, Cal.
Silver Sprout Mining Company.—Principal place of business, San Francisco, State of California. Location of works, Kearsarge Mining District, Inyo County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 17th day of February, 1875, an assessment of five cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, at the office of the company, in San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 16th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Thursday, the 17th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
T. E. WINGARD, Secretary.
Office—Room 13, No. 318 California street, San Francisco, California.
Theresa Mill and Mining Company.—Principal place of business, San Francisco, State of California. Location of works, Coulterville District, Mariposa County, California.
Notice is hereby given that at a meeting of the Board of Directors, held on the 14th day of March, 1875, an assessment of twenty cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, at the office of the company, Room 15, 408 California street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 14th day of April, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the 10th day of May, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.
B. K. HENCOX, Secretary.
Office—Room 15, 408 California street, San Francisco, California.
Tuolumne Hydraulic Mining Company.—Location of principal place of business, City and County of San Francisco, State of California. Location of works, Tuolumne county, State of California.
NOTICE.—There are delinquent upon the following described stock, on account of assessment No. 4 levied on the 23d day of February, 1875, the several amounts set opposite the names of the respective shareholders, as follows:
Names. No. Certificate. No. Shares. Amount.
John Hahn.....1 5 00
E Van Santen, Trustee.....2 100 20 00
E Van Santen, Trustee.....3 100 20 00
E Van Santen, Trustee.....4 100 20 00
E Van Santen, Trustee.....5 100 20 00
E Van Santen, Trustee.....6 100 20 00
E Van Santen, Trustee.....7 100 20 00
E Van Santen, Trustee.....8 100 20 00
E Van Santen, Trustee.....9 100 20 00
E Van Santen, Trustee.....10 100 20 00
E Van Santen, Trustee.....14 100 20 00
E Van Santen, Trustee.....15 100 20 00
E Van Santen, Trustee.....16 100 20 00
E Van Santen, Trustee.....17 100 20 00
E Van Santen, Trustee.....18 100 20 00
E Van Santen, Trustee.....19 100 20 00
E Van Santen, Trustee.....20 100 20 00
E Van Santen, Trustee.....21 100 20 00
E Van Santen, Trustee.....22 100 20 00
E Van Santen, Trustee.....23 100 20 00
Camilo Martin, Trustee.....24 100 20 00
Camilo Martin, Trustee.....25 100 20 00
Camilo Martin, Trustee.....26 100 20 00
Camilo Martin, Trustee.....27 100 20 00
Camilo Martin, Trustee.....28 100 20 00
Camilo Martin, Trustee.....29 100 20 00
Camilo Martin, Trustee.....30 100 20 00
Camilo Martin, Trustee.....31 100 20 00
Camilo Martin, Trustee.....32 100 20 00
Camilo Martin, Trustee.....33 100 20 00
Sidney Buckingham.....42 500 100 00
Sidney Buckingham.....43 500 100 00
Sidney Buckingham.....44 100 20 00
Sidney Buckingham.....45 100 20 00
Sidney Buckingham.....46 100 20 00
Sidney Buckingham.....47 100 20 00
Sidney Buckingham.....48 100 20 00
S D R Stewart.....52 1,000 200 00
S D R Stewart.....53 1,000 200 00
S D R Stewart.....54 500 100 00
S D R Stewart.....55 500 100 00
E Weissig, Trustee.....88 3,000 600 00
Isaac T. Milliken.....84 100 20 00
Charles Baum, Trustee.....85 750 150 00
WGTaalbertsberg, Trustee.....89 2,500 500 00
George W Clark.....not issued 6,000 1,200 00
E Kindman.....not issued 750 150 00
J T Machan.....not issued 3,000 600 00
And in accordance with law, and an order of the Board of Directors, made on the 23d day of February, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the company, Room 14, 302 Montgomery street, San Francisco, California, on Saturday, the 17th day of April, 1875, at the hour of 12 o'clock, m., of such day, to pay delinquent assessments thereon, together with costs of advertising and expenses of the sale.
I. T. MILLIKEN, Secretary.
Office—Room 14, 302 Montgomery street, San Francisco, California.
POSTPONEMENT.—The above sale is hereby postponed until Monday, March 19th, 1875, at the same hour and place above mentioned. By order of the Board of Trustees,
I. T. MILLIKEN, Secretary.

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Wm. Norris, Wm. H. Taylor, J. B. Haggin,
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WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary
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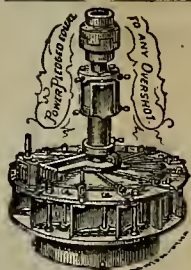
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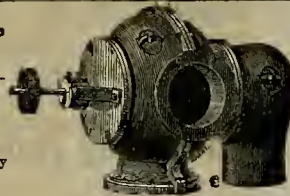
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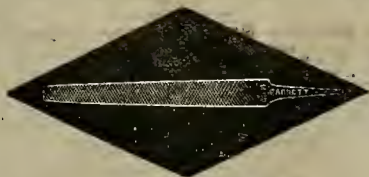
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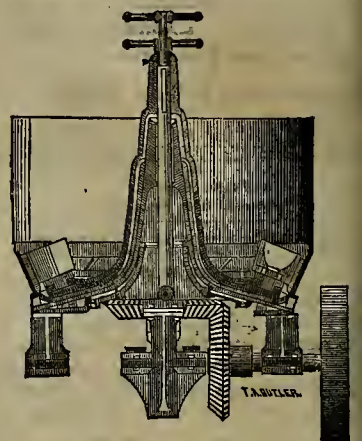
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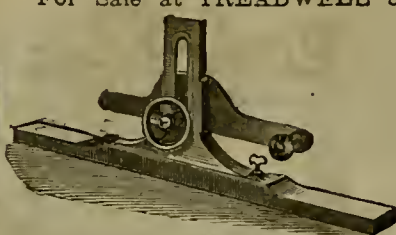
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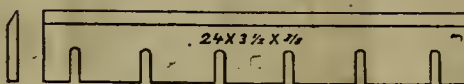
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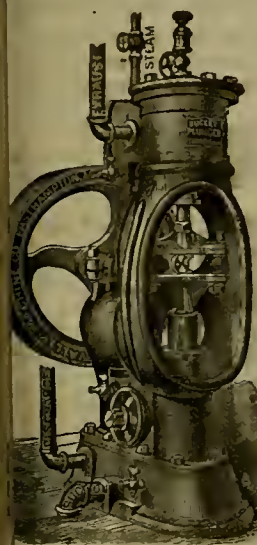
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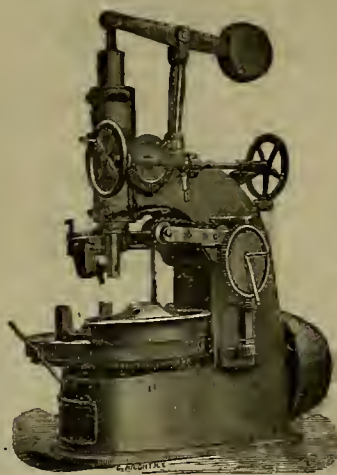


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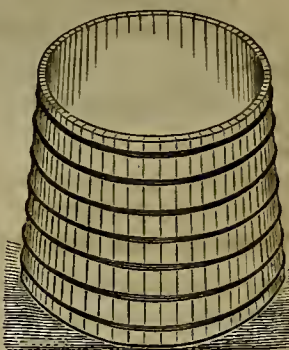
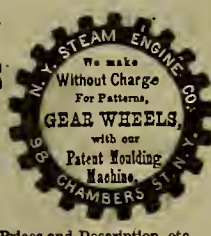
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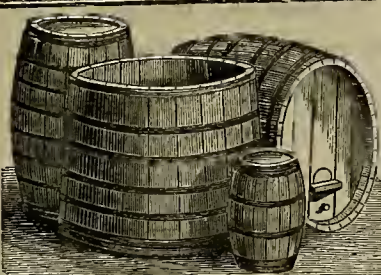
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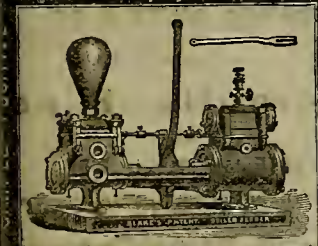
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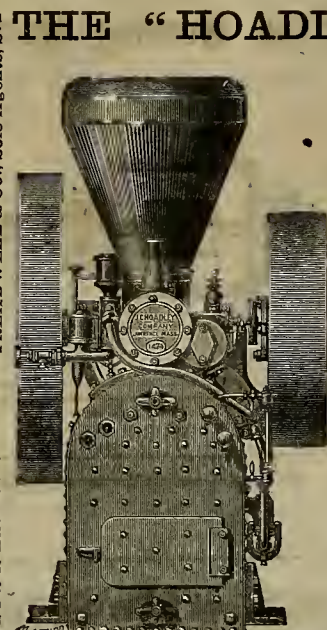
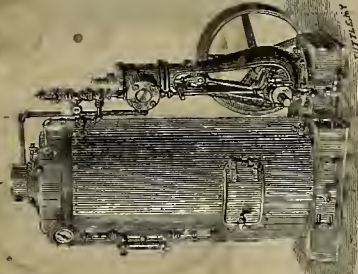
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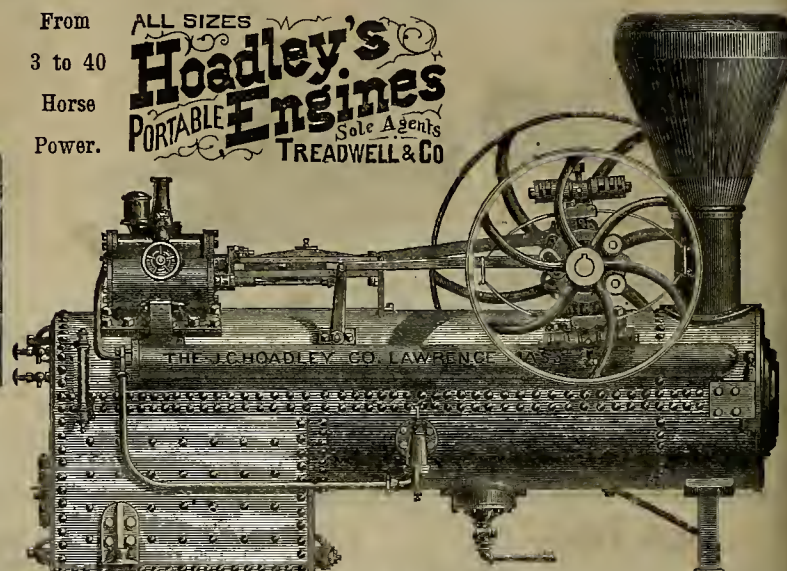
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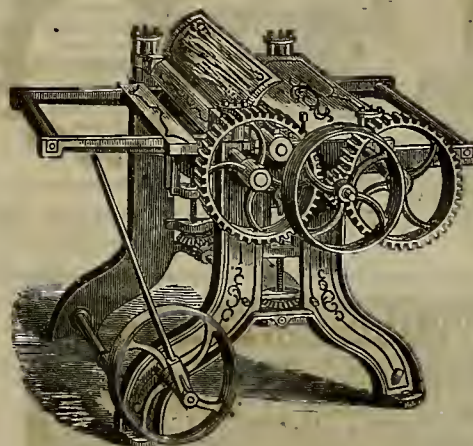
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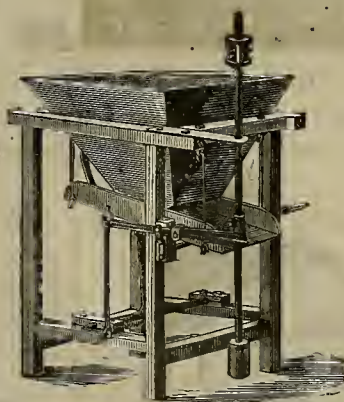
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MINING AND SCIENTIFIC PRESS.

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SAN FRANCISCO, SATURDAY, APRIL 17, 1875.

VOLUME XXX
Number 16.

A New Industry.

A collection of all the various articles of domestic and commercial use into which paper enters as the chief constituent, would form quite an extensive and interesting museum. With the expanding progress of invention it is difficult to forecast where the end will be to the application of this simple yet useful material. So extensive has become its application that the rag bag of the housewife, the gleanings of the cheffonier, and the waste of the cotton mill, long since failed to meet the wants of the paper manufacturer in the way of new material, and almost the entire fibrous material of the vegetable kingdom, not even omitting the growth of the forest, has been called upon to supply this ever increasing demand for paper "pulp."

The latest use to which paper has been applied is the manufacture of barrels of various sizes, from the size of a fruit can capacity up to the largest packages employed for packing flour, sugar, etc.

Were we not already familiar with the paper collar, paper bosom, and even the full length extension of shirt, paper handkerchiefs, pants and coat—the last made even water-proof—we might have regarded the idea of a paper barrel as preposterous. But nothing in the way of handiwork possibilities can now surprise the ordinarily intelligent Yankee; and so, when some months since we heard that to that curious collection of machinery employed in the wonder working mechanisms that may be daily witnessed at the Pacific Barrel Factory of Flint, Peabody & Co., on Brannan street, near Eighth, was to be added still another set of machinery for converting the straw of our wheat fields into convenient packages for conveying to market the grain itself, we suppressed any demonstration of curiosity, but resolved to "keep an eye out" and watch closely the development of that new Yankee notion. True to our purpose, we have from time to time made some excuse or another for just happening in, you know, at the works, until one day the past week we observed the workmen actually engaged in making paper barrels, and judging from the *modus operandi* and the quality of the article produced, we see no reason why that institution would not better serve the public and themselves by converting their supply of timber into kindling wood, and turning their entire force to converting the waste straw of our wheat fields into the neat looking and substantial paper barrels with which they are now prepared to supply all who may be in need of that kind of package.

What is a Paper Barrel?

Is a question that the reader will very naturally ask—how is it constructed? In answer we would say that this barrel is made of successive layers of ordinary straw paper board, cemented together, and subjected in the process to an enormous pressure, the result of which is a compact sheet of considerable thickness, and of far greater resistive force than the same thickness of the toughest wood that the forest can produce. The sheet thus formed has its two ends dove-tailed, as shown in Fig. 1 of the accompanying illustration, which are afterwards brought together and closed in the form of a cylinder, as shown in Fig. 2, backed by a cleat of the same material, and held firmly in place by double pointed tacks, which are driven through and clinched on the inner side. The heads of the barrels are turned from wood and flanged, as shown in section, and inserted in the cylinder, and so secured as to be much stronger and safer than in a common wooden barrel. The barrel may be subsequently strengthened by hoops, either of paper or iron, as may be desired, although the former seems all that is needed. The resisting power and durability of these barrels will be perfectly apparent to any person who will take the trouble to examine them. The following may be mentioned as

Some of the Advantages

They possess over the wooden barrel. Their form being that of a uniform cylinder there is a saving of fifteen per cent. in stowage. This

would be a large gain in stowing in a vessel, and also in cost of storage in warehouse.

They have successfully stood all trials as to liability to burst, having been tested with 4,000 pounds inside pressure without bursting.

The paper is made water proof, impervious to air or moisture, and hence is not liable to absorb the odors arising from other articles when stored together in a vessel, and being about air tight they are especially desirable as a protection against the insects and vermin which abound in warm climates and against

than boxes. They are also proof against dust, bugs or insects, as they are so tight that none can enter.

They can be unheaded without injury to barrel or head, and when empty will form a valuable and even ornamental article for many household purposes, such as for the storage of



Paper Barrel Complete.



Paper Barrel in Parts.

loss of flour or sugar by sifting out in handling.

They are more easily handled than the wooden barrel, as they roll at a true angle, while the wooden barrel, from its convex shape, is liable to roll in any direction. Nei-

soiled clothing, furs, linen, vegetables, etc. They are especially calculated as desirable packages for flour, sugar, rice, cheese, butter, meal, grain of all kinds, coffee, spices, dried and other fruits, etc.

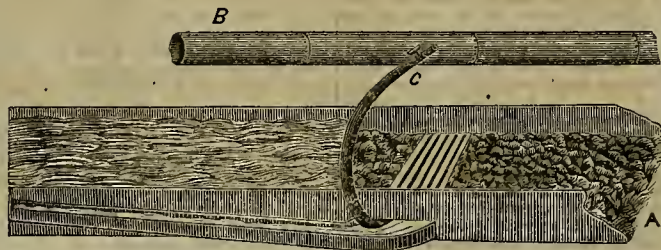


Fig. 1. Main and auxiliary sluice-boxes. A, rock-pavement; B, large iron pipe; C, small pipe.

ther will the heads fall out as readily as those of wooden barrels.

They can be shipped each part complete, and set up as required, thus saving much

At some future time, when the machinery is in more full and complete operation, we propose to give a detailed description of the machinery by which they are constructed, and the

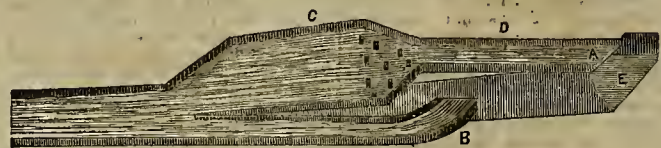


Fig. 2. Arrangement of undercurrent, (perspective distorted to show details.) A, first tap; B, second tap; C, platform of undercurrent; D, widened boxes; E, main sluice.

space and cost in transportation; and in this way any man can be his own cooper. Any boy can put them together. A smart boy can set up from one hundred to one hundred and fifty barrels per day. The hoops are only added for protection in rolling, so that if they become loose, or are even knocked off, the barrel is in no degree impaired.

The paper from which the barrel is made is manufactured from wheat straw, and it is evident that nothing can be cleaner or sweeter for the packing of flour than the straw on which it is grown. And the same advantage applies to sugar and many other articles.

These barrels are lighter and more easy to handle than any others of equal capacity, or

misfortune, soon after they started on the Potrero, to lose their entire stock and machinery by fire. But, nothing daunted, they immediately ordered new, more perfect and more extensive machinery, and rebuilt at their present location. They have been constantly adding new and improved machinery from time to time, thus keeping their establishment constantly abreast of the best appointed institutions of the kind in the country, and always ready to supply the public with the best character of work. It is in furtherance of this desire to be behindhand in nothing, that they have just added the new feature which forms the subject of this article. We may also add, in concluding, that much of the success of this enterprise has been due to the energy, urbanity and untiring devotion to his charge of the chief manager, Mr. James L. Crosset, who has been in charge of the works from their very first inception until the present time.

Hydraulic Mining in California.

No. 21.

Figure 1 represents the sluices running on a higher grade than 6 inches to 12 feet, to make the difference in grade which exists between the two sluice-boxes more prominent and perceptible. A represents the rock pavement in the main sluice-boxes flush with the grating. B is an iron pipe, large enough to supply streams of pure water in sufficient quantities, when necessary. C is a smaller pipe, leading a jet of water into the box below the grating. The small sluices, containing the strained gravel-wash, will gain, in a run of 250 feet, about 3 feet and 6 inches high over the main sluice-boxes, the former running on 4 inches and the latter on 6 inches grade to the 12 feet. At this point—250 feet from the first tap—another grating and small sluice-box is established as before. At the same point the platform of an under-current, 36 feet long and of any desirable width, running on a grade of 12 inches per 12 feet, or 1 inch per foot, can be constructed. This platform connects at its lower end with the second smaller sluice-box, and empties its contents into that box, which needs to be enlarged sufficiently to carry, in a shallow stream, all the gravel and water received. It is supposed that another jet of pure water has been tapped from pipe B, and applied as before mentioned. It will hardly be necessary to say that all these arrangements should be carried on far enough from the main sluices not to interfere with them except at those places where the tapping takes place.

In Fig. 2 A is the first tap, running 250 ft. and gaining 3 ft. 6 in. over grade of main sluices. B, Second tap from main sluices, 3 feet 6 inches lower than the first. C, Platform of under-current, on 1 inch per foot grade, and 36 feet long. D, Widened boxes, running on 4 inch per 12 feet grade. E, Main sluice.

We have here, then, in a distance of 250 feet, and without loss to the grade or elevated position of the main sluices, an under-current of 36 feet length and 1 inch per foot grade; and we can repeat the arrangement for every similar distance, and without losing control of the strained gravel, etc., which is carried onward independent of the mass of material in the main sluices.

The finer gravel, which is gradually extracted from the main sluices, must be collected into one box, increased in size as new tributaries empty into it. Considering that only very fine gravel, with an increased supply of water, is carried by these boxes, they may be made very wide, so as to permit the gravel and sand to spread and run in a thin stream.

To regulate the overflow, triangular checks, as represented in the platform C in the last sketch, may be used, one of the angles turned toward the stream.

If a drop is preferred, from time to time, instead of an under-current, or its platform, a very strong and tight box should be placed below, and a few feet lower than the actual drop.

To the bottom of this box a strong iron pipe, 1 or 2 inches in diameter, may be adjusted, being, at the same time, connected with the supply-pipe which furnishes the water along the line of sluices.

Condensed from an article by Charles Waldeyer, of the last Annual Report of the U. S. Commissioner of Mining Statistics.

Coal on the Pacific Coast.

At the 1st meeting of the California Academy of Sciences, Amos Bowman, formerly of the State Geological Survey, read the following paper on the "Coal Deposits of the Pacific Coast."

By permission of the Chief Engineer and Directors of the Central Pacific railroad company, I hope to be able to present to the Academy, shortly, for examination and criticism, one or more of a series of maps made by me, which accompanied a report to the Chief Engineer, Mr. Montague, of a reconnaissance, undertaken at his suggestion, and recently carried out by me in the employ of the railroad company.

The subject of this reconnaissance end of these maps is the coal deposits adjacent to the lines of communication of the railroad.

Where coal furnishes the sinews or motive power of all our traffic, and where the cost of getting it involves not only dollars and cents to the railroad company, but fares and freights, touching every pocket in the Pacific States, we are in a position to realize that the formations in which coal is found are worth knowing about, and that there can be a case where even fossils mean dollars and cents.

I had previously given attention to tertiary and principally surface geology as underlying the great industry of hydraulic placer mining, and to the "eriferous slate formation" of the mesozoic or middle age—in other words, secondary age, with its gold veins, as underlying the quartz mining industry of California, these two industries together yielding California, annually, over \$20,000,000 in gold.

The present study brings up the intermediate period, the *cretaceous*, and in its comprehensiveness it is, geologically, perhaps the most important. California pays out over \$6,000,000 every year for coal; the people of the United States are paying, at the low average of \$5 per ton, \$220,000,000 every year for coal; the civilized world is paying over a billion annually.

I wish to state, only very briefly now, a few of the leading facts that my reconnaissance developed:

1. The fact of the existence of two continents; a Cordilleran continent far to the west of the Appalachian continent, at the time when the peculiar condition of things arose in the West, which resulted in giving us our coal beds.

The outline of the Cordilleran continent of the period I was able to trace much more easily and with much more detail than I had anticipated was possible, with the data and the means at hand when I began. The rocks of the cretaceous period in the Pacific States are generally sandstones, merely locally metamorphosed, and the fossils found in them are so abundant that the contributions of geologists of the United States and other exploring parties have furnished sufficient data from which their general geographical distribution could be mapped with perfect reliability.

The Rocky mountains at our latitude were not a part of this Cordilleran continent, but formed one large island, extending from Denver to Santa Fe. The Overland railroad, where it crosses the summit of the Rocky mountains, follows what was the bottom of the sea, along a strait, extending through the Rocky mountains. At Salt Lake it strikes the ancient western continent of our coal period, and at Rocklin it leaves it again.

The sea extended not only from Omaha to the island of the Rocky mountains mentioned, but 270 miles west of the eries of the Rocky mountains, over what is now the Cordilleran plateau, as far as the Wasatch mountains, and down along the Colorado river into Arizona. On the west side it covered a large portion of Arizona, of Eastern Oregon, and of the interior of British Columbia east of the Cascade mountains.

The upper cretaceous and lower tertiary rocks embrace a series of formations which may be called the *Cordilleran coal measures*. Their fauna and flora are closely related to each other. Their lithological character and the geological conditions under which they were formed are identical, forming as they did a marginal deposit, extending clear around this Cordilleran continent of our coal period, and giving me a hundred thousand square miles of country more or less coal bearing.

That this statement may not appear exaggerated, I will add that the localities have been tabulated in the report referred to, by States and Territories, and located on the maps, and that the coals themselves, with accompanying fossils, were essentially collected or sent for by myself and Mr. Soupham, Assistant Engineer of the Central Pacific railroad. They are not packed away in boxes, but properly arranged and labeled, in paper trays, and placed on shelves, where they can be seen. There are about 300 specimens, representing the coals and coal measures, and they will speak for themselves.

In the table of localities where coal has been found are given the particulars of the size of veins or seams of coal as reliably as possible. Representative localities and representative coal deposits are thus placed before the eye, from which the conclusion is unavoidable and indisputable, that in respect to coal the Pacific States and Territories have not been left out in the cold.

Taking different basins, so situated around the margin of this Cordilleran continent as to be at tolerable regular distances from each other, it is found that the conditions for coal making were in general not unfavorable.

The test of this is the size of the veins in representative basins geographically distributed throughout. Considered either as to the extent of distribution, when compared with similar large areas in other parts of the world, or as to the thickness of particular veins in widely separated localities, where the conditions were most favorable, they do not seem to fall short of the rest of the world.

The quality of this coal of the Cordillera has been alleged to be sadly against us. Many will remember the time when we used to regret that we were so unfortunate as to have no timber suitable for ship building.

Our coal has been called "lignite" by experts because there was no other word in the dictionary for it. Several geologists have held on to the old fallacy, long since abandoned by leading geologists, that there was no "true coal" to be found in any other than one geological period. Not being "true coal," it could be nothing else than "lignite."

Neither the origin nor the chemical analysis nor the quality of the Cordilleran coals justify the old nomenclature. Hayden was the first to speak out on the subject. They are not lignites properly—a name presupposing that they are derived principally from ancient forests. In the vegetation that gave rise to these accumulations, there is a parallelism to that of the carboniferous coal deposits, a resemblance in method, though the plants were of different families.

To settle the question whether we must refrain from calling them "true coals," I set to work systematically. First, I collected and tabulated all the ultimate analysis that I could find. I found abundant material, representing all our principal coal basins, excepting that of San Pete, Utah. The comparison with wood, with peat, and with eastern and foreign coals, showed clearly that the title "true coals," as limited to any formation or period, is not scientific. Varying degrees of hydrogen, in association with oxygen, running down to anthracite, characterize our western coals, precisely like those of any other formation.

Next, as to the effective heat producing qualities, I collected the results of half a dozen series of elaborate experiments which have been made of our coals in comparison with others, and tabulated them along with the ultimate analyses. The showing is that, notwithstanding some of our coal is little better than peat, that some of it has a large percentage of ash, that most of it has a large percentage of water,—we have not only first-class coals, coking coals, gas coals, and anthracite, but nearly every other variety that can be desired, represented in the Cordilleran coal measures.

Wonderful Retention of Heat.

On the 30th of October last, about two o'clock in the afternoon, the large new air shaft of the Belcher mine, then completed to the 1000-foot level, took fire and was destroyed. The timber of the shaft all burned out and the rock fell in and blocked it up. After mature deliberation it was thought that it would be better and cheaper to sink a new shaft than to try to clear out the old one, so badly were its sides caved and so great was the quantity of rock that had fallen into it. The new shaft was sunk a short distance to the west of the old one. It has now reached a point near the 1000-foot level, where it will be continued down on an incline. The incline was started at the 1000-foot level, and carried up to meet the vertical portion of the shaft. The course of this incline carried it through the remains of the old vertical shaft, but as soon as it was tapped the men found that they could do nothing in it on account of the ashes, burnt earth and rocks that poured down into their incline. A tunnel was then run until it had reached a point a short distance west of the old shaft, when a vertical raise was made to the line of the proposed incline to be run up to meet the new shaft. The men then began to work down on the incline in order to reach the point from which they were driven in trying to come up. They have succeeded in getting into the bottom of the old shaft, where, much to their surprise, they find the rock still red hot. In trying to but in timbers they were set on fire, and in order to work at all it is found necessary to bring a line of hose into the place and play a stream of water upon the rocks wedged in the bottom of the old shaft. There is no timber on fire among the rocks. They seem to have been heated to a degree so intense at the time of the fire, that they have remained red hot ever since. When we find so small a mass of rocks as can be contained in the bottom of a shaft remaining hot for over five months, after having been heated to whiteness, should we be incredulous on being assured by scientists that the center of the earth, once a molten mass of rock, still remains in a molten state after untold ages? Nearly three years after the great fire in the Yellow Jacket mine, places were found in the lower levels where the rock was still red hot.—*Virginia Enterprise*.

THE BELCHER ore breasts are looking well and holding out beyond all expectations. The mine is yielding 500 tons of ore per day. The air shaft is down to the 1000-foot level, and is fast drawing off the hot air and cooling the lower levels of the mine.

THE new pumping machinery for the Utah mine is on the ground ready for erection as soon as the foundation for its reception is completed. This portion of the work is being pushed with all the energy possible.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening Apr. 5th, Vice-President Henry Edwards in the chair. There was quite a full attendance of members. The donations to the cabinet comprised several bird's nests, of San Joaquin county, donated by Charles D. Gibbs; collections of plants from Wasatch mountain; grasses, barks from the Sandwich Islands; oil nuts by Mr. Frink; plants, etc., from Japan, by Professor Davidson. The library received the usual monthly publications and periodicals.

Horatio Stone, of the Washington Art Association, delivered a lecture on the Unity of Arts. Mr. Stone made some complimentary allusions to the resources of California, and paid a graceful tribute to Mr. Lick in introducing the subject. The lecture was rather elaborate, but was listened to with attention.

Amos Bowman read a paper on Pacific Coast Coals, elsewhere referred to in this issue.

Professor Brewer exhibited a map showing the distribution of woodland in the United States. It was prepared by running over all the counties of the States east of the Mississippi and marking what was timber land and what was not. These maps were prepared at the time the last census was taken. For the Western States the information was based on estimates derived from persons familiar with certain localities, coast survey officers, engineers, etc. The map was shaded so as to show the extent and comparative thickness of woodlands.

In speaking of the map Prof. Brewer alluded to the theory of the connection of the existence of forests with rainfall. There are no data of any authority to prove that the destruction of forests lessens the rainfall. In the investigations of the Smithsonian Institute no evidence has been found, in any part of the United States, that the destruction of forests has reduced the rainfall. The fact appears to be, but has not been proved by instrumental methods. He said, however, that in some places where rain gauges were kept only a few miles apart, the difference in rainfall was very marked; in some places it appeared as if timber affected it, and in others not.

Dr. Gibbons thought there was evidence to prove that there was a connection between forests and rainfall. Speaking of California, he said that, in regions very limited in extent, the rainfall varies very much in a few miles. The rainfall in San Francisco and Sacramento is nearly the same. At San Rafael, about twelve miles to the north, they have from one-half to two-thirds more rain than in this city. On the western side of the bay, to the south, near Redwood City and Mountain View, the average quantity is certainly not more than two-thirds of what there is here. As we advance to the south the average is gradually, but rapidly, lessened, and vice versa on the north. To the north there are extensive tracts of timber, and to the south there is comparatively little. It is worthy of remark, however, that the rainfall in the southern part of the state has been exceptionally large this year.

The President called the attention of the Academy to the fact that, as the Academy was founded April 4th, 1853, it was now of age and entering its twenty-second year. He hoped it would continue to prosper as well as it had done.

Dr. Gibbons exhibited a branch of poplar on the end of which a piece of mistletoe had grown in a peculiar manner. It came out from the end of the branch exactly as if it had been grafted artificially.

IMPORTANT ENGINEERING WORK.—A great engineering work, the only one of the kind in France, is about to be executed at Lyons. It is that of an iron bridge to connect the plateau of Fourvières with that of the Croix-Rousse, which are two heights, like that of Montmartre, in Paris, at a distance of 300 metres from each other. This undertaking is estimated to cost about 2,800,000 francs, of which a subvention of 600,000 francs only is asked from the city. This aerial bridge will consist of three spans, the central one of 135 metres and the two others of seventy metres each, resting on open iron columns in a line with the houses on the quays. The platform of the bridge will be sixty-five metres above the road and nearly fifty metres above the houses. Each of the two central columns will have inside a lift, by which pedestrians will be raised in two minutes, at a charge of ten centimes, to the top, whence they may reach the higher parts of the city, where they may have business. The only similar works existing in Europe are the Britannia Tubular Bridge in England, constructed by Robert Stephenson, in 1847, and consisting of one span of 569 feet and two smaller ones; that over the Conway, by the same engineer, of a stretch of 400 feet and the bridge of Dirschau, in Prussia, which has six sections of 129 metres each.

THE South California claim lies east of the Belcher and Overman, and about one north of the Woodville. A working shaft of three compartments is being sunk to develop this lead, substantially timbered, and now down eighty feet.

THE tunnel in the West Point mine, Weshoe, has been discontinued, as it would not strike the ledge low enough. A working shaft has been commenced on the ledge itself.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Tenth Lecture Delivered before the University of California College of Agriculture, on Monday, February 1st, by Prof. C. E. BESSEY.

The Heath, Sunflower, Madder and Parsley Family.

The family we take up to-day is the *Heath* family, *Ericaceae*, a group including about 1,200 species. They are found mostly in temperate climates and usually in localities which are quite moist. They are inclined to grow in bogs and marshes and are trees, herbs, or shrubs, most of them being shrubs. A few of them are herbaceous, a few are white and ghostly, as the parasitic Indian Pipe, of but a few inches in height, and others again are tall and tree-like. Taking the order as a whole, we find that it may be said to be composed of the *Heath* family proper, of certain little outline groups, and in these outline groups, we have certain plants. The *Heath* found so abundantly in England, Scotland, and very abundant on the Cape of Good Hope has small leaves which continue green all the year.

While the most of the plants of the order are familiar with are shrubby, *Menziesia* and *Madrona* are trees, much removed in their aspect; they are usually pnt, however, into what is called an outline group of the order. Throughout the greater part of the group, including the *Heath* proper, there runs a narcotic poisonous principle.

Two of them furnish valuable timber. First, is *menziesia*, *Arctostaphylos glauca*, a native of California and other portions of the Pacific coast, and here I have a little block of *manzanita*, which will give you a pretty good idea of its wood.

The *madrona* is called *Arbutus Menziesii*, being named after Menzie, who made a great many discoveries along this coast.

[Professor asks if they know how far *menziesia* extends north. One student says, I know they are as far north as Siskiyou county.

[Speaking of a specimen of *manzanita* or *madrona*.] I should say this was fully

Equal to Rosewood.

I made the observation that I supposed they would not grow large enough, but was told that upon the mountains they grow to be very large; large enough so that they can get good pieces for making furniture. It branches out so that it can be used for veneering or any such purposes as that I have seen it made use of in a manufacturing establishment. They seem to be to cut it up into thin pieces. There were pieces put upon the furniture so as to represent raised panels, and in this way they use it quite largely. The *madrona* is a very fine wood. I see it stated in the books to grow sometimes to the diameter of twelve inches. Now, looking the whole order over, I find that there is but one other species well known which is large enough to be used in the arts at all and that is an allied species of this *madrona* found in Southern Europe, which attains about the size of our tree. So that we are very fortunate in having this very pretty and valuable wood.

Several species furnish food for their berries. *Gaylussacia* furnishes, in one or two of its species, what are called properly huckleberries, or frequently in the books, whortleberries. In the market, huckleberries and blueberries are mixed up and you can scarcely tell them, one from the other.

The *Cranberry*, belonging to *Vaccinium macrocarpon*, is now grown very extensively in certain parts of the East. Growers make cranberry bogs in wet places. This cranberry has a trailing stem, not usually more than an inch in diameter, usually grown in moss found in marshes. It is quite productive, and with its fruit you are probably acquainted. The difficulty in growing them here would be, the dry season.

If you have here what are called *sphagnum* bogs—this bog moss found in such places, having, in a high degree, the property of absorbing moisture from the atmosphere—you may be sure that you can grow the cranberry. A very few cranberries have been grown on ordinary dry land, but so far the experiment has not been very satisfactory.

A good many of the nurserymen in the East are advertising the nland cranberry. It doesn't amount to very much, you could not keep enough moisture around the roots in a tale. You will find, perhaps, down here, a very soft mud and running up sometimes for two feet, will be these old moss stems. The moss is growing at the top and dying at the bottom. Now, these cranberries seem to root very little down below this, and they trail along all through this. You have to imitate that to a certain extent; either by a system of irrigating or in some manner you must keep

The Lower Part of this Stem Moist.

Wherever growers have had any lasting success it has been only by imitating the natural growth. But, as I said, some are trying to grow it upon nland. Massachusetts and Wisconsin are the great districts for cranberry culture, and all the eastern markets are supplied from this source, excepting the supply from the wild bogs

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SCIENTIFIC PROGRESS.

The Mission of the House Fly.

The mission of the house fly and mosquito have long exercised the ingenuity of the most curious and the most scientific. The generally received opinion is that they form one of the ills of life that was imposed upon humanity as a penalty for the undue curiosity or presumption which led to the expulsion of our first parents from the garden of Eden.

One possible beneficial use of the mosquito, inferred, in part, from the fact that it is found almost exclusively in malarial districts, is that its mission is to inject homoeopathic doses of quinine into the system, either as a warning to humanity to absent itself from such localities, or as an antidote to the malarial poisons taken into the system by residence in such places. We gave the views of the originator of this idea in a recent issue of the Press—to the end that they might be taken for what they were worth.

And now comes a Mr. Emerson, an English chemist, with rather more show of wisdom and science than was manifested in the propounder of the quinine theory, and gives us his theory with regard to the mission of the fly, which we find expressed in the *Scientific American* as follows:

Did you ever watch a fly who has just alighted after soaring about the room for some little time? He goes through a series of operations which remind you of a cat licking herself after a meal, or of a bird plucking its feathers. First, the hind feet are rubbed together, then each hind leg is passed over a wing, and then the fore legs undergo a like treatment; and lastly, if you look sharp, you will see the insect carry his proboscis over his legs and about his body as far as he can reach. Now the rubbing together of legs and wings may be a smoothing operation; but for what purpose is this carefully going over the body with his proboscis, especially when that organ is not fitted for licking, but simply for grasping and sucking up food.

This query, which perhaps may have suggested itself to thousands, has recently for the first time been answered by a Mr. Emerson; and certainly in the light of the revelations of that gentleman's investigations, the fly assumes the position of an important friend instead of a pest to mankind. Mr. Emerson states that he began his self-appointed task of finding out whether the house fly really serves any appreciable purpose in the scheme of creation, excepting as an indifferent scavenger, by capturing a fine specimen and gluing his wings down to a microscope slide. On placing the slide under the instrument, to the investigator's disgust the fly appeared covered with lice, sending the offending insect to be promptly released and another substituted in his place. Fly No. 2 was no better off than fly No. 1, and the same might be predicated of flies 3, 4, 5 or of *n* flies, as the algebras have it. Mr. Emerson concluded that there was something which at once required looking into. Why were the flies lousy? Meanwhile fly No. 2, on the slide, seemed to take his position very coolly, and, extending his proboscis, began to weep it over his body, as if he had just lighted. A glance through the microscope, however, showed that the operation was not one of self-beautification, for wherever the lice were, the trunk went. The lice were disappearing into the trunk—the fly was eating them! Up to this time the investigator had treated his specimen as of the masculine gender; but now he changes his mind and concludes it to be a female, busily devouring not her own progeny. The flies then carry their young about them; and when the family is too numerous or the mother too hungry, the offspring are eaten.

While reasoning thus, Mr. Emerson picked up a scrap of white writing paper, from which a fly appeared to be busily eating something, and put it under the instrument. There were the progeny again on the paper, and busily rubbed off with a cloth. "This," he says, "set me thinking. I took the paper into my kitchen again and waved it around, taking care that no flies touched it, went back to the microscope and there found animalcules, the same as on flies. I had now arrived at something definite; they were not the progeny of the fly, but animalcules floating in the air; and he quick motions of the flies gathered them in their bodies, and the flies then went into some quiet corner to have their diutiny meal."

The investigator goes on to describe how he continued the experiment in a variety of localities, and how, in dirty and bad smelling quarters, he found the myriads of flies which existed there literally covered with animalcules, while other flies, captured in bedrooms, or well ventilated, clean apartments, were miserably small and entirely free from their prey. Wherever filth existed, evolving germs which might create disease, there were the flies, covering themselves with the minute organisms and busily devouring the same.

Mr. Emerson, while thus proving the utility of the fly, has added another and lower link to the curious and necessary chain of destruction which exists in animated nature. These infinitesimal animalcules form food for the flies, the flies for the spiders, the spiders for the birds, the birds for the quadrupeds, and so on up to the last of the series, serving the same

purpose to man. He certainly deserves credit for an interesting and novel investigation, and for an intelligent discernment which might even attack the more difficult task of teaching as the user—for nature makes nothing without some beneficial end—of the animalcules themselves.

A New Gigantic Fossil.

We recently alluded to the reported discovery of a fossil skeleton of a gigantic beast, apparently of the bovine family, hat different from anything hitherto met with, either living or dead. The remains were found in some marshy land on the north shore of Lake Erie, eighteen inches under ground; while over them stood an oak tree three feet in diameter. A correspondent of the *Scientific American*, on hearing that the skeleton was on exhibition at St. Catharines, Ontario, Canada, went to see it and reports to that paper substantially as follows:

There are not many of the bones to be seen, but there was enough to give an idea of what the beast must have been. The horn, which was the most conspicuous, I found to be eight feet nine inches in length and two feet one inch in circumference, slightly spiral, considerably curved and tapering almost to a point. There are three pieces of the jaw, one of which is two feet long and contains the two back molar teeth, and is one foot five inches from the joint to the first molar tooth. The largest of the teeth are seven inches long, and three and one-half broad, measured on the face. A joint of the back bone measured thirteen inches in breadth and twenty-one in height. A bone said to be the third rib, is four feet five inches in length, and the bone from the knee to the ankle is seven inches across the top.

The horn in its present state weighs one hundred and five pounds, and one of the teeth weighs five and one-half pounds. The bones are in a very good state of preservation, and also the horns; but the teeth (which are tubercular) are perfect, the enamel being as hard and intact as ever. There is more of the skeleton still under the surface, which will be taken out as soon as the frost is out of the ground.

A New Utilization of Refuse Materials.

A very important discovery has recently been made by MM. Croissant and Bretonniere, of Mulhouse, France, which consists in producing dyes of a large variety of brown hues from substances not merely refuse, but in themselves colorless. The pigments are obtained by the reaction of alkaline sulphides upon ordinary wood sawdust, humus, horn, feathers, linen, silk, cotton, and paper waste, gluten, blood, and a number of other materials. In certain cases, when treated with the sulphides or polysulphides, the sulphur directly combines with the organic body; in others sulphuretted hydrogen becomes substituted for the hydrogen atoms eliminated.

The same body gives different shades, according to the degree of temperature, the duration of the operation, and the proportion of sulphide employed. The longer the heating and the higher the degree, the nearer the dye approaches to black. Humus gives a fine bistre shade, which does not fade, and is unalterable by organic or mineral acids, caustic lyes, soap, oxalate of potassa, etc. With bran a color is produced which subsequently, with bichromate, yields a fine brownish yellow or resin color, which can be changed to gray by the addition of carbonate of soda. Sawdust, preferably of oak, chestnut, and other non-resinous woods, gives a soluble dye of a brownish black, which appears upon the fabric of a greenish hue. It is possessed of high coloring properties and is very permanent.

CYCLES OF GROWTH.—A writer in the *Prairie Farmer*, who has lived on the prairies of Illinois for twenty years, thinks that many plants, if not all, have a minimum and maximum year for producing flowers and that these years are at regular intervals of time. They increase gradually from minimum to maximum, and then decrease gradually to minimum, thus forming a cycle. These cycles, differ in different plants, from four to seventy years. He suggests that this may account for the different varieties of grain "running out," and wishes others to make observations in this direction.

BURNING UNDER PRESSURES.—According to recent investigations by M. Caillaet, the results of burning sulphide of carbon, alcohol, and carburetted hydrogen, under pressures reaching thirty-five atmospheres; are that the flame arguments considerably in brilliancy, while the combustibility of the substance burned is notably diminished.

REWARDS AND PUNISHMENTS.—An English scientist, by way of experiment, injected arsenic into the veins of some dogs, for which he was fined by an English magistrate for cruelty to animals. Shortly afterward the French Academy of Sciences awarded him a prize of \$500 for his scientific researches.

NEW USE FOR THE CAMERA.—Among recent curious inventions is the application of the camera obscura to a railroad car, imparting to the traveling and wondering beholder a moving diminutive picture of the country through which he is passing.

BORAX.—M. Schretz states that borax enables the spontaneous movements of all living vegetable tissues and kills microscopic animalcules. In this country the use of borax as a preservative of wood has been patented.

MECHANICAL PROGRESS.

Filth or Foul Water the Cause of Boiler Explosions.

The following interesting matter is collected from a recent report of A. T. Hay to the Secretary of the U. S. Treasury on the subject of steam boiler explosions. His remarks are quite novel, and well worthy a close consideration:

When we boil pure water the steam rises regularly in spheres from the bottom of the vessel to the surface of the water. Steam at a like temperature and pressure has at all times the same number of molecules in a like volume, and the true measure of its energy may be calculated with mathematical precision. Water assumes three natural or allotropic forms—liquid, solid and vapor; in all these forms its qualities inhere. What is true of a molecule of water, ice or steam, is true of the whole volume of either—these several forms being due entirely to a change of temperature. Water is the most stable compound in nature; neither pressure, cold, nor heat alone being able to reduce it to its original elements.

Many of our most terrific explosions take place under a reduction of pressure; in fact, I have known instances wherein, just before an explosion ensued, the steam gauge would recede from 50 lbs. to 20 lbs. pressure, and no amount of firing would bring up the pressure sufficient to perform the work satisfactorily. If there had been a scarcity of water there would have been a surplus of steam. When boilers fire easily and steam freely there is no danger of any fearful disaster. If boilers give way under such conditions, it is simply from rapture, the effects of over-pressure, and not explosions in any sense of the term.

There can be no violent explosion from steam made from clean water, free from organic matter. At least, after many years' close observation, coupled with direct investigation and research, I have failed to find an instance where pure simple steam made from clean water ever exploded within a range of from 15 lbs. up to 500 lbs. pressure to the square inch. But I do find that explosions in steam boilers reveal in filth and foul water. Take, for instance, the Mississippi and its tributaries, and it will be found that steamboat boiler explosions have been most frequent in the vicinity of large cities, and as we go down the river. The Lower Mississippi has been termed a graveyard, while in that portion of the river above St. Louis, including the Illinois, where the waters are comparatively pure and free from nitrogenous matter, explosions have been very rare, while the Ohio, from Cincinnati down, is noted for many steamboat disasters. The most destructive and terrific explosions have occurred in the spring of the year, when the waters were loaded with organic substances, earthy salts and oleaginous matters.

When we boil foul water we find it tumultuous, accompanied with a low, bumping sound, with fits and starts, so sudden and violent in some instances as to jump bodily out of or even burst an open vessel. This antagonism to the boiling of any compound solution is caused by the attraction of these foreign particles for each other (chemical action and reaction), while in the boiling of pure water there is no chemical action whatever. Great rivers, like those in the Ohio, Mississippi and Missouri valleys, are great natural sewers, and their waters at certain seasons of the year are loaded with organic remains in every stage of putrefaction, while city wells and those around factories frequently become great sink-holes and receptacles for matter. My researches show that such waters hold in solution and carry in suspension from six up to sixty-three grains per gallon of organic substances, to which may be added copious quantities of oleaginous matter in certain localities and the salts of ammonia—N, H₃. These substances find their way into steam boilers, where they rapidly undergo chemical change, distillation, concentration, and sometimes violent decomposition—that is, culminate in terrific explosion.

These organic skeletons, glycerine salts, albuminous substances and ammoniacal gases found in water, consist chiefly of carbon, hydrogen, oxygen and nitrogen, and it is among such nitrogenous combinations and types that we find some of the most remarkable explosive bodies. They are not only aeriform, but they are gases of the most subtle and potent character; gaseous substances, in which the different elementary atoms are all chemically combined in the same molecule, that are liable to sudden and violent decomposition whenever the opposing forces to which they owe their existence become deranged by heat or some external cause. Their affinities are very feeble; hence their frequent destruction at high temperatures. Merely a molecular disturbance of any kind may cause violence. Their combination being internal and instantaneous, they develop a force at least ten times greater and one hundred times quicker than that of steam pressure—sudden and violent enough to destroy open vessels. But in clean water we have the most stable substances known, under the three distinct forms named, either of which may be safely had out of the other by merely a change of temperature.

As I said before, heat alone will not decompose water, but electrically readily resolves it into its original elements, and chemical action

being the source of electricity, water in the midst of sizzle and treacherous company becomes demoralized and loses its virtue and stability, and goes off in a gaseous state in times of chemical reaction. This frequently occurs when boilers explode, as neither water nor steam are ejected from them, but an inflammable gas is evolved. Under such conditions the engineer, dead or alive, is convicted of murder for allowing the boilers to become dry, when, in reality, a moment before the explosion his boilers contained a full gauge of water.

Electric Lathe Chuck.

In order to obviate the inconvenience and loss of time involved in the ordinary mode of fixing upon a lathe chuck certain special kinds of work, such as thin steel disks or small circular saws, the chuck is converted into a temporary magnet, so that the thin steel articles, when simply placed on the face of the chuck, are held there by the attraction of the magnet; and, when finished, can be readily detached by merely breaking the electric contact and demagnetizing the chuck. The face plate of the magnetic chuck is composed of a central core of soft iron, surrounded by an iron tube, the two being kept apart by an intermediate brass ring; and the tube and core are each surrounded by a coil of insulated copper wire, the ends of which are connected to two brass contact rings that encircle the case containing the entire electro-magnet thus formed. These rings are grooved, and receive the ends of a pair of metal springs connected with the terminal wires of an electric battery, whereby the chuck is converted into an electro-magnet capable of holding firmly on its face the article to be turned or ground. For holding articles of larger diameter, it is found more convenient to use an ordinary face plate, simply divided into halves by a thin brass strip across the center; a horseshoe magnet, consisting of a bent bar of soft iron, with a coil of copper wire round each leg, is fixed behind the face plate, each half of which is thus converted into one of the poles of the magnet. The whole is enclosed in a cylindrical brass casing, and two brass contact rings fixed round this casing are insulated by a ring of ebonite, and are connected with the two terminal wires of the magnet coils. A similar arrangement is also adapted for holding work upon the bed of a planing or drilling machine, in which case the brass contact rings are dispensed with, and any desired number of pairs of the electro-magnetic face plates are combined so as to form an extended surface large enough to carry large pieces of work. For exciting the electro-magnet, any ordinary battery that will produce a continuous current of electricity can be used; but in machine shops, where power can be obtained, it is more convenient to employ a magneto-electric machine—such as Gramme's for instance—rather than a battery.

New Mode of Raising Water.

Mr. R. F. Mushet, of Cheltenham, England, has recently invented and patented a device, whereby water and other fluids can be raised from a greater depth than has hitherto been practicable by the use of an ordinary suction pump. To the lower end of the barrel of an ordinary suction pump is attached a section of feed pipe, the united lengths of which barrel and pipe must not together exceed the height to which in practice a suction pump will raise a column of water. The lower end of the suction pipe passes into a covered reservoir or chamber, and extends nearly to the bottom of the same. A second length of suction or feed pipe is inserted through the bottom of the reservoir or chamber, and passes upwards to within a short distance of the top thereof. A similar arrangement of pipes and reservoirs or chambers is continued until the source of water is reached. The reservoirs or chambers are respectively supplied with water by any convenient means, a stratum of air remaining at the top of each reservoir or chamber. The pump is set in action in the ordinary manner, and the water is raised from the source of supply and discharged from the outlet of the pump-barrel. A check valve or valves is or are placed in the suction pipes for the purpose of sustaining the column or columns of water, and thereby rendering the discharge from the pump more uniform than it otherwise would be.

A LOCOMOTIVE HILL CLIMBER.—A new locomotive for use on Ithaca hill, N. Y., has made its appearance. The incline has five tracks, of which the two outer are of the usual width, used in the ordinary manner. When the engine starts up the hill it rests upon a pair of rails just within the usual track and upon a set of double flanged small driving wheels which are upon the same axles with the big drivers—they being only about thirty inches in diameter; this inside track is raised about fifteen to eighteen inches above the outer one, and high enough so that the big drivers do not touch the track at all; the engine rests now upon the small drivers, and is independent of the outer ones; then in the center of the track is placed a wide cogged rail, which exactly meshes into the cog wheel, which is between these small drivers; directly under the center of the locomotive. Thus it will be seen that, by applying power to the big drivers, in the ordinary way, the power is applied to the cogged wheel, which does the climbing. The cogs are about three inches from tip to tip, and the wheel is eight inches wide.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. E. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

FRIDAY, APRIL 9.		4300 Pioneer.....1½	
MORNING SESSION.		500 Piocho West Ex.....1½	
45	Alpha.....22/22½	618	Raymond & Ely.....50/55
1160	Best & Balcher.....35/32½	295	Rye Patch.....2
180	Belcher.....35/32½	100	S. C. Charlot.....1½/1½
50	Bullion.....16/16	100	Seg Rock Island.....1½/1½
185	Bullion.....16/16	100	War Eagle.....4½/65
115	Chollar.....6/6	500	Woodville.....2½/2½
2040	Crown Point.....41/38½	1800	Wells-Fargo.....25/20
50	F.....40/40		
20	G.....40/40	TUESDAY, APRIL 13.	
40	H.....41	MORNING SESSION.	
275	Confidence.....22/22½	465	Ophir.....97
1045	Con Virginia.....45/45	10 h. 30.....	53/60½
105	C.....50/50	445	Mexican.....28/27
85	Caledonia.....20/21½	100	Gould & Curry.....18½/18½
5	Exhaquer.....30/30	800	Best & Balcher.....50/50
120	Globe.....15	100 h. 30.....	53
173	Hale & Norcross.....45/42	20	Savage.....130
145	Imperial.....5½/50	130	Chollar.....5½/40
65	Julia.....14/12½	50	Hale & Norcross.....10/41½
50	Juniper Con.....14/14	1635	Crown Point.....45/43
95	K.....10	50 h. 6.....	41½
80	Knickerbocker.....17/16½	300	K.....41½
35	K.....17/16½	195	Imperial.....8½/90
1050	Mexican.....23/22½	20	Empira Mill.....8½
50	h. 5.....2½	430	Kentucky.....17½/17½
2615	Ophir.....95/90	200	Belcher.....37½
110	h. 5.....6½	20	h. 30.....30/30
73	Savage.....131/121	175	Confidence.....42
630	Sierra Nevada.....12/12½	250	Sierra Nevada.....41/41½
120	Succor.....105/114	670	California.....53/53½
270	Silver Hill.....11	230	Bullion.....55/55½
60	Union.....8½/90	365	Vermon.....61/62
230	Yellow Jacket.....36	10	Seg Belcher.....10½
20	h. 30.....98	53	Justice.....37½
20	h. 5.....55/57	615	Lady Bryan.....60/63
AFTERNOON SESSION.		290	h. 10.....6½
3217	Andea.....15	290	Julia.....17½/17½
60	American Flat.....5½	500	Sierra Nevada.....41/41½
120	Alta.....15	100	Knicker.....13½/14
20	Belmont.....4½/4½	400	Globe.....10½
20	Belmont.....4½/4½	55	Baltimore Con.....8½/90
20	Challenge.....7½	60	Ching-na.....7
250	Cosmopolitan.....25/20	10	Utah.....5
180	Dayton.....3½/3	120	R. C. Island.....5½/66
185	Edna.....3½/3	150	New York.....30/30
70	Edipse.....25/27	50	Phil Sheridan.....17
85	Golden Charot.....6½/67	165	American Flat.....9½/93½
55	Ida Elmore.....3½/40	100	Tyler.....5½
120	Kosuth.....10	455	American Flag.....2½/30
510	Leopard.....10	231	h. 30.....2½
40	Lady Wash.....1½/1½	55	Alta.....50/4½
205	Lady Wash.....1½/1½	400	Andea.....10½
205	Meadow Valley.....14½/14	160	h. 30.....60/62
115	Man-field.....7	100	Belmont.....4½/4½
240	Mahogany.....10/93½	100	Chief of Hill.....10
850	Niagara.....75/52½	500	C. C. Chollar.....20
50	Occidental.....3½	445	Eureka Con.....30/33
325	Old Gold Hill.....2½/2½	200	El Dorado South.....19
40	h. 30.....75/73½	50	Eureka.....4
250	Piocho West Ex.....1½	325	Golden Charot.....14/15
300	Prussian.....13	97	Jefferson.....2½/2½
300	Prussian.....13	100	Kosuth.....2½
100	Phil Sheridan.....13	100	L.....2½
335	Raymond & Ely.....45/40½	100	Leviathan.....15/16
235	Rye Patch.....2	625	Meadow Valley.....8½/93½
205	S. C. Charlot.....1½/1½	50	h. 30.....10
205	South Caroli.....1½/1½	50	Mahogany.....9½
50	S. Rock Island.....1½/1½	50	Mint.....300
108	War Eagle.....5½/50½	50	Niagara.....700
300	Wells-Fargo.....2½/2½	600	Oregon.....2½/2½
SATURDAY, APRIL 10.		605	Old Gold Hill.....2½/2½
MORNING SESSION.		50	Piocho.....4½
120	Alpha.....22/22½	50	Piocho West Ex.....4½
330	Belcher.....31/31½	500	Pioneer.....1½/1½
515	Best & Balcher.....32½/32½	300	Poorman.....50/44
50	Bullion.....16/16	470	Raymond & Ely.....55/51½
60	Buckeye.....35/50	270	South Caroli.....1½/1½
780	Crown Point.....39½/39	50	h. 5.....2
50	h. 5.....3½	50	Wash & Croala.....1½
140	Confidence.....22/22½	500	Woodville.....2½/2½
30	Con Virginia.....41/40½	500	Wells-Fargo.....25/20
1150	California.....62½/63		
55	Exhaquer.....30/30	WEDNESDAY, APRIL 14.	
20	h. 30.....306	MORNING SESSION.	
20	Empire Mill.....5½	630	Ophir.....99/100
330	Eureka Con.....18½	135	Marican.....27½/27½
30	Hale & Norcross.....44/45	100	Gould & Curry.....18½/18½
470	Imperial.....5½/50	565	Best & Balcher.....50/50
60	Imperial.....5½/50	20	h. 30.....51½
1205	Lady Bryan.....16½/16	40	Savage.....131/132½
1500	Meadow Valley.....17½/17½	145	Chollar.....84/85
575	Mexican.....27/24½	70	Hale & Norcross.....44
185	Ophir.....51/51½	20	h. 30.....44½
250	h. 30.....99/100	215	Crown Point.....40½/40½
480	Overman.....61/63	20	h. 5.....41½
330	Raymond & Ely.....46/49½	60	Jacket.....81/87½
50	h. 30.....114	60	Empire Mill.....64
50	Succor.....114	60	Sierra Nevada.....40/41½
50	S. S. S.....123/114	250	Imperial.....38
115	Sierra Nevada.....3½/3½		
115	Union Con.....5½/5½		

THURSDAY, APRIL 8.		THURSDAY APRIL 15.	
MORNING SESSION.		MORNING SESSION.	
30 Alpha.....	20	75 Alpha.....	22
36 Am Flat.....	36 1/4	53 Belcher.....	34
90 Best & Belcher.....	49 5/8	353 Best & Belcher.....	53 1/2
60 Balcher.....	55 3/8	353 Ballou.....	53 1/2
85 Ballou.....	45 3/4	129 Cal. & N. Y.....	63 1/2
90 Bacon.....	44	80 Ch. Har.....	63 1/2
13 Baltimore Con.....	8 1/2	515 Crown Point.....	38 1/2
70 California.....	61 1/2	60 Comdena.....	60
100 Coors Patn.....	54 3/4	30 Con. Virginia.....	50 1/2
15 Chollar Potosi.....	63 1/2	160 California.....	61 1/2
10 Con Virginia.....	55 1/2	30 Caledonia.....	21 1/2
55 Caledonia.....	71 1/2	5 Challenga.....	5
55 Concord.....	21 1/2	120 Chas. & Co.....	120
50 Daney.....	15	125 Dardanelles.....	125
40 Dayton.....	20	125 Empire Mill.....	125
70 Dardanelles.....	23 1/2	5 Eschequer.....	5
40 Gould & Curry.....	48 1/2	30 Gold & Curry.....	18 1/2
90 Globa.....	16 1/2	45 Glohe.....	45
5 Hale & Norcross.....	42 1/4	30 Hale & Norcross.....	43 1/2
55 Imperial.....	8 1/2	210 Imperial.....	210
55 Justice.....	21 1/4	363 John & Ryan.....	363
100 Julia.....	7	906 Julia.....	906
60 Knickerhook.....	1	500 Kentucky.....	71 1/2
5 Kentuck.....	15 1/2	100 Knickerbocker.....	100
30 Keweenaw.....	15 1/2	300 Kyran.....	300
70 Mexican.....	21 1/2	930 Mexico.....	930
20 New York.....	8	300 New York Con.....	27 1/2
75 Ophir.....	56 3/4	105 Ophir.....	103 1/2
100 Sierra Nevada.....	11 1/2	100 Union Con.....	61 1/2
20 Rock Island.....	51 1/2	22 Occidental.....	22
20 Savage.....	12 1/2	175 Rock Island.....	175
5 Silver Hill.....	10 1/2	20 Savage.....	20
100 Sierra Nevada.....	11 1/2	165 Sierra Nevada.....	13 1/2
5 Seg Belcher.....	110	35 Silver Hill.....	110
10 Union Con.....	8 1/2	100 Union.....	100
50 Utah.....	44 1/2	50 Union Con.....	50
70 Woodman.....	25 1/2	100 Yellow Jacket.....	100
30 Yellow Jacket.....	55 1/2		
AFTERNOON SESSION.		AFTERNOON SESSION.	
30 Andes.....	57 1/2	100 American Flag.....	100
0 Am Flag.....	24 1/2	120 Alta.....	120
00 Boeth.....	50c	35 0 Andes.....	61 1/2
00 Boech & Paxton.....	50c	335 Belmont.....	43 1/2
00 Bore.....	50c	300 Cherry Creek.....	300
00 Eureka Con.....	22 1/2	0 C P Ravine.....	5
00 Golden Chariot.....	63 1/2	350 Comopolitan.....	350
00 Ida Elmore.....	33 1/4	100 Eureka con.....	37 1/2
00 Jefferson.....	11 1/2	100 Eureka Grass Valley.....	100
00 Leopard.....	51 1/2	50 Florida.....	50
00 Leviathan.....	13 1/2	55 Golden Chariot.....	55
15 Meadow Valley.....	7	225 Ida Elmore.....	33 1/2
00 Pioneer.....	50c	100 Idaho Grass Valley.....	100
00 Mahogany.....	10	405 K K Con.....	110
25 North Carson.....	1	130 Leviathan.....	130
0 O G Hill.....	370	330 Meadow Valley.....	330
00 Pioneer.....	50c	120 Tech. Lard.....	120
00 Prospect.....	3 1/2	210 Mansfield.....	210
00 Poorman.....	42 1/2	103 Mahogany.....	103
00 Raymond & Ely.....	40 1/2	200 Mint.....	200
00 Rye Patch.....	22 1/2	55 Poorman.....	55
00 Silver Con.....	20 1/2	50 Picocha.....	50
00 Wells-Fargo.....	25 1/2	905 Raymond & Ely.....	50 1/2
00 War Eagle.....	50 1/2	55 Rye Patch.....	55
		00 Rye Patch.....	55
		940 South Chariot.....	940
		700 Woodville.....	24 1/2
		830 Wells-Fargo.....	830

Mining Stocks.

The market during the week under review has been without any noteworthy general movement. The Comstocks have been ready, with slight and comparatively regular fluctuations. Toward the close of last week a downward tendency was observable, which was only maintained for a time, but at the opening of the present week met with the customary relapse. Consolidated Virginia has declared its annual little dividend of \$1,080,000 and is the only Washeo mine now distributing dividends. It is expected, however, that several other prominent mines will soon come to the front with regular monthly returns to stockholders. Ophir, California and some of the old Hill mines are spoken of as probable dividend-payers.

Assessments are now in order. Yellow Jacket, Chollar and Hale & Norcross call for each, and California for \$3.

Among the outside stocks Enreka Consolidated and Raymond & Ely have attracted much attention. A sudden leap upward of 20 p

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ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.										
Company.	Location.	No.	Amt.	Levied.	Deling't.	nt. Sale.	Secretary.	Place of Business.		
Amerlon Flag M & M Co	Washoe	7	50	Mar 26	May 4	May 28	Geo R Solinney	320 California st		
American Flat M Co	Washoe	6	100	Apr 10	May 14	June 2	A O Sankay	331 Montgomery st		
Albion & Co Ravine S M Co	Cal	5	50	Mar 9	Apr 11	May 3	A Noel	419 California st		
Bacon M & M Co	Washoe	3	50	Mar 9	May 12	June 1	Edw May	419 California st		
Baltimore Cons M Co	Washoe	8	100	Apr 12	May 19	June 7	C A Sankey	331 Montgomery st		
Booth G M Co	Cal	1	15	Mar 4	May 1	May 25	Geo R Spinnery	320 California st		
Boggs & S M Co	Washoe	13	50	Mar 4	Apr 10	Apr 29	C H Sankey	331 Montgomery st		
Caledonia S M Co	Washoe	11	30	Mar 4	Apr 13	May 1	F F Lichten	414 California st		
Chief of the Hill M Co	Washoe	6	25	Mar 26	Apr 30	May 20	Charles S Neal	419 California st		
Chollar-Potosi M Co	Washoe	6	50	Apr 14	May 18	June 8	W E Dean	419 California st		
Chloride & Elko S M Co	Washoe	50	50	Mar 22	Apr 12	Apr 29	J M Buffington	320 California st		
Daney G & S M Co	Washoe	13	50	Mar 22	Apr 28	June 8	R B Noxon	419 California st		
Europa M Co	Washoe	3	25	Apr 14	May 20	June 8	R B Noxon	419 California st		
Globe Cons M Co	Washoe	5	75	Mar 18	Apr 22	May 12	J Maguire	419 California st		
Golden Charter M Co	Idaho	12	50	Mar 18	Apr 22	May 1	L Kaplan	Merchants' Ex		
Hale & Norcross S M Co	Washoe	13	50	Apr 13	May 18	June 1	F F Lichten	419 California st		
Independent G M Co	Cal	50	50	Mar 18	Apr 19	May 10	Geo T Grimes	240 Montgomery st		
Justice M Co	Washoe	14	30	Mar 18	Apr 20	May 20	J S Kennedy	Merchants' Ex		
K L Cons M Co	Eureka Nevada	1	50	Apr 2	May 6	May 6	E B Minor	419 California st		
Kossuth M Co	Washoe	3	50	Feb 25	Mar 19	Apr 21	C F Stern	419 California st		
Lady Bryan M Co	Washoe	6	50	Mar 18	Apr 19	May 7	Frank Swift	419 California st		
Mammoth Silver M Co	Nevada	18	10	Feb 25	Apr 23	Apr 28	D A Jennings	401 California st		
Meadow Valley M Co	Ely District	8	100	Feb 25	Mar 23	Apr 20	J W Colburn	419 California st		
Mexican G & S M Co	Cal	1	50	Mar 22	Apr 26	May 1	J W Colburn	419 California st		
Monitor Belmont M Co	Nevada	1	50	Mar 16	Apr 19	May 17	W W Hopkins	419 California st		
Oberman S M Co	Washoe	31	30	Mar 16	Apr 20	May 10	Geo D Edwards	414 California st		
Phelan & G S M Co	Washoe	2	15	Jan 21	Mar 1	Mar 30	W R Townsend	331 Pine st		
Picton M Co	Washoe	7	100	Apr 13	Apr 17	May 7	T L Kimball	408 California st		
Puente West Extension M Co	Washoe	4	50	Mar 24	Apr 3	May 22	R H Brown	402 Montgomery st		
Prussian O & S M Co	Washoe	4	50	Apr 1	May 10	June 5	J W Colburn	419 California st		
Rock Island & Elko S M Co	Idaho	10	50	Mar 22	Apr 15	May 1	J W Colburn	419 California st		
Sereno Silver M Co	Washoe	11	50	Feb 25	Apr 3	Apr 23	J H Sayre	10 Stevenson's Bldg		
Silver Cord M Co	Idaho	8	100	Mar 27	Apr 1	Apr 22	Frank Swift	419 California st		
South Charter M Co	Idaho	13	50	Mar 30	May 1	May 25	C H Bangert	402 Montgomery st		
South Comstock G & S M Co	Cal	2	25	Apr 9	May 12	May 31	J M Buffington	Merchants' Ex		
St Patrick G M Co	Washoe	10	50	Feb 2	Mar 8	Mar 31	D F Verdall	409 California st		

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The market during the week under review has been without any noteworthy general movement. The Comstocks have been steady, with slight and comparatively regular vibrations. Toward the close of last week an upward tendency was observable, which was firmly maintained for a time, but at the opening of the present week met with the ordinary relapse. Consolidated Virginia has declared its usual little dividend of \$1,080,000 and is the only Washoe mine now distributing dividends. It is expected, however, that several other prominent mines will soon come to the front with regular monthly returns to stockholders. Ophir, California and some of the Gold Hill mines are spoken of as probable dividend-payers.

Assessments are now in order. Yellow Jacket, Chollar and Hale & Norcross call for \$5 each, and California for \$3.

Among the outside stocks Enreka Consolidated and Raymond & Ely have attracted most attention. A sudden leap upward of 20 per cent. in each of these startled the market early in the week. With Raymond & Ely the other Pioche stocks strengthened in sympathy. Enreka Consolidated has been developing the new strike with flattering prospects. Steady and larger dividends are promised for the future. The Idaho stocks are on the up grade and are stiffening daily.

THE LOCOMOTIVE.—For some time past series of valuable illustrated articles has been running in the *Railroad Gazette*, entitled "Catechism of the Locomotive." These articles have now been published in book form, and are for sale at Bancroft's, in this city. It comprises a most exhaustive treatise on locomotives, in such a form as to furnish a clear and easily understood description of the principles of construction, and operations of the locomotive of the present day, a subject which is not so closely or adequately treated in any similar work. It is clearly and plainly written, in a manner decidedly advantageous for those who have not acquired studious habits of thought. To such the question asked presents first a distinct image of the subject to be considered, so that the explanation or instruction which follows is much more apt to be understood than it would be if no such question had been asked. The idea was taken from the German work on locomotives by Georg Kosak, and the work is largely quoted from. The work is profusely illustrated with all conceivable sorts of diagrams, so as to explain each thing in detail as it occurs. It is very comprehensive and full, and contains in the appendix tables "of the properties of steam," of "hyperbolic logarithms," "of the properties of different kinds of fuel," "of the resistance of trains," etc. This book is useful, not only to locomotive engineers, but to all classes interested in steam engines; and to students and apprentices it is invaluable. The author is M. N. Fournier.

THE Amador quicksilver mine is yielding about 100 pounds of metal a day.

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Amador Cons M Co	Nevada	J M Buffington	Merchants' Ex	Annual	April 20
Barcelona Cons M Co		J P Moore	426 California st	Annual	May
Cons M Co	Mexico	Chas Baum	318 Battery st	Special	April 29
Franklin M Co		Wm H Watson	302 Montgomery st	Annual	May
Globe Cons M Co	Washoe	Called by Trustees	419 California st	Special	Mar 24
Hubb & Hunt S M Co	Idaho	Called by Trustees	499 California st	Special	April 9
Illinois Central M Co	Ely Dist	T L Kamball	409 California st	Annual	April 20
Cons M Co	Idaho	R H Brown	402 Montgomery st	Special	April 27
Providence G & S M Co	Ely Dist	Chas E Elliott	419 California st	Special	April 3
Shasta Bullion G & S M Co	Cal	Called by Trustees	111 Leidesdorff st	Annual	April 24
Yoe & G M Co	Cal	J L Armstrong	545 Sacramento st	Special	April 22
Wyoming G M Co	Cal	J M Buffington	Merchants' Ex	Annual	April 19

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Belcher M. Co.	Washoe.	H. O. Kibbe.	419 California st	3 00	Jan 11
Black Bear Quartz	Cal	L W Oliver		25	Mar 17
Charles M & M Co	Cal	Frank Swift	401 California st	10	Nov 16
Cons Virginia M Co	Washoe	Charles H Fish	401 California st	25	Apr 10
Crown Point M Co	Washoe	E E Elliott	414 California st	2 00	Jan 12
Cons M. M. Co.	Nev	W. G. East.	220 Clay st	1 00	Jan 25
Eureka Consolidated M Co	Nev	W. G. Taylor	419 California st	1 00	Apr 10
Excelsior M & M Co		Frank Swift	419 California st	1 00	Apr 10
Jefferson S M Co		Frank Swift	331 Montgomery st	50	Apr 10
Rye Patch M Co	Nevada	O A Lankey	409 California st	50	Apr 10
		Edmund	409 California st	50	Apr 10

HEAVY FLOW.—At the Lady Washington mine, on the Comstock, the miners last week suddenly cut through or into what is supposed to be the east wall of the ledge, encountering a snob a heavy flow of water that the men had to get out of there in a hurry. The water rose in the shaft rapidly, and although it has been taken out at the rate of 150,000 gallons per day ever since, it had attained a height of nearly 100 feet in the shaft day before yesterday. Since then the huge bailing tanks have been gaining upon it and the water is gradually lowering in the shaft. Like similar bodies or pockets of water found in the ledge, it will doubtless become drained out in due time.

A FLOOD of water was recently tapped in the Globe Consolidated mine, by the south drift from the main west cross-cut on the 400-foot level. Pieces of quartz and ore brought out by the flood are of a highly encouraging character.

THE frame of the new building for the incline machinery of the Ophir mine is nearly completed, and laying the foundation for the hoisting engine will be pushed to completion as fast as the nature of the work will permit.

THE erection of the new incline machinery on the Savage mine is nearly completed, and the developments on the 2200-foot level are looked forward to with great interest.

THE Hale & Noroross mine extracted 292 tons of ore last week; there are 2,764 tons on the dumps.

SEVERAL prominent silver mines in Bingham, Utah, have developed rich copper veins thirty feet wide.

At the Pacific Rolling Mills about 150 tons of rails have just been finished, beside the usual amount of miscellaneous work. The mills have been partly shut down during the past week, for repairs, but everything will be in running order with a full force on Monday. They are very busy at present. A large amount of work is being done for the mines; and in fact this class of work alone has, of late, been sufficient to keep the mills busy.

At the California mine the new machinery is fast arriving on the ground and the excavations for the foundations of the engine and other machinery is being pushed to completion as fast as it is possible for it to be done.

A PROJECT is on foot to establish a large foundry in East Napa, to be conducted by a joint stock company. Its purpose will be to manufacture stoves, etc.

CARSON river, it is said, will not be able to furnish sufficient water this summer to run the mills on that stream to half their capacity.

THE Pacific Tannery of Stockton recently

No less than 34,255 immigrants have arrived in California overland since April 1, 1874.

THE Chollar mine sent to mill 279 tons of ore last week, assaying \$34.27 per ton.

THE Enfera mine at Grass Valley cleaned up 300 ounces gold amalgam last week.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

RICH DISCOVERY.—Amador Dispatch, April 10: We are reliably informed that another richartz mine has recently been discovered about a mile from the town of Sutter Creek, which, from present indications, is likely to prove as valuable, when fully developed, as the famous Amador mine. The new mine is owned by the Hamilton mining company, and a shaft has already been sunk to a depth of 25 ft, at which depth the vein is three ft wide, and is increasing in width and thickness as they go down. About 80 tons of the rock has been taken out and crushed, and it yielded an average of 12.50 per ton.

MINING ITEMS.—Amador Ledger, April 10: Mining still continues in the Kennedy, and proposals for sinking 100 or 150 ft deeper in the main shaft have been advertised. The ore in the Kennedy at the lowest depths reached, looks very flattering.

Col. Whitesides, M. E., was in our county a few days ago making an examination of the royal League mine near Drytown, and should a report be favorable, the mine will again be placed in working condition.

The Gover, also near Drytown, at last reports was producing high grade ore from a very extensive body. The future prospect of the mine is represented as being very flattering. Considerable activity prevails in gravel mining with satisfactory returns. The heavy gravel claims along the line of the canal are being opened on a permanent scale, and as far as hydraulic power has been applied, the claims are looking remarkably well. When these claims shall be thoroughly opened (many of them presenting gravel over 200 ft in depth), it is but reasonable to expect a large amount of gold therefrom. Altogether the mining outlook of the county is very encouraging.

ALABAMA.

CLEAN-UP.—Calaveras Chronicle April 11: A recent clean-up at the Veith hydraulic claim, Tunnel ridge, after a run of thirty days, resulted in \$4,000. A cave that occurred during a month delayed operations somewhat. Hydraulics have multiplied rapidly in this vicinity during the past few years; and yet, considering the opportunities that have not been improved, at character of mining is still in its infancy.

NEW COSTA.

NEW RETORTS.—Contra Costa Gazette, April 1: The quicksilver company at work near Dayton are progressing satisfactorily in running their tunnels, and in accumulating good ore for the furnaces, which they have not been operating for the past few weeks, as their retorting apparatus was not satisfactory. Their retorts were on a new and before untried plan, which was found defective on trial, and they have been replaced by others of well tested sort, and the furnaces will soon be again started in operation.

YO.

PANAMINT CONS. M. Co.—Panamint News, April 6: This is the new company recently incorporated, which is now engaged developing the following mines: Don Juan, Jesse May, New England, California and Humboldt. The Don Juan is situated in Woodpecker canon, where is a 20-ft shaft and a 50-ft tunnel in the mine. The ore averages about \$100 per ton as comes out of the mine. The Jesse May is a quartz canon, and consists of 12 parallel shafts of quartz, of from three to four feet in width, all rich in ore and only a few feet apart. They have 100 tons of \$150 ore on the dump. In tons of \$300 ore have been assayed and assayed. The other mines of the company are being worked.

TWILIGHT.—This mine is on the north side of Sunrise canon. On this ledge an open cut has been run for a distance of 20 ft, and some 15 ft from the cut a shaft has been sunk to a depth of 30 ft. At these points a ledge fully 15 ft in width is shown. The country rock is limestone, but it is entirely covered up by the debris from the main or porphyry mountain. About one hundred tons of ore have been taken out of that assay, on an average, \$200 per ton.

SUNRISE.—There is piled up on the dump of this mine not less than 500 tons, and there is a sight in the different openings made, not less than 1500 tons more—all free milling ore. It is more will be taken out until the mill is ready for crushing. From the hundreds of assays made from this ore, the average is \$150 per ton.

The Emma lies about 1200 ft south from the Twilight, and is probably on the same vein. Work is just being commenced, and there has been efficient done yet to determine the width of this ledge, but thus far it maintains the same characteristics as the Twilight and Sunrise—the whole vein matter is chloride of silver free-milling. The owners of this mine are Messrs. Everlet & Moore.

ERN.

THE NEW DISCOVERIES.—Southern Californian, April 5: Very interesting accounts come from the new discoveries at Kernville. The whole range of mountains, between Kern and Inyo counties, is believed by our keenest prospectors to be rich in mineral. The first discovery was made by A. F. Bunnell, of Kernville, by accident,

while out prospecting in the rough, almost inaccessible mountains northeast of town, hunting for an extension of the Bull Run ledge owned by Gilpin and others. The lead crops boldly out and can be traced at least a mile, Alfred F. Bunnell being the first locator. Seven claims of 1500 ft each have been located by John Dunn, Robert Butts, Daniel Thornton, J. S. Collins, James Bunnell and J. D. Batton. The lead runs parallel with the Big Blue, and about one mile west. An assay shows \$325 gold, with some silver and an entire absence of base metal. Work is now progressing. The mill of the Big Blue will be used for the present, crushing rock. The prospects are that Kernville will become one of the most important mining towns in the State.

NAPA.

CHROME IRON.—St. Helena Star, April 8: We learn from the party most interested, Mr. C. B. Sharpe, of Chiles valley, that he has sold out his chrome iron mine, situated near his ranch, in the aforesaid valley, to the firm of Tyson Brothers, of Baltimore. Their agent, Mr. Reiser, is still in this vicinity, and it was through him the sale was made. The ore will be brought by wagon to this point, and hence to San Francisco by rail. This is the first mine that has been sold in this neighborhood, and the ore from which, will come here. May it not be the last. We want mines to be sold and worked, and all the ore to come out this way. Every ton is productive of good to the business interests of our town.

COAL.—Calistoga Press: A coal mine was recently discovered about eight miles from Middletown, on Soda creek, by Messrs. Brown & Co., and looks and burns well. There is no danger of its giving out, as the ledge is about 40 ft wide. G. Ivanovich showed us a sample of the coal. It is pronounced by experts to be of very good quality.

THE CALISTOGA MINE.—It is well known here that when the mill stopped last fall the road leading from the mine to the mill was impassable, and that its condition was the sole cause of the stoppage of the mill. A thousand tons of high-grade rock was left at the dump, awaiting fair weather. After the mill hands were discharged, the managers of the mine considered it expedient to put a large force of men at work on the prospecting tunnels, and to that end have been to work on three important points. First, tunnel No. 4, on the extreme south line of the mine, and 2,000 ft from the discovery point. Second, tunnel No. 3, about a hundred yards west of the toll-gate, and tapping the ledge 690 ft under the cropping, and third, tunnel No. 2, on the ore yard, 385 ft under the cropping. This tunnel is on the ledge almost 260 ft, and the development on this level promises the most flattering results. The ledge has widened to about six ft, and the average assay has been \$130 per ton. About twenty tons per day are taken from the face and stopes immediately over the tunnel, and all of a character that shows the existence of a perfect fissure vein. Tunnel No. 4 is within about 40 ft of the ledge, and No. 3 will reach it in about 65 ft. The mill is now in full operation, and we may confidently look for the silver bricks again.

NEVADA.

CINCINNATI HILL.—Foothill Tidings, April 8: We took a stroll over beyond Gold Hill one day this week and found a really live movement on one of the oldest locations in Graes Valley district—the Cincinnati Hill claim. Several years ago these claims, comprising 2,600 feet on the ledge, were largely worked through innumerable shafts, down to where water interfered, and a goodly amount of gold taken out. No machinery was ever put upon it, we believe, and a drain tunnel run in from a long distance only took the water from a depth of about fifty feet. Recently a company of Graes Valley men, having secured the title from the former owners, have made an earnest start, under the superintendence of Mr. John Bray, toward opening up these claims and working them below the water level. When we were there a large double shaft, inclining about 60 degrees, was down fifteen or twenty feet, the boiler, engine and hoisting rig set, and by the look of things they would soon be nicely under way. They expect to reach the ledge at the point above which it has been worked out, in five or six weeks, when affairs thereabouts will begin to get exceedingly interesting.

NEW YORK HILL.—Everything in and about this mine seems to be in a most prosperous condition. Rich rock continues to come from the lowest depths and a partial clean up made this week turned out a \$6,000 bar apparently as easy as any of the older mines of the district.

CALIFORNIA CONSOLIDATED MINE.—Nevada Transcript, April 8: The California Consolidated mining company own the California and the G-11 Tunnel mines, which are located on the hidden of Deer creek, about half a mile from town. The California is on the south side of the creek, and the Gold Tunnel on the north side. Mr. J. L. Holand is the Superintendent, and has held the position since August last. The ledge in the 420-ft level in the California averages from one to two feet in width and is composed of heavy sulphate rock. The last cleaning was made a day or two since at about 300 tons of rock, and yielded 832 ounces of amalgam, which is worth eight dollars an ounce. There was about 100 tons of sulphate saved, which will yield a hundred dollars to the ton. Therefore, the crushing yielded about \$8,156, or over \$27 to the ton. The hoisting at both mines is done by steam power. The

mill at the Gold Tunnel is driven by water power, and the one at the California by steam power. There is a new incline being sunk at the Gold Tunnel preparatory to the erection and use of new machinery so as to allow more extensive and systematic work. They are employing only 30 men at the present time at both mines. There are ten stamps in each mill and they can be kept running steadily on rock from the mine. As before said, the future prospects of the mine are first-rate.

PLACER.

RISING SUN.—Placer Herald, April 10: The new shaft of the Rising Sun mine, which is situated near Colfax, is now down about 500 ft. The work of opening up the drifts is being prosecuted with vigor. The ledge varies in size from 2 to 3 ft. About 20 men are employed in the underground works of the mine. The new hoisting works are, it is said, a model of neatness, convenience and good workmanship.

TUOLUMNE.

CINNABAR.—Union Democrat, April 10: The recent discovery in the vicinity of Marsh's Flat has attracted considerable attention from parties below. Mr. Dodge has returned from San Francisco with others attracted by these reports. If there is a paying lode existing, every effort will be made to find it by experienced miners and capitalists who are interested. A claim was recorded this week in the name of W. C. Ralston, which is a good sign that nothing will be spared to develop its value properly.

MAKES & DARROW.—Tuolumne Independent, April 10: The company are gaining depth very fast on their new hoisting shaft; it is expected they will reach the main vein in a short time. They are already getting small stringers of quartz in the rock and carrying rich sulphurets, indicating vein matter (and consequently solid lode not far distant). They are also refitting their three stamp prospecting mill, preparatory to testing and classifying the different gold and silver bearing quartz already discovered upon this excellent mine. The Superintendent is indefatigable in pushing the work ahead. We wish them all success.

ENCOURAGING.—The owners of the "New Albany," situated east of this place, were up from San Francisco last week on a tour of inspection, and went home more than pleased with their property. They have given orders to have a two mile ditch dug to the mine for power for a mill, which, in all probability, will be erected before long. The mine is sufficiently developed to warrant this expenditure.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—Gold Hill News, April 8: The north drift from cross-cut No. 2 on the 1500-ft level connected yesterday morning with cross-cut No. 3, greatly adding to the circulation of air in that portion of the mine, and proving the continuous extent of the rich ore from the south line to cross-cut No. 3, a distance of over 220 ft. Taking into consideration the fact that the last 20 ft of the south cross cut run on the south line of the Ophir is in rich ore, there is not a doubt left but what cross-cuts Nos. 4 and 5 will both find the ore vein as rich when they reach it as it is in cross-cuts Nos. 1 and 2. There are only 120 ft unfinished of the large air gallery on this level being carried forward to connect with the Ophir for ventilating purposes.

CONE, VIRGINIA.—Daily yield, 500 tons of ore. The joint east cross-cut on the California line, on the 1300-ft level, is in 200 ft, and will have 60 or 70 ft yet to run to reach the ore vein. The joint east cross-cut on the California line, on the 1400-ft level, has connected with the north drift from the ore breast, greatly assisting the ventilation of that portion of the mine. No prospecting is being done on the 1550-ft level at the present. The shipments of bullion up to last evening, for the past month amounted to \$1,701,000 with bullion enough not yet melted to swell the yield to \$1,750,000.

BECKER.—The main incline is down 11 ft below the 1600-ft station, the bottom still in very hard blasting rock. There is a considerable seepage of water in the shaft that interferes somewhat with the progress of the work. The south winze on the 1400-ft level is down 134 ft, the bottom still in good milling ore. The middle winze on the same level is down 115 ft, the bottom in ore that will pay for milling. The face of the north drift from the east cross-cut on the 400-ft level is in a fine quality of quartz, but has developed no valuable body of ore as yet.

OPHIR.—There is little or no change in either the appearance or yield of the ore breasts on the 1465-ft level. Sinking the northeast winze below the 1465-ft level is making steady progress. The new hoisting works building for the incline machinery is completed, and good headway is being made with the heavy stone foundations for the engine.

ANDER.—Work on the lower levels is making steady progress, with a very favorable prospect of the development of a fine body of rich ore.

WOODVILLE.—Sinking the new shaft is progressing at the rate of two ft per day, the bottom still in good working ground. The north drift on the 300 ft level is again being driven ahead, following the hanging clay wall of the ledge, which is well defined and of the regular Constock formation. The ore at this point is 22 ft in width, and of a fine character.

STEELE'S NEVADA.—Sinking the new shaft is making fine headway, the rock in the bottom blasting out finely, and no water to interfere

with the work. The large water tank at the 600-ft station is rapidly approaching completion. Driving the northeast drift on the 700-ft level of the old shaft is making good headway, the face in ledge matter of a favorable character.

CROSSLAR-POTOSI.—The south drifts on both the 1150 and 1250-ft levels are still being driven vigorously ahead, the face of both in porphyry mixed with ledge material.

OVERMAN.—The men have been taken from the drifts at the bottom of the winze on the 1100-ft level and put to work to enlarge the pump stations in the shaft preparatory to putting in the new and powerful pumps.

GOLDEN FLEECE (PEAVINE).—During this week 50 ft was added to the south drift, all through good ledge matter. The shaft being raised from the incline to the surface for hoisting purposes will be completed in about 14 days, when the engine and pump will be put in their places. Present assays average \$140 per ton.

UTAH.—The flow of water from the north drift on the 400-ft level continues so strong that all work on that level has been suspended for the present, and the tanks are kept as busy as possible hoisting the water to the surface.

LEO.—The ledge matter in the face of the main tunnel is steadily improving in character. The northeast drift shows the ledge to be very large at that point, and the formation is of the most promising nature.

HALE & NOACROSS.—The north drift on the 2100-ft level has reached the Savage line, and will connect in a very short time with the Savage works, which will give a much needed ventilation on that level. Daily yield, 60 tons of ore from the old upper workings.

BEST AND BELCHER.—The south drift from the bottom of the winze on the 1700-ft level is still driven vigorously ahead, without change of interest to report, if we except the rapid headway that is being made since the introduction of a Burleigh drill—the drift having been advanced 21 ft during the week, where only 5 ft could be made in the same length of time by hand work.

GOULD & CURRY.—The shaft is enlarged to four compartments, and is now in fine working order down to the 1500-ft station. The water has risen in the shaft to a considerable distance above the 1700-ft level, so that all work on that level is stopped for the present.

CALLEDONIA.—Sinking the new shaft is making splendid progress, the rock in the bottom blasting out finely.

SAVAGE.—Enlarging the drift on the 2200-ft level is making fine headway. The work of putting in a large water tank and pump station at the 2200-ft level is being pushed with all the vigor possible.

JULIA.—The face of the south drift, on the 1000-ft level, is still in soft porphyry, mixed with quartz of a very encouraging character.

SENATOR.—The body of quartz cut into last week proved only a hunch, yet the face of the drift continues in fine looking vein matter.

LADY BAYAN.—Owing to the breakage of a spur wheel of the pumping machinery and a stoppage of the pumps, the lower level of the mine is completely flooded, the water having stopped all work below the 250-ft level.

JUSTICE.—Water increases as the main incline attains depth below the 800-ft level. The face of the main drift south at the 800-ft level, from the incline, is in hard porphyry, very wet.

CROWN POINT.—Daily yield 500 tons of ore. There is no change in any of the upper ore producing levels of the mine. Opening the 1700-ft station is nearly completed. Everything in and about the mine is working finely.

IMPERIAL-EMPIRE.—The face of the south drift on the 2000-ft level is still in clay and porphyry. The face of the east cross-cut from this drift is in porphyry.

BALTIMORE.—The shaft is being thoroughly repaired and placed in the best possible working condition.

PAUL SHEARDAN.—The reddish brown stringers of quartz so plentifully met with of late, and which give such good assay, increase in frequency as well as in size.

BUCKEYE.—The water has been drained at the 550-ft station, and a drift started east to determine the full width of the vein, as the entire station is in ledge matter.

BULLION.—The body of quartz in the south drift on the 800-ft level continues to enlarge as the work of development progresses.

YELLOW JACKET.—The 1740-ft level is being gradually cased off by the connection with the Imperial mine, so that much better progress can be made with the prospecting operations in the future.

NIAOABA.—The ledge continues to show improvement as the shaft gains greater depth. The ore is of a fine grade and gives great encouragement.

NORTH CONSOLIDATED VIRGINIA.—The new shaft is down over 100 feet, with the bottom in fine looking ledge matter, which gives good assays.

KOSUTH.—The ore in the face of the south drift on the line of the ledge on the 350-ft level is showing considerable improvement as the drift advances.

OCCIDENTAL.—Cross-cutting the ore vein to the westward has been commenced.

ORIGINAL GOLD HILL.—The uprise above the cross-cut from the main south drift is all the way in good ore. Retimbering the main drift in place is the principal thing being done at present.

NEVADA.—The east cross-cut at the lower level gives an excellent showing of low grade ore, but no pay ore as yet.

Continued from Page 250.

throughout the States where it abounds. Oregon is here the source of supply.

A few species of the order furnish essential oils or essences. The only one that we need notice, is what is called the wintergreen. Its oil or essence is derived from the little plant, *Gaultheria procumbens*, called wintergreen. It is usually a little plant three to four inches high, bearing bright, red berries. They gather the plant and distill the leaves, distilling over the volatile oil used in medicine, flavoring candies and flavoring drinks. It is said to be stimulating, and so is more or less valuable.

The great importance of the order lies in its furnishing a large number of very beautiful ornamental plants, and wherever you find an *Ericaceae* ornament, you may be very sure of having always something quite pretty. The forms are always quite pretty. Take up a flower and examine it; it has all the perfection of a symmetrical form, instead of having a looseness as though it had not been quite finished. Indeed, I should say that among these plants are the most perfect forms we have.

The next one is the genus *Erica*, found in the region of the Cape of Good Hope. There are 300 species; perhaps 250 of them have been grown. I noticed in Woodward's Gardens quite a number of them. One species of *Erica* is the heath I spoke of a while ago. Rhododendrons grow usually to six feet in height, with large showy flowers. Azaleas, which may be seen in almost any greenhouse, have large, spreading flowers of all colors. I would caution you again against making free use of these plants, only as you know what they are. In fact, it is known that honey made from some of these, the Rhododendron, for instance, is Poisonous.

It would be injudicious to have very many of them growing near where bees are kept. The plant that covers the heaths of Scotland belongs to this family and originally belonged to this genus, *Erica*. But you understand that whenever we get a genus which has a great many species, there is a great temptation for the botanist to divide it up. There are now about 400 species of the genus *Erica*, so the botanists are splitting it to pieces. I think the true heath has been taken out of that. The only true *Erica* we have in the United States grows in two or three restricted districts in Massachusetts.

The Composite or Sunflower Family.

Composite, containing fully 10,000 species. It is what is called a very "natural" order; that is, any one seeing the plants would class them together, even without a knowledge of botany.

They are found in all countries and in all climates, having perhaps as wide a distribution as any order. Now, in all this vast assemblage, it is remarkable that there are hardly any trees. A considerable number are shrubby; but the great majority are herbaceous and very many of them are only annuals. A bitter, astringent principle runs through a large part of the order, but this very rarely becomes poisonous. There are a very few poisonous plants, but as a general thing you may chew of them or eat of them with safety. Though including so many species, comparatively few are of economic value. Perhaps, taking the number of species, this is the most valueless order we have. Under the food plants we have what is called the Jerusalem Artichoke, *Helianthus tuberosus*, a very near relative of the common Sunflower. This produces tubers resembling the potato; having very nearly the same general properties, and they are used in some places, because they are very readily grown. It is a perfectly hardy plant throughout the whole United States, so that the people need not replant it. If a field is once planted with artichokes, all that is needed is to cultivate it. I think it would be well to.

Grow it Where Swine are Kept.

It would be very valuable grown in this way; when the hogs are feeding on corn, and need a change of food, the grower could turn them in and let them get these tubers. The culture of the potato, however, has mostly driven out the Jerusalem artichoke. By the way, "Jerusalem" does not mean it came from Jerusalem. It is an American—Brazilian—plant, and was taken to Spain. In Europe it was called *girasole*; as it passed over into the English language, the common people got hold of it and changed it to Jerusalem.

True Artichoke, *Cynara Scolymus*, is a native of Southern Europe. In this case, instead of eating any tubers, we eat small, undeveloped flower scales, grown somewhat here and brought into the market. Jerusalem artichoke looks like wild sunflower, has every appearance of it. In fact, it is found more or less running wild all over the eastern part of the United States.

Silfry, or, as it is sometimes termed, vegetable oyster, *Trago pogon porrifolium*, is a native of Europe, grown for its roots, which are about as thick as this chalk pencil, growing six, to eight or ten inches in length. They are cut in each fall, and are used somewhat as ingredients in soup. It is worth growing, I think, in any place.

Lettnice, *Lactuca sativa*, is probably a native of Central Asia. It has been grown so long that it is now grown in every place. Eddive, belonging to the East Indies, called botanically *Cichorium edule*, is also another plant quite considerably grown for salad. Chicory, *Cichorium intybus*, a native of Europe, is grown throughout almost all portions of the United States for its roots. These are powdered, dried, and mixed with coffee. It is supposed to give it a little better taste. I think, however, for most people, the testimony is it does

not improve it very much. Dandelion roots and wormwood are valuable medicines, used largely, and arnica, used as a tincture, is found very valuable in serious wounds. These three, dandelion, wormwood and arnica, are almost all of the ordinary herbs in good repute mentioned in the dispensatory, while chamomile, feverfew, elecampane, southern-wood, and many others are what might be called domestic remedies. In the dispensaries you will find that they are not admitted as first-class medicines.

On the plains and in the Rocky mountain region several species of *Artemisia* furnish a large portion of the fuel. This *Artemisia* sometimes grows up some three feet high or so, mostly smaller, and they call it sagebrush. It is not the sage, by any means, but it is very closely related to wormwood, having nearly the same properties.

There are other forms, all used more or less, however, for fuel. [A student asks "What particular variety of *Artemisia* is it that furnishes food for animals?" That certainly cannot be a true sage. Is it bitter? [Student, "It is bitter until the frost." It is probably just one of these common species, one of these white ones. One kind is very white occasionally; sometimes more or less green. It grows east as far as the Missouri river, and I suppose, westward as far as the Sierra Nevada.

Among the ornamental plants, and there are many of them, are chrysanthemums, dahlias, sunflowers, zinnias, marigolds, and a great many others. Now, this order is peculiarly adapted to improvement. You take any one of the wild composites, and it is a very easy matter to change its form so as to double it, so as to make a quite ornamental plant of it, so that the flower will be quite attractive. The effect of cultivation may be seen in these asters, daisies and chrysanthemums. Wild dock is one; cultivation will double it. Now, this doubling is only changing the little double flowers of the great composite whole into the

Fig. I.



Ox Eye Daisy, or Whiteweed.

long, ligulate, or strap-shaped ones. Examine the next dahlia you see; you will find that the only change is as stated. There is no change, really, in the structure. Instead of the little floweret having that general form, it is split down on one side, considerably elongated, and has taken on a form like that. It is simply a very slight change in the corolla that brings about the result.

The whole order seems to have a very great tendency to become weedy. There is hardly a plant in the whole order but that has a tendency to become weedy, if it has a chance; so that out of the 150 species which may probably be found in California, undoubtedly one hundred may be found as weeds.

The Worst Weeds are Imported.

Thistle, cocklebur, rag-weed, bitter-wood, ox-eye daisy, may weed, beggar-tick, and dandelion are the most important of the weedy growths belonging to this order. Ox-eye daisy, or white-weed, [Fig. I.] grows East. I don't know whether it is found here or not. It has white flowers about an inch and a half across. [A student thinks it has been seen here.] It has a thin stalk, and grows always in very little bunches. I suppose the seed falls on the ground near it, so the plant will multiply both by its underground stems and by its seeds. It sends out little underground stems, so that a small plant is very soon a big one, and is quite troublesome to deal with.

One plant in the order is very peculiar. Growing all through the prairie regions of Iowa and Illinois we find what is called the compass-plant. It is in general appearance like the sunflower. It sends up from the ground a number of great radial leaves, and after awhile it sends up its flower-stem. Now, these leaves have the property of standing in the meridian. Why it is, or how it is, there does not anybody know.

The general shape of the leaf is very greatly lobated, reminding you of an enormous calyx. Now, that leaf stands almost always in that direction, so that one edge of it is to the north and the other to the south. You go to any of these plants—I have done so hundreds and

hundreds of times—and you will find all the leaves, except some two or three, apparently twisted around, though growing on every side. They twist around to the meridian. This peculiarity of the plant is made use of by the inhabitants quite frequently to find their direction. If you stand north or south of the plant and look towards it, you will see only the edge of the leaves; while viewing it from the west or east side, you will see those great, broad leaves standing out. Several years ago Dr. Gray attempted to explain it. It was suggested that a careful examination would probably reveal the fact that there were nearly the same number of stomata to be found on each side. Examination was made—the stomata were about equal. But the difficulty is, while that might account for the leaf trying to deal justly with its two sides, it will not account for this fact, which is very well established; that there are a great many other plants closely allied, the leaves of which do not turn in this way. So that, after all, Dr. Gray's suggestion did not account for the whole thing. You can not tell by these leaves any more about which way is north and which south than you can with your compass, if both ends of the needle are shaped alike. Of course you cannot tell which is which. I have seen this, where for some reason the leaf apparently wished to twist around where it had twisted.

More than Once Around,

Or over 360 degrees.

It is quite common for them to twist 160 to 180 degrees. All that grow in a certain position must twist around that far, at any rate ninety degrees.

The next is the Madder family, *Rubiaceae*, herbs, shrubs and trees, numbering nearly 3,000 species, mostly confined to the hotter portions of the globe. There are no timber trees which are of special value. There are some of local value. The order deserves its importance from the fact that it furnishes

Coffee, Quinine, Ipecacuanha and Madder,

Four of the most important vegetable products. The coffee tree is called *Coffea Arabica*. It was called Arabica because supposed at that time to be a native of Arabia. It is now found native in Abyssinia. It is a much branched tree, growing to the height of twenty feet. The

Fig. II



Leaves, Flowers and Fruit of Coffee Tree.

flower has a fragrance a good deal like the orange and the tree yields red berries as big as an ordinary cherry. Each berry has inside of it two seeds, which are the coffee seeds. (See Fig. 2.) These seeds always lie with their sides or faces approximating.

Examine a grain of coffee; cut it down carefully and you will find a little embryo, a very minute one, indeed. It will be necessary, perhaps, to boil the kernel before you can do this conveniently. It is of comparatively recent use, some accounts placing its introduction into Arabia somewhere in the fifteenth century; so it was about the time tobacco, potatoes and Indian corn were brought into notice. About 1560 it was first brought to London, long after they had been chewing tobacco. It was quite a good while before it came into general use. Now it is cultivated in the West Indies and considerably in South America, also in the East Indies. All these differences in locality have brought about differences in the coffee; but it is that we get from Arabia which is the best, occasionally to be found in the markets under the name of Mocha coffee. So, if you want to get the finest, highest priced, best tasting, buy Mocha. Java stands next, produced in the East Indies, largely upon the island of Java and usually it is next in price also.

The Rio coffee comes from the West Indies, South America, and a little of it comes from the extreme southern part of Hindostan.

Down in that part of Asia they grow it, and it is found to be the same quality and same grade as the Rio, so it is classed with it. It is the greenest and poorest. Now, it is found that if the very poorest coffee is kept for a long time in close boxes or chests, it is improved. If ordinary Rio is

Kept Ten to Fifteen Years,

It is found that in that time it will be fully equal to the best Mocha. The difference seems to be partly due to climate and largely due to the way in which it is preserved or prepared; the two go together somewhat. The West Indies and South America are not favorable to the long ripening which it should undergo. In

Java the climate is such that it ripens more slowly, while in Arabia the ripening is slower still. This is something parallel exactly with the ripening of the grape. In both cases we find the same thing—long ripening favors a higher development.

The second important plant is the *Cinchona*. There are several of the trees growing in the mountainous regions of Peru, Bolivia and New Grenada, and generally throughout the western part of South America. They all belong to this genus *Cinchona*. Of species belonging to this genus are *C. officinalis*, *C. calisaya*, *C. micrantha* and others. From a number of these species are obtained all the Peruvian bark and Jeeuit's bark. From the Peruvian bark we get, by manufacture, the quinine, which is really, I think, a chemical; I think it is an anaphate of the alkaloid or alkaline principle. It is used very largely now all over the world. This *Cinchona* was first made known under the name of Peruvian bark about 1640. Some of the Jesuits happened to be traveling in South America and made the discovery that it was valuable for fevers. They introduced it into Europe, and there is now a great demand for it. For a time there was a great danger that it would become extinct, so the English Government took steps to make plantations of it. There are now fine plantations in the islands of the West Indies, also in the East Indies.

Ipecacuanha, a very strong and safe emetic, is derived from *Cephaelis Ipecacuanha*, a small plant growing in Brazil. The root of this is taken, powdered and manufactured. It is perhaps one of the most generally used of all the emetics that are in general practice.

Madder is derived from *Rubia tinctoria*, which is a perennial, herbaceous insectivore, a native of the Mediterranean region. It is grown for its roots. The roots bear tubers which resemble those of the dahlia, but not quite as large, by any means.

They have a remarkably great amount of coloring matter in them. The roots are powdered and the coloring matter extracted. It is cheap, quite durable and very largely used in the red colors of calico and other cheap fabrics. It is grown largely in the United States throughout Southern Ohio, Indiana, Illinois and the adjacent regions, considerably also in Kentucky. If not already introduced into this State, it can be added as one of the industries.

The Parsley family, *Umbelliferae*. It might be called the humble family, because of the humble-looking inflorescence. It is quite extensive, including fifteen to sixteen hundred species, mostly herbaceous, although in the south temperate zone a few shrubby ones are found, and in one or two cases tree-like forms are known.

The order is mostly found in the north temperate zone. There are three distinct principles or properties to be found in the order, sometimes in the same plant. First, an acid, poisonous principle which is usually very abundant in the stems and leaves, so that these parts of the plant are generally to be avoided; an aromatic, wholesome principle is found in the roots, or seeds as we call them. You will understand that it has a form of fruiting, doublets, usually known as seeds; they are really two fruits. The third principle is a milky, resinous one. This is found usually in the roots, although it is found occasionally in the stem and other parts of the plant. A few of the plants are somewhat important. First, the parsnip, *Pastinaca sativa*, a native of Europe. In this case we eat the roots. If the plants have been well grown, grown rapidly, have not been made poisonous by too much sunlight, too much heat, they are quite palatable. The Carrot, *Daucus carota*, also of Europe, is used for the same purpose.

Both of these, if allowed to run wild,

Deteriorate and Become Poisonous.

Cultivation takes out the poisonous principle, and one may grow very good parsnips which will have no poison in them.

Celery, *Apium graveolens*, is a native of Europe, very well known. In this case, as is very well known, we eat the stems. Take the green stems and they are poisonous, but when this poisonous matter has been driven out by keeping the stems away from the sunlight for some time, they are quite wholesome. They grow it first, allowing it to be a foot high, and then throw earth, sometimes straw, sometimes boards around it—usually boards—so that the stem is kept away from the light. Whenever perfectly white, they are wholesome. Whenever acid, and I find some such are in the market here, you should throw them away; don't eat them.

Parsley, termed *Apium petroselinum*, is a native of Southern Europe, and is grown as a pot-herb. Some mix it up with their food. Now, in connection with all these, parsley, parsnip, carrot and celery, you must remember you are

Dealing with Poisonous Plants.

Among the aromatic plants we find caraway, coriander, dill, cum n, anise, fennel, etc. Of course they are harmless.

We get a few gums, first *asafoetida*, from the Northern *asafoetida*, a tall plant, native of Southern and Western Asia, and is grown there.

The main north drift on the 1740-foot level of the Yellow Jacket mine has made a connection with the south drift from the Imperial on the same level, thus curing a fine circulation of good air, and greatly aiding the development of that portion of the mine.

A new working shaft is to be sunk in the South Europa mine, on the Cometock,

Useful Information.

Coloring Process for Gems.

There is a factory in Idar, Germany, where the coloring of stones for art purposes is said to be carried on to a greater extent and more perfectly than in any other part of the world, the process pursued in thus converting chalcodony and red and yellow carnelian into onyxes resulting in the production of admirable specimens, which are known and prized in all the markets of Europe and America. The peculiarity of this process consists in the fact that the ribbons or zones in the different varieties of chalcodony—which, in the kidney-shaped masses of that substance, lie superimposed—differ in their texture and compactness; but owing to their similarity of color in the natural state, they can only be distinguished from each other with difficulty. The stone is, however, capable of absorbing fluids in the direction of the strata; and as the strata possess this property in different degrees, it necessarily follows that a colored fluid be absorbed, and the quantity taken up by the pores of the stone is different for every stratum of zone, a number of tints will be produced corresponding to the number of zones, each being distinct and colored in proportion to the quantity of the fluid absorbed. In this way a specimen of stone naturally but slightly colored may be rendered equal to fine stratified chalcodony or onyx, and may be employed equally well in the engraving of cameos, or for any other purpose where the variety of color can be rendered available.

THE POTTERY TANK.—Among the many vegetable products of Brazil, the pottery tree of Para, is not the least worthy of note. This tree, the *Mokilea utilis* of botanists, attains a height of one hundred feet up to the lowest branches. The stem is very slender, seldom much exceeding one foot in diameter at the base. The wood is very hard, and contains a large amount of silica; not so much, however, as the bark, which is largely employed as a source of silica in the manufacture of pottery. In preparing the bark for the potter's use, it is first burned, and the residue is then pulverized and mixed with clay in varying proportions. With an equal quantity of the two ingredients, a superior quality of ware is produced. It is very durable, and will bear almost any amount of heat. The natives employ it for all manner of culinary purposes. When fresh the bark cuts like soft sandstone, and the presence of the silica may be readily ascertained by grinding a piece of the bark between the teeth. When dry it is generally brittle, though sometimes hard to break. After being burned, if of good quality, it cannot be broken up between the fingers, a pestle and mortar being required to crush it.—*Am. Artisan.*

COATING SEAMS IN WROUGHT IRON TANKS.—Some one asks the *Scientific American* if there is any preparation for coating the seams of large wrought iron tanks so as to prevent the leakage of alcohol? The tanks are for storing it; they are perfectly water tight, but the spirit, being of a much less specific gravity than water, oozes out. To this query that journal replies as follows: Try cotton cloth soaked in lime, and cold rivet with this between the plates. Let us know if this succeeds, and also the results of other experiments tried by you, and we may be better able to inform you of a mode of procedure.

INTERESTING AND IMPORTANT CALCULATION.—It is estimated that of the 12,000,000 women in America, at least 11,000,000 wear calico dresses. It is not an unreasonable supposition that the spirit of economy here, during the past year, induced them to forego one dress apiece, or an average of eleven yards each, making, in all, a loss to the trade of 121,000,000 yards. This is nearly the entire product of all the Massachusetts mills for a year. From the above it will be seen how easy, from a slight inducement or necessity for economy, an overburdened market may be produced in the article of cotton goods.

OXYGEN AND EGGS.—In dry oxygen gas eggs are not affected, unless punctured. Moist oxygen decomposes the eggs. In moist nitrogen eggs will keep three months. Hydrogen the same. Eggs, whether pierced or whole, are perfectly preserved in carbonic acid, dry or moist. Illuminating gas the same. In chlorine water 1 to 500 eggs kept eight months in a closed vessel. In a solution of dilute chloride of lime, eggs would not keep ten days. Lime water and sulphate of lime kept them a little longer. Carbolic acid solution 1 to 500 preserved them about six weeks.

USEFUL HINT.—A kind of tracing paper, which is transparent only temporarily, is made by dissolving castor oil in absolute alcohol and applying the liquid to the paper with a sponge. The alcohol speedily evaporates, leaving the paper dry. After the tracing is made, the paper is immersed in absolute alcohol which removes the oil, restoring the sheet to its original opacity.

WOODEN SKEWERS.—The only manufactory of wooden skewers in the world, it is supposed, is at Toledo, Ohio, whence millions of them are shipped to England. They are made by machinery from hickory blocks. Between eighty and ninety thousand are turned out every day.

BET CIDER.—M. Plouard, a lawyer of Andelys, France, has devised a new cider, said to be very cheap and of excellent flavor—the peculiarity of which is that a large proportion of sugar beets is mixed with the apples before pressing; 80 pounds of beets are mixed with 700 quarts of apples, or about 11 pounds to 100 quarts. The beets and apples are pressed together, then saturated with water, left quiet in a cellar for twenty-four hours, and pressed anew. This is repeated seven times. The inventor says he makes 100 quarts of cider for 80 cents, which seems rather questionable.

NEW USE FOR GAS-TAR.—A gentleman in Burlington, Vt., of an investigating turn of mind, a week or two ago determined to try it again with the rats which infested his house. He purchased a supply of coal tar at the gas works, and placed small quantities of it in the rat holes in his cellar, and elsewhere in their runways. The rats, bedabbling themselves, became disgusted with the manner of their entertainment, and speedily left the premises, and have not been seen or heard from since.—*Sci. American.*

SLEEPING CARS.—Sleeping cars have ceased to be a luxury and have become one of the necessities of modern travel. It is said that the Palace Car company own 800 cars, which are operated on 32,000 miles of road. The average cost of these cars is \$17,500. In Pennsylvania they run their cars on 22 lines of road, and 17 in Ohio. Their net profit in these two States is said to amount to 14½ per cent. on the capital employed, from which 5 per cent. must be deducted for wear and tear, leaving 9½ per cent. net profits.

NEW APPLICATIONS OF ELECTRO-METALLURGY.—A very ingenious application of electro-metallurgy has recently been brought before the notice of the Society of Arts. It consists in the application of a coat of silver, by means of electro-deposition, on natural leaves and flowers. By this means very delicate ornaments are produced, since the precise form and texture of the natural leaf is preserved under the thin silver film. The special process by which these results are attained is the invention of Mr. Deaton.

AMERICA BEFORE THE DAYS OF COLUMBUS.—The supposition that America was known to the northern nations of Europe many centuries before Columbus was born is now very generally credited. The evidences in favor of that supposition are constantly accumulating. So much interest is felt in the matter by European scientists that an "International Congress" is to convene at Nancy, France, on the 19th of July next, of persons interested in investigating this interesting and important subject.

COMBINATIONS OF COLORS.—As an illustration of the limitless number of combinations which the three primary colors are capable of, it may be interesting to know that in the Gobelin tapestry manufacture 28,000 distinct shades of yarn are employed, each one distinguishable by the practiced eye.

Good Health.

To Produce Perspiration.

EDITORS PRESS.—One of your subscribers takes an interest in recommending the following recipe for family use. She has used it for years, and has never known any but good and satisfactory results, and through her some M. D.'s have confirmed her testimony by continued use of some where a sweating effect was desired:

Take gum camphor, saffron, ipecac and Virginia snake root, each one ounce; opium, half-ounce (pulverized); add one quart good fourth proof brandy, digest or soak two weeks, then filter or strain.

Dose.—For adults a teaspoonful every one or two hours, in a little warm herb tea to produce sweating. Useful in fevers, inflammations, colds, and wherever free perspiration is desired. When used for children, the amount and frequency of the dose should be modified according to age and circumstances.

Rio Vista, March, 1875.

How to BREATHE.—Civilized man is the only being that breathes through the mouth, which at once shows that it is an unnatural and acquired habit. The wild Indian would as soon think of eating with the nose as of breathing thus. The habit is usually acquired in childhood, and is generally the result of breathing impure air. It is then that the fond mother should guard her offspring with watchful care against this vicious and deadly enemy of her child. Let her follow the example of the wild Indian mother, and give her child the pure air of heaven to breathe, and if perchance it opens its little mouth during sleep, let her gently press its little lips together, until the habit of keeping them closed becomes fixed for life.—*Science of Health.*

If a wound made by a rusty nail be held for twenty minutes over smoke from burning wool or woolen cloth, the pain will be relieved and the worst case of inflammation allayed. This is simple and worthy of a trial, in these very frequent cases, which often result so fatally.

What the Health Lift Does for Exhausted Nature.

This era is one of condensation—from condensed thought to condensed milk—and the question here was how to condense exercise. Rather is it a gradual, easy, complete waking up of every torpid molecule in brain, liver, blood and nail, the sending through and possessing the entire man with a new sense, and re-creating him there, so that he returns from his few minutes at the lift a new creation. It doesn't seem to take the place of exercise exactly, but rather to make all exercise tell. It is the complement of the exhilarant to it. Never shall I forget the sensations of my first lift and my introduction to parts of myself unknown or forgotten. It seemed to be forever to the end of me—as if life was going out from its center to an infinite circumference, as if the eye were gone beyond fingers' ends, and would soar into, fill all space. Then a glow all over the body that was as luscious and cheery as any that have been told of by the Turkish bath enthusiasts, and then—I am afraid it may betray me—an exhilaration purer and more subtle and enduring than that of the best champagne. That was a red letter day, and though I have never felt quite that first, full joy again, my experience has been a record of many joys; joys that come of soothing and strengthening to a fagged brain, and a weary body and a pestered soul. I take my lift before my late dinner, when the day's work is done. I carry to it whatever weariness the day has made—of body, of brain, of heart—and I go away another than the man I came. Head-ache, limb ache, heart-ache are gone, or toned down to easy bearing, and a new counteractant vigor set at work in all the pulses. It seems to get behind the heart, and bolster that first seat of power and action. It is the best of rest.—*Rev. John F. Ware.*

Interesting Facts.

The organ of vision is considered the most delicate organization of the human frame; yet many who were born blind have been enabled to see by surgical operations, and the following is an interesting fact concerning one of that class: A youth had become thirteen years of age, when his eyes were touched by a surgeon. He thought scarlet the most beautiful color; black was painful. He fancied every object touched him, and he could not distinguish by sight what he perfectly well knew by feeling; for instance, the cat and dog. When his second eye was touched, he remarked that the objects were not so large in appearance to this as the one opened at first. Pictures he considered only partly colored surfaces, and a miniature absolutely astonished him, seeming to him like putting a bushel into a pint.

Stanly, the organist, and many blind musicians, have been the best performers of their time; and a schoolmistress in England could discover that the boys were playing in a distant corner of the room, instead of studying, although a person using his eyes could not detect the slightest sound. Professor Sanderson, who was blind, could, in a few moments, tell you how many persons were in a mixed company, and of each sex. A blind French lady could dance in figure dances, sew and thread her own needle. A blind man in Derbyshire, England, has actually been a surveyor and planner of roads, his ear guiding him as to distance as accurately as the eye to others; and the late Justice Fielding, who was blind, on walking into a room for the first time, after speaking a few words, said: "This room is twenty-two feet long, eighteen wide and twelve high," all of which was revealed to him with accuracy through the medium of his ear. Verily, "we are fearfully and wonderfully made."

THE VIRTUES OF BUTTERMILK.—Mr. Rebber, in a paper presented to the French Academy, thus extols the virtues of buttermilk: Life exists only in combustion, but the combustion which occurs in our bodies, like that which takes place in our chimneys, leaves a detritus which is fatal to life. To remove this he would administer lactic acid with ordinary food. This acid is known to possess the power of removing or destroying the incrustations which form on the arteries, cartilages and valves of the heart. As buttermilk abounds in this acid, and is, moreover, an agreeable kind of food, its habitual use, it is urged, will free the system from these causes, which inevitably cause death between the seventy-fifth and hundredth year.

READY MEANS FOR THE PRODUCTION OF OZONE.—Ozone may be easily and abundantly generated in an apartment by means of an aqueous solution of permanganate of potash and oxalic acid. A very small quantity of these salts, placed in an open porcelain dish, is all that is necessary, the water being renewed occasionally as it evaporates. Metallic vessels should not be used. Ozone, as most of our readers are aware, is remarkably conducive to health.

DARK HOUSES.—A dark house is always an unhealthy house, always an ill-aired house, always a dirty house. Want of light stope growth, and promotes scrofula, rickets, etc., among the children. People lose their health in a dark house; and if they become ill they cannot get well in it.

Domestic Economy.

Cooking Cranberries.

Cranberry sauce is the great American dish, and the most popular one for general use, either for dinner or tea. As a relish with game, poultry and meats of all kinds, it is unequalled. To every pound of fruit add three-quarters of a pound of sugar and half a pint of water. Stew over a moderate but steady fire. Be careful to cover and not to stir the fruit, but occasionally shake the vessel, or remove to a gentler heat, if in danger of sticking or burning. If attention to these particulars be given, the berries will retain, to a considerable extent, their shape, which is desirable and adds greatly to their appearance on the table. Boil from five to seven minutes, when they should be removed from the fire, turned into a deep dish, and set aside to cool. If to keep, they can be put up at once in air-tight jars. Very soft berries should first be removed and those remaining thoroughly washed, after which they should be placed in scalding water for about two minutes and then taken out; this removes a portion of the acidity, and a little less sugar will be required.

White sugar (granulated is best) should be used, and not too much water; the proportions given of each, it is thought, will suit the majority of tastes, but when otherwise, the quantities can be made larger or smaller, though in using sugar too freely, the distinctive cranberry flavor will be partially lost; some may prefer one pound of sugar where the amount specified is three-quarters, but probably others will be better pleased with less, perhaps with half a pound—especially dinner sauce—which makes the preparation very palatable, and has the advantage of economy; but when desired to keep a long time without canning or sealing, a larger quantity should be used. On account of the acidity of the fruit it is preferable, though not positively necessary, to use porcelain-lined cooking utensils.

VALUE OF A MILK DIET.—If any one wishes to grow fleshy, a pint of milk before retiring at night will soon cover the scrawniest bones. Although now-a-days we see a great many fleshy females there are many lean and rank ones, who sigh for the fashionable measure of plumpness, and who would be vastly improved in health and in appearance could their figures be rounded with good solid flesh. Nothing is more coveted by thin women than a full figure, and nothing will so rouse the ire, and provoke the scandal of one of those "clipper builds," as the consciousness of plumpness in a rival. In cases of fever and summer complaint, milk is given with excellent result. The idea that milk is feverish has exploded, and it is the physician's great reliance in bringing through typhoid patients, or those in too low a state to be nourished by food. It is a mistake to scorn the milk picher. Take more milk and less meat. Look to your milk-man, have large-sized, well-filled milk pichers on the table each meal, and you will also have sound flesh and light doctor's bills.

USEFUL HINTS FROM ONE WHO KNOWS.—Beef can be preserved for farmers' use by cutting it up, frying slightly, packing in a crock and covering with warm tallow. Beef tallow should be used for this, and kept perfectly clean and tried out nicely.

We cook hams in the same way in the spring, but consider them best without frying. They should be tightly packed and care taken that the warm lard fills up all the vacant places left by the meat.

Some housekeepers think that tallow is not fit for cooking purposes; but I think when it is properly rendered it is as good for some things as lard. I prefer it for frying doughnuts, and one of my acquaintances, a good cook, says it is the only shortening fit for mince-pie crust.

A PAN DOWDY.—Did you ever hear of a pan dowdy? It is an old-fashioned New England dish and has the flavor or our grandmother's cookery. Make a rich crust; line a deep earthen pot with it; now slice some apples quite thin for the first layer, strew the apples with molasses and spice and a teaspoonful of milk; cover with a thin crust and repeat the process. Cover the top with crust and your pan dowdy is made. Bake in a slow oven. A brick oven is made use of in New England generally. When done turn it on a platter and serve hot.

AN EXCELLENT BREAD PUDDING.—Soak two pounds of pieces of dry stale bread or toast all night in plenty of water, with a plate laid on the top to keep them under the water. Next morning pour off and squeeze out all the superfluous water; then mash fine the pieces of bread, mix with half a pound of cleaned currants, a quarter of a pound of moist sugar, four ounces of sweet chopped fine, and two teaspoonfuls of fresh ground allspice; grease the inside of a baking dish with a bit of suet, put in the pudding and bake four hours.

YELLOW ON SILK GARMENTS.—Boil the articles for half an hour in Marseille soap, with the addition of wheat bran; then rinse, and dye to a buff in a bath of soap and annatto, lift, and pass through a sulphuric acid bath of ½% Beaume, in which they will acquire a beautiful yellow color.

MINING SCIENTIFIC PRESS

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Manufacture of Agricultural Implements.

The Kimball Manufacturing Company are
enlarging their sphere of enterprise by the addi-
tion of a branch establishment for the man-
ufacture of agricultural implements. For the
accommodation of this new industry a commodi-
ous building, 90x220 feet in its exterior dimen-
sions, has been erected on the corner of Berry
and Sixth streets.

It is proposed to manufacture every imple-
ment needed on a farm from a garden trowel
to a lumber wagon. Heretofore our farmers
have depended almost wholly on Eastern man-
ufacturers for their implements and as a result
a large sum has annually been sent away which
could as well be retained to circulate in our
own State.

The most approved machinery will be intro-
duced by the Kimball company and they intend
that their agricultural implement depart-
ment shall be fully equal in reputation to their
other manufacturing departments which is a
sufficient guarantee of its excellence. The
building is two stories in height. On the
ground floor is the engine, of eighty-horse
power, twelve forges, lathes and necessary ma-
chinery. The upper room is divided into a
drying room, a painting room, wood workers'
room and an office for the Superintendent, Mr.
E. Soule. Between seventy-five and one hun-
dred hands will be employed when the manu-
facture is in operation, which is expected to be
about May 1st. In time it is the intention of
the company to add a foundry for the cast-
ing of such light work as is needed in their
business.

This will form a valuable acquisition to the
constantly increasing manufacturing enterprises
of San Francisco. We feel that its success is
assured.

RUBBER PAINT.—The U. S. Hospital at the
Pravido, and the Governor's mansion at Sacra-
mento, are both being painted with the rub-
ber paint manufactured by the Pacific Rubber
Paint Co., No. 207 Sacramento street. This
paint is fast coming into more general use as
its merits become known, and the manufactur-
ers have all they can do to fill orders.

Giant Powder.

The jury in the inquest relative to the recent
explosion at Rincon Point went out to the
Giant Powder Works on Monday last to wit-
ness a series of experiments with the powder.
The Mayor, members of the Board of Super-
visors, and a number of other gentlemen were
present. The manufacturers desired to prove
to the jury and others that the powder would
not explode by contact with fire, but would
simply burn up, unless the proper agents were
used to explode it. Giant powder, it may be
stated, is a compound of nitro-glycerine and in-
fernal earth. The particles of the nitro-
glycerine are absorbed in the earth, as if by a
sponge, and when ignition takes place, either
by loose powder or powder cartridge, a con-
tinuous and very hot flame is the result, until
all is consumed, but never an explosion.

The experiments were carried on a few burn-
ed yards from the Superintendent's resi-
dence, in the sand hills on the other side of the
Golden Gate Park. Boxes of Nos. 1 and 2
powder were carried to the spot, as well as a few
boxes of cartridges and some percussion caps.
Out of a box of fifty pounds of No. 1 giant
powder Mr. Varney dug a half spadefull, and
set it off with a piece of punk. It simply
burned up. The box of powder from which
this was taken was then ignited with a fuse,
but no cap, and it burned up in a fierce, broad
mass of flame. A box of ordinary cartridges
was then burned in a similar manner, but the
combustion in this case was less rapid, as the
powder was packed together and burned slower.
One of the cartridges being cut in two, one
portion was burned loosely, and the other was
placed over a heavy beam of wood, with a per-
cussion cap inserted. At last came the shock
and a shower of dust. The four ounces of
dynamite shattered the beam into fine splinters.
A 50-pound box of cartridges was now
placed upon an upright pole triangle, and a
weight of 100 pounds was allowed to descend
upon it from a height of thirty or forty feet.
Except in smashing the box and bursting the
cartridge, it had no effect. This shows that
simple percussion will not ignite the powder.
A fire being lighted, two shovelfuls of loose
powder were thrown into the flames; and then
cartridges were thrown in, and they all burned
up. A 50-pound can of No. 2 powder was then
ignited. Its conflagration lasted a couple of
minutes. Then five pounds of No. 1 powder
were packed tightly into a box and placed
among the live embers. The powder simply
burned away.

A quantity of loose giant powder was then
taken in a box and set on fire. When half con-
sumed a bucket of water was thrown upon it
and the fire quenched. The remaining half of
the powder, now saturated with water, was then
exploded with a cap. This experiment aston-
ished all present, who had no idea such a thing
could be done.

Experiments were now made to demonstrate
the extraordinary strength of the powder. Into
a mortar with a bore for a 32-pound ball a
quarter of an ounce of ordinary black
blasting powder was inserted as a charge. It
sent the ball a distance of precisely nine feet.
The same quantity of No. 2 giant powder
hurled the ball in a graceful arch a distance of
443 feet; and a quarter ounce of No. 1 powder
sent the ball 45 or 50 feet farther. A quarter
ounce was also tried without a cap. Not
enough power was developed to send the ball
out of the mortar. Thirty grammes (almost
an ounce) of blasting powder was next applied
to discharging a 32-pound ball vertically. This
was done by placing the ball in a cavity in
the upper side of a solid iron surface. When
placed in this hollow the ball was not quite half
imbedded, and rested directly on the powder.
The ball did not rise at all. With the same
quantity of giant powder it shot straight up-
ward about 1,000 feet. Half a pound of pow-
der, looking like ordinary damp sawdust, was
poured loosely on an 8x8 stick of timber, with-
out being tamped or otherwise confined, and
when exploded with a cap, it cut the heavy tim-
ber clean in two without splintering it at all.

Those present were thoroughly convinced
that when caps are not stored beside the pow-
der, though it is inflammable and gives out a
strong heat, it is an explosive not at all danger-
ous to handle. They were also convinced that
if 150 pounds of powder had exploded at Rin-
con Point it would not have left a vestige of
Hathaway's warehouse, or even the Marine
hospital. The general opinion is that when the
powder in the box on the floor caught on fire
from the sparks from Clark's pipe, the blaze
set fire to the fuse which was affixed to the
cartridge on the table, and thereby ex-
ploded only the 15 pound cartridge, which
caused the damage.

Upon returning to the city, the jury, with-
out hearing further testimony, returned the
following verdict:

We find that these persons came to their death by the
explosion of a quantity of giant powder, which was be-
ing prepared in cartridges in an office occupied by J. N.
Risdon, contractor for the removal of Rincon Rock.
That the explosion was occasioned by the setting on fire
of a fifty-pound box of giant powder by a spark dropped
from a pipe carelessly held by J. Clark, foreman of
the work, and one of the sufferers, which flamed up and
exploded a box of detonating caps lying on a bench a

few feet from an eight-pound cartridge just filled by J.
Curry. We think that J. N. Risdon, contractor for re-
moving Rincon Rock, and the occupant of the office
where the explosion occurred, should be greatly cen-
sured for permitting the manufacture of cartridges in
such a neighborhood, adjacent to dwellings and busi-
ness buildings, and suffering detonating caps and giant
powder to be stored on the same premises. We under-
stand that the city ordinances do not prohibit the
storage of giant or Hercules powder within the city
limits; and we recommend that an ordinance be passed
by the Board of Supervisors forbidding the storage of
giant or Hercules powder or dynamite in quantities of
over fifty pounds within the city limits, or the storage
of detonating caps or black powder in the same pre-
mises with giant or Hercules powder or dynamite, and
the absolute prohibition of the transportation through
the streets of this city of nitro-glycerine. (Signed, John
Taylor, Foreman; R. G. Brush, Thos. V. Fawcett, H.
H. Bigelow, Geo. W. Wyer, Isaiah Dixon, C. A. Kellogg,
M. J. Luddington, G. Forest Walter.

A New Gas Machine.

In walking down Beale street one day this
week we came across a newly invented gas ma-
chine of small proportions but large capacity,
which, as it will be shortly introduced in this
city and is a California invention, we examined
carefully. It is called the Hydrostatic Gas
Machine, and is run by air, water and gasoline,
in a simple manner. The water is admitted in a
small spray into a large-mouthed pipe. Thence
it goes into a receiver, where the air forced in
by the water, and which is carried down with
it, is stored. From this tank it passes through
a pipe or pipe, under a perforated diaphragm,
and upward through it and a film of gasoline
floating over this diaphragm. This film of oil
is kept constantly by means of communication
with a reservoir connected by pipes with the
carburettor, and as the carburettor is supplied
with water from a side tank by means of a
siphon, the water in the carburettor, in trying
to retain the level of this tank, flows down one
of the pipes connecting with the gasoline re-
servoir, forcing up, by its specific gravity, an
equivalent quantity of gasoline into the car-
burettor, where it floats upon the water already
there.

The air, after passing down through the in-
let pipe, and upwards through the perforated
diaphragm and gasoline film, is naturally dis-
charged with the gas, and is passed off through
suitable outlets to the burners.

This is the operation of the machine, which
appears, however, much more simple than a
description. The machine itself appears like
a small galvanized iron box with a few
connecting pipes, and occupies a space
of about two feet square. The barrel or
can of gasoline may be buried in the ground in
the back yard if necessary, or placed anywhere
out of the way, as it needs no attention after
being filled. The capacity of the apparatus was
examined is about two hundred burners, and
the whole cost will be about \$5 or \$10. The
whole thing runs by natural laws. When the
gas is turned on the machine begins to make
gas, and when it is turned off the action of the
machine ceases immediately; accordingly there
remains on hand only about enough gas to
start with, perhaps a cubic foot. Turning on
the gas at the burner also turns on the water
to start the machine, and vice versa. There is
no large gasometer to maintain, nor any ex-
pensive apparatus. As far as we can see there
is no danger of any explosion, as the gasoline
barrel may be buried in the yard, and there is
only a thin film of the substance in the ma-
chine, and that floats upon more than two
hundred times its bulk of water. This also
may be kept in a cellar if thought necessary.
This may be really called a poor man's gas
machine. The owners propose putting them
in houses in this city for the cost of meters
already in; and they inform us that the gas
co. (including water bill) from 90 cents to
\$1.10 per thousand feet.

The capacity of the smallest sized machine is
two hundred burners, and it makes gas in pro-
portion to the amount used, only running
when required. The cheapness of this ap-
paratus is greatly in its favor, as also its sim-
plicity and economy in working. It will
answer as well in the country as in the city, as
only a slight fall of water is necessary. Alto-
gether, the machine appears to us a simple and
effective one, and the owners are sensible
enough to put it at a price low enough to allow
any one to purchase. The first machines are
now being built at 139 Beale street. The in-
ventor is John C. Henderson, and we understand
that A. Chabot, Henry Pierce and G. R. Cot-
trell are the other owners of the patent. As
soon as all the arrangements are made the
machines will be put upon the market, and
judging from the men interested it will not be
long before this is done. It is different in op-
eration from any apparatus for similar pur-
poses heretofore invented, and its simple op-
eration and cheapness commends it to favorable
notice.

HOPE IRON WORKS.—Mr. Hanscom's new
works on the Potrero will be in running order
in about a month. The buildings are nearly
completed, the cupola furnace and the en-
gines are being put in place. Most of the
lathes, drills, etc., have been procured in
Philadelphia, and will arrive shortly. The
works are to be very complete, and the ma-
chinery ordered is all first class.

The machinery for the War Eagle mine has
arrived, and the mine is sending 20 tons of ore
per day to the mill.

Hydraulic Engineering in the Sierras.

In December, 1873, we gave a description of
the Virginia and Gold Hill water works, show-
ing by diagrams and engravings the details of
this great undertaking. The pipe as it now
stands extends a pressure of 1,720 feet perpen-
dicular, or 750 pounds to the square inch—the
greatest in the world. The average diameter
of the pipe used is 11 1/2 inches, and the entire
weight was about 700 tons. Nearly one million
rivets were used to manufacture it, and some
thirty-five tons of lead were consumed in
making the joints. At the point of heaviest
pressure the pipe is No. 0 thick, and is hot
riveted with 5/8 rivets, there being a double row
on the straight and a single row on the round
beam. The entire length of pipe crossing
Washoe valley is 37,100 feet.

These works are to be doubled in capacity
and another pipe ten inches in diameter is to
be laid across the valley. Marlette lake, which
is at an elevation of about 1,500 feet above O
street, Virginia City, is within a mile of the
eastern shore of Lake Tahoe and 1,000 feet
above its level. The lake has an area of 200
acres and is 15 feet deep when full in
winter.

The present supply is obtained from Hobart
creek, and is conducted for a distance of twenty-
two miles to Virginia. The creek is fed by
melting snows, and the amount of water is de-
pendent upon the character of the season.
When the snow fall is heavy and the thaw
gradual the supply is ample, but when the
snow melts rapidly early in the spring, the
volume of water is much diminished before
the season is over. The new works will take
the water from Marlette lake and add it to the
supply from Hobart creek. A tunnel half a
mile long is being run through to the mountain
range between Hobart creek and Lake Tahoe.
This is being worked from both ends by air
compressors and Burleigh drills. If considered
necessary, a shaft twenty-five feet deep will be
sunk on the line of the tunnel, and work can
then be prosecuted on four faces of the tunnel
at the same time. Six miles of grade are also
necessary to reach Marlette lake.

The pipe is the main feature of the under-
taking. The water is carried in flumes to the
eastern end of the pipe. From the outlet on the
eastern end it runs through a flume eight miles
long to Virginia and Gold Hill, connecting with
the city pipe system. The inlet of the pipe
has a perpendicular elevation above the outlet
of 465 feet. The supply, with the present pipe,
can be increased to 2,350,000 gallons per day.
The new pipe, which is to cross the valley, is
ten inches in diameter, made of iron, lap
welded. This will give ten pipes across the
valley, of nearly equal capacity, and the supply
will be greatly increased. There has been a
scarcity of water for mining purposes, but with
this supply more mills will be erected at the
mines, thus doing away with the expense of
hauling ore to reduction works at a distance.
The immense consumption of water is caused
by the building of mills, new hoisting works,
increased power of old ones, etc. The details
of this work are interesting to hydraulic en-
gineers, as the methods of tightening leaky
joints, the automatic air valves, blow offs,
elbows, straps, etc., are of novel construction
to stand the immense pressure. The additions
to the work will cost some \$500,000. Consi-
derable of this increased supply of water will be
used in hydraulic works. The ground, accord-
ing to the Gold Hill News, with water at a
nominal figure would have paid well, but op-
erations have been suspended for the present
on account of the expense incurred in obtaining
water.

MR. GEORGE SPAULDING, who has had bui-
ness connections with this office for some years
past, departed for the East with his family this
week, on a three months' trip. Mr. Spaulding
came to this State about twelve years ago. He
was at one time assistant foreman on the old
San Francisco Journal, and then foreman in
the Daily Flag office. He was foreman on the
MINING AND SCIENTIFIC PRESS for about five
years. He then bought out Dewey & Co.'s
job printing office and went into business with
Harrison Barto, under the firm name of Spaulding
& Barto, which firm is still successfully
running. Mr. Spaulding has been one of the
Board of Directors of the Mechanics' Institute
for over four years, and one of the managers of
three of the industrial exhibitions given by
the Institute. The managers of the Institute
gave Mr. Spaulding a dinner on Tuesday
evening last, on which occasion speeches were
made and a general good time enjoyed. Mr.
Spaulding is one of those quiet, unassuming
men, who unconsciously make friends every-
where and who "wear" well. In all our inter-
course with him we have never heard him ac-
cused of any incivility or unfairness of any
kind, and the estimation in which he is held by
his friends would be flattering to any man. He
has fortunately prospered in pecuniary mat-
ters by honesty and upright dealing, and is
now rewarding himself for close attention
to business by taking a pleasant trip. He goes
back to his old home at Fitchburg, Mass., for
a few weeks, and we, as well as all his other
friends, part from him with regret, and wish
him a pleasant trip and speedy return.

Baker's Rotary Blower.

This blower, illustrations of which we here-
with give, is made entirely of iron. The cylin-
drical portion or case is bored out and faced on
the ends. The heads of the machine, or ends
upon which the bearings are bolted, are also
faced off true. The case is secured to the ends
by bolts, and, when in exact position, the ends
are doweled so that when the case is removed
it can be returned to its proper position with-
out much trouble or delay.

The base is cast in one piece and faced on its
upper side, and bolted firmly to the ends of
the machine. The drums are each one solid
iron casting, turned up true and balanced, thus
insuring closeness and at the same time steady-
ness when running. The two lower drums are

nor will the machine have to be taken apart for
internal repairs.

The large illustration affords an exterior view,
and Fig. 2 gives a sectional representation of
the interior. The external case is made of
light boiler iron, formed up very truly and in-
serted into the heads of the machine, said
heads being of cast iron, firmly secured to a
bedplate of similar material. They are also
bolted together longitudinally by outside iron
rods. Within the case, and concentric there-
with, is a cylinder, A (a single iron casting),
which is provided with two vanes, B and C.
The shaft of the cylinder, A, is rotated by the
driving pulley shown outside. The air enters
at D, from underneath, and is forced by the
vanes out through the outlet, E, in the direction
of the arrow. In order to prevent any
direct communication between inlet and outlet,
two slotted cylinders, F and G, are arranged
on separate shafts, the latter actuated by gear-
ing on the main shaft (partially concealed by

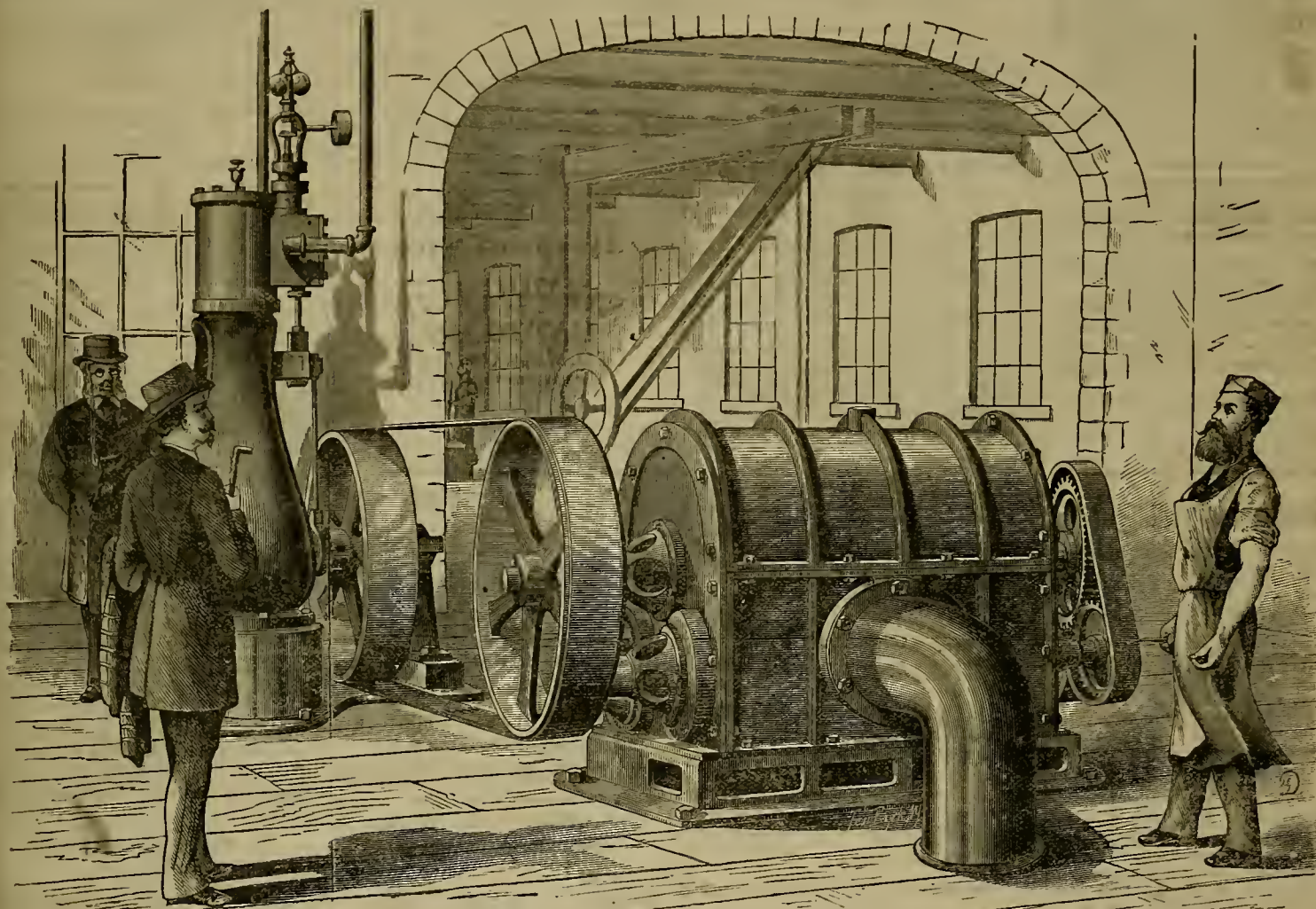
ment's consideration, anposing the auxiliary
cylinders to revolve in the direction of the
arrows drawn within them, will show that,
whatever the position of the vanes may be, one
or the other or both of these cylinders will pre-
vent communication between inlet and outlet;
while their slots will always be presented to
the vanes so that the latter may, at the proper
time, enter and so pursue the uninterrupted
course necessary to drive a steady blast.

The manufacturers enclose to us a report of
the Franklin Institute Committee on this
blower, giving a comparison between the Baker
and Root blowers, in which the former has the
advantage. The Committee examined the ma-
chines in detail and in announcing the report
say, "Your committee are therefore of the opin-
ion that the Baker machine has proved itself
the best in every respect and entitled to the
first premium and diploma." The report is a
very flattering one to the Baker Blower and as
it is on file in this office can be examined by

The Old Bell to be Mended.

It is quite generally known that the old bell,
at Independence Hall, Philadelphia, which
first rang out the joyful news of our nation's
birth, has long been silent by reason of a seri-
ous fracture which made its appearance while
being violently rung on a Fourth of July occa-
sion many years ago. Although its ringing,
joyous tone has not been heard for these many
years, by reason of this injury which has been
heretofore considered past remedy, it has been
carefully preserved and shown to visitors at
Independence Hall, as a precious relic; and in
the preparations for the coming centennial
jubilee, a prominent place had been arranged
for it, where, in mute but eloquent silence, it
would form one of the connecting links be-
tween the past and the present.

But a better fate and better purpose, it is



BAKER'S ROTARY PRESSURE BLOWER.

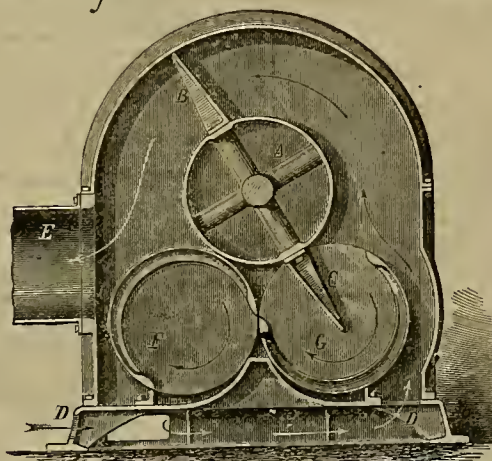
slotted their entire length, to allow the wing of
the central drum to pass; these openings or
slots are made considerably wider than is
needed for the passage of the wings; this is
done to insure perfect freedom in action, and
at the same time to remove the danger of the
wings coming in contact when entering or
leaving. As each drum only acts as abutments
alternately, the power required to drive them
is merely to overcome the friction of the jour-
nals. The wings of the central drum are faced
off and bolted on firmly; they are cast in the
 requisite form to insure the greatest strength
in proportion to their weight. The gearing,
which is made exceedingly strong, is only in-
ended to keep the drums in proper position.

The bearings and journals are made extra
large, to secure as large a bearing surface as
possible, and to give to the journals a great de-
gree of strength, so as to prevent them from
springing in the bearing, and to overcome
rapid wear. A shield is placed over the gears
to prevent accidents. There is only one pulley
to each machine, and as this is made with a
diameter large enough to give the belt a good
running speed, and with breadth amply in-
sufficient for the purpose, the necessity of furnishing
extra belts, pulleys, counter shafts, &c., is
avoided, and the expense saved. The
great trouble heretofore has been to build a rotary
pressure blower, of sufficient strength,
fewness of parts and ease of motion to stand
the work they generally receive; whereas in the
improved blower the working parts are made
exceedingly strong, and there is no point in
actual contact (although working very close)
in its internal movements; hence the tendency
to hammer itself apart is entirely removed.
As there is no material to shrink in dry weather,
or expand in wet, nor into or bolts innum-
erable to become loose, the internal working
parts of the blower will not require replacing,

fast as the central drum. As the cylinder, A,
therefore turns in the direction of the arrow,
Fig. 2, the vane, B, is almost in contact with
the upper part of the casing, and is compres-

those interested. Further information can
also be obtained by addressing T. Wilbraham
& Bros., 2,314 Frankford avenue, Philadelphia,
Pa., sole manufacturers of the American pat-

Fig. 2



the figure on the extreme right of the large en-
graving) so that said cylinders revolve twice a
mining the air before it, driving the blast out of
the pipe, E. This compressed air is prevented
from returning to the inlet by the cylinder, F,
which above is close against the cylinder, A,
and below meets the abutments formed on the
bottom. The vane, C, at the same time has
entered the slot of the cylinder, G. A mo-

ent, or Charles Ashbury, Birmingham, Eng-
land, in relation to the English, French and
Belgian patents.

Besides their own big sixty stamp mill, the
Consolidated Virginia mining company is run-
ning the Mariposa, Occidental, Bacon, Kelsey,
Trench, Hoosier State and Sacramento mills—
eight mills in all.

hoped, is in store for the old "Independence
Bell." Mr. D. L. Riggs, of Salem, Oregon,
who has devised a method for mending broken
bells so as to restore their tone to their original
pitch, has been corresponding with the cen-
tennial authorities at Philadelphia, with the
view of trying his skill in the restoration of this
precious relic. The result of this correspondence
has brought an invitation to Mr. Riggs
to visit Philadelphia with this object in view,
and he has already gone thither. It is to be
hoped that he will succeed in the effort, and
that after its long silence, that old bell will
again resume its duty of ringing in the advent
of the "Glorious Fourth," from the bellfry of
Independence Hall, and that the first note of
its new-found voice will be heard when the
rising star of July 4, 1876, ushers in the cen-
tennial return of our country's natal day.

INDUSTRIAL IRON WORKS.—The foundry
and machine shop recently erected by Mc-
Cormick, Lewis & Co., on Beale street, and
known as the Industrial Iron Works, are now
in the full tide of successful operation. The
first "run" was made on Saturday the 3d inst.
At their works may be seen in operation Ba-
ker's Rotary Pressure Blower, the only one in
use, we believe, on this Coast. The Baker
Blower is said to be a desirable improvement
on rotary pressure blowers in the great strength
and absence of friction internally. The Messrs.
McCormick, Lewis & Co. have all the facilities
which improved machinery can afford and are
determined to do first-class work in every re-
spect.

The largest hoisting cable on the Comstock
lode arrived at Virginia City on Sunday, con-
signed to the Savage mining company. It is
4,000 feet in length and weighs 25,190 pounds.
It will be used in the incline.

Banking.

Anglo-Californian Bank.

LIMITED.
Successors to J. Seligman & Co.
London Office.....No. 3 Angel Court
San Francisco Office.....No. 412 California street.
Authorized Capital Stock, \$6,000,000,
Subscribed, \$3,000,000. Paid in, \$4,500,000.
Remainder subject to call.

DIRECTORS IN LONDON.—Hon. Hugh McCulloch, Reuben D. Sassoon, William F. Schofield, Isaac Seligman, Julius Sington.

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SAN FRANCISCO.

The Bank is now prepared to open accounts, receive deposits, make collections, buy and sell Exchange, and issue Letters of Credit available throughout the world, and to loan money on proper securities. 2v27-cowbp

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Capital, Five Million Dollars.

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H. F. HASTINGS.....Manager.
R. N. VAN BRUNT.....Cashier.

BANKING HOUSE.

No. 423 California street San Francisco.

KOUNTZE BROTHERS, BANKERS, 12 WALL STREET, NEW YORK.

Allow interest at the rate of Four per cent. upon daily balances of Gold and Currency.
Receives consignments of Gold, Silver and Lead Bullion, and makes Cash advances thereon.
Invite Correspondence from Bankers, Mining Companies, Merchants and Smelting Works.

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411 Bush street, above Kearny..... SAN FRANCISCO
4v27tf G. MAHE, Director.

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Refers to Dewey & Co., Patent Agents; Judge S.
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AMMONIA!

For Washing and Cleaning Purposes.

For Sale by all Grocers.

This article is universally used in Europe, and, recently introduced for general family use in San Francisco and neighborhood, is already in great demand. It is now the intention of the manufacturers to introduce it all over the Pacific Coast, at prices which will bring it within the reach of every household.
It is unequalled for cleaning Woolen Fabrics, Cutlery, Carpets or Crockery; for Scrubbing Floors, Washing Paint, Removing Grease Spots, Shampooing or Bathing.
It renders water soft, and imparts a delightful sense of coolness after washing.
DIRECTIONS.—For Laundry, use two to four table-spoonfuls to a wash-tub of water. For bathing, use one table-spoonful in the bath-tub. For removing grease spots, apply with a brush, undiluted, and wash with water afterward. For stimulating the growth of plants, use a few drops in every pint of water used in watering.
PRICE.—Per Pint Bottle, 25 cents; per quart Quart Bottle, 40 cents; per Half Gallon, 75 cents.
Also, SULPHATE OF AMMONIA for chemical purposes; fertilizing; and the preparation of artificial manures. AMMONIACAL PREPARATION for the prevention and removal of boiler scale. CRUDE AMMONIA, for general manufacturing, and PURE LIQUOR and AQUA AMMONIA for chemical and pharmaceutical purposes.
Manufactured by the
SAN FRANCISCO GAS-LIGHT CO.
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Glasgow Iron and Metal Importing Co.
Have always on hand a large Stock of
Bar and Bundle Iron, Sheet and Plate Iron
Boiler Flues, Gas and Water Pipe, Cast
Steel, Plow and Shear Steel, Anvils,
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m6-m2

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS OF AND DEALERS IN
ASSAYERS' MATERIALS
Chemical Apparatus and Chemicals,
Druggists' Glassware and Sundries,
PHOTOGRAPHIC GOODS, ETC.,
512 and 514 Washington street, SAN FRANCISCO

We would call the special attention of Assayers Chemists, Mining Companies, Milling Companies Prospectors, etc., to our large and well adapted stock

ASSAYERS' MATERIALS

—AND—

Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.
Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grains Grammes, will be sent free upon application.
7v25-tf JOHN TAYLOR & CO.

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits.
They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the muller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces.—Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.
Ores sampled.
Assaying in all its branches.
Analysis of Ores, Minerals, Waters, etc.
Plans furnished for the most suitable process for working Ores.
Special attention paid to the Mining and Metallurgy of Quicksilver.

E. HUHN,
C. A. LUCKHARDT,
Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS

ADVANCES MADE

On all kinds of Ores, and particular attention

PAID TO
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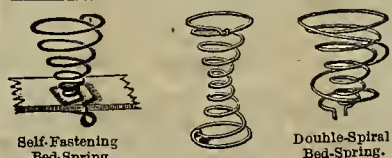
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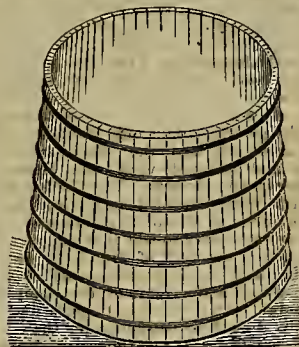
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The Screw Propellor.

The following paper was read by W. W. Hanscom, of the Hope Iron Works, at the meeting of the Society of Engineers of California, held April 6th. The paper will be discussed at the next regular meeting:

"During my experience and study of the screw as a means of propulsion of steam vessels I have endeavored to find expressions which would approximate to a certain value in the efficiency and power required to propel vessels at any given speed, the displacement being fixed. So far in my investigations I find formulas which, in order to approximate to the power required for a given speed, insist on a deeper knowledge of higher mathematics than is possessed by many men of sound judgment, whose very opinion will come nearer to the actual duty performed and power required than the so-called formulas. Not that formulas should not be employed, but so many terms are called into use in their evolution that they become intricate, and oftentimes, I think, more unreliable than the so-called rules of thumb, which have come into common use for approximation; and also, I think, what may be called false terms are brought into requisition, which do not have any necessary bearing on the question, and only serve to make more complex the solution of a question so important.

In this paper I propose to speak particularly of only one or two points in the screw propeller, and those are the proportion which the area of the screw's disc bears to the immersed midship section, and the importance of sectional lines. "At another time I shall speak of the pitch and velocity. I believe that some very erroneous notions have crept into the heads of designers and owners of screw steamers, and while I treat with respect the opinions of others, I shall endeavor to give some reasons for the ideas which I have respecting the diameter of screw, at present a general standard, I believe, of first-rate speed at sea. I mean the average of a voyage is about ten knots, and in order to make the comparison which I have intended the speed to that rate. Although at some future time the speed of vessels may be increased much beyond that, and even now vessels are doing it, yet not many, I think, on the coast of California and Oregon, are exceeding it.

It is commonly supposed, and the theory is advanced by well-known writers on the screw propeller, that the larger the diameter of the screw the more will be its effect in proportion to the power consumed; therefore, they say, get the screw's diameter as large as possible.

But such is not the fact, and I take it for granted that the immersed midship section may bear to the area of the screw's disc, indifferently, any proportion between four to one and two and one-half to one, without impairing its efficiency—that is, the area of the immersed midship section may be anywhere between two and one-half and four times the area of the screw's disc, and its efficiency for the power will be the same, or, if there be any advantage, it will be in favor of the smaller diameter. I am assuming now a vessel with any certain displacement and proportion of length to breadth; that, too, being an element of not as much consequence, I think, as has been given it; and in examining the results of trials of steamers in the British navy this becomes palpable.

To show the indifferent effect with given power, I will take the British war steamer, *Archer*, whose general dimensions are as follows: Length, 186 ft., 4 in.; beam extremes, 33 ft., 10 in.; draft of water, 13 ft., 3 in., forward, 14 ft., 11 in., aft; displacement, 1245 tons. This vessel's length was about five and one-half times her breadth, and on one trial the proportion of immersed midship section to the area of the screw's disc was 3.03, and at a speed of ten knots the proportion of power to displacement was .63 per cent.—that is, for each ton of displacement .63 of a horse-power was required for a speed of ten knots.

When the diameter of the screw was reduced so that the immersed midship section was 4.68 times the area of the screw's disc, then the power required was reduced to .57 per cent., or a saving of six per cent., showing that a smaller diameter of screw has made the vessel more efficient. At a given speed and all the periphery of the screw travels the same distance through the water, no matter what may be the diameter, therefore the smaller the area of the screw's disc can be made—within certain limits, which are not yet closely defined—the less will be the frictional resistance to the water on the wheel, and consequently the more is there realized in the percentage of the net horse power.

One of the reasons which I assume for this is the fact that the resistance of a vessel does not entirely depend on the sharpness of her water line, as is commonly supposed. I am aware that I am making an assertion which is in direct opposition, or nearly so, to many preconceived notions concerning the fineness of the water lines of propellers, both entrance and leaving, or, in other words, the relative sharpness of the bow and stern.

The resistance of a vessel varies with her size, and inversely in a nearly certain proportion to the displacement. For instance: Tak-

ing a speed of 10 knots, a vessel displacing from 7,000 to 8,000 tons will require about .23 of a horse-power indicated for each ton of displacement. A vessel displacing 5,000 tons will require from .32 to .35, horse-power for each ton of displacement; 3,000 tons from .40 to .45 horse-power for each ton of displacement, and a vessel of 2,000 tons will require from .50 to .60 horse-power for each ton of displacement. Vessels of 1,000 tons require from .60 to .70 horse-power for each ton displacement, and in this connection I will state that there seems to be not much of any difference whether the length of vessel is $4\frac{1}{2}$ or $6\frac{1}{2}$ times the breadth of beam. The power required varies but little, so that there must be something in the economic propulsion of steamers besides the comparative proportions of length and breadth and inverted midship section to the area of the screw's disc. One point here is that which I find has been entirely overlooked, or at least I have never seen it referred to, and that is the shape of the sectional lines of a vessel, which are of really much more importance than the shape of the water lines; in fact, no particular attention need be paid to the extreme sharpness of the water lines, provided the sectional lines are shaped properly. By sectional lines I mean vertical planes cutting the vessel longitudinally from end to end, at various distances from the center of the keel. With merchant steamers, especially, it is desirable to use the least fraction of horse-power per ton of displacement for a given speed, and all the efforts have been apparently in the direction of extreme length to breadth, so that the water lines or horizontal planes cutting the vessel longitudinally may be, as they are called, easy. This comes from the fact that the motion of the water, when a vessel is passing through it, is assumed to move almost entirely in a lateral direction, and no apparent heed has been given to its vertical motion.

Mr. John Bourne, in his able treatise on the screw propeller, seems to have overlooked this important fact, as well as the comparatively small difference in the relative efficiency of long and short vessels, for he states in his work on "The Screw Propeller" that the resistance increases in different proportions with long and short vessels, compared to their breadths, and his expression that "the superior efficacy of long screw vessels over long paddle steamers is mainly imputable to the partial recovery of power by the screw"—shows that the after body of propeller steamers have usually been so proportioned that the water has not had free access to the wheel in a solid body, thereby allowing the screw to create centrifugal action in the water, throwing it up against the stern and raising a hill of water down which the vessel slides. The very fact of the settling of a vessel by the stern when under way seems to prove that the support is partially taken away, while at the same time the water at the bow is raised up by its inability to pass under the vessel easily, assisting at the same time to raise the forward part. And especially under these circumstances should the screw be made comparatively small in diameter, that it may only act on the column of solid water which may come under the vessel in the most direct line to the screw. In calling your attention to this point, and also to the importance of proper sectional lines, I have no doubt you will be able to explain the comparative speed of some very flat vessels, which have quite full water lines.

The English war steamer *Aboukir*, of 3,150 tons displacement, and whose length is only 3.4 times her breadth, requires .5 of a horse-power per ton of displacement for a speed of 10 knots.

The *Aurora*, 3,498 tons displacement, with a length 4.53 times her breadth, requires .42 of a horse-power for each ton displacement, a difference of .08 of a horse-power for each ton of displacement, a difference of about 27 horse-power, or less than two per cent. of the total horse-power required for a vessel whose length is only 3.4 times her breadth.

The *Bombay*, whose length is 4.47 times her breadth, requires with a displacement of 3,020 tons, .47 of a horse-power for each ton displacement; and the *Algiers*, whose length is 3.65 times her breadth, requires .34 of a horse-power per ton of displacement; while the *Arctusa*, whose length is 4.79 times her breadth, requires with a displacement of 2,801 tons, .46 of a horse-power for each ton. The *Arrogant*, whose length is 4.37 times her breadth, requires .55 of a horse-power for each ton of displacement.

These records of trials made under the most favorable circumstances for accuracy, indicate that considerable variation, so far as proportion of length to breadth is concerned, does not affect the power required, and that there is some other point of more importance to examine, and that, I think, will be found in the sectional lines—that is, when the length of the vessel is proportioned to her draft, so that easy sectional lines can be formed with even a short floor, then the power does not materially vary with variations in the length, the breadth, or the variations of the area of the inverted midships action to the area of the screw's disc, of course within certain limits, which are yet to be determined.

In conclusion I would state that all the experiments which have yet been made tend to prove that there is very little economical difference between a true screw and those of the most elaborate design and construction, and not as much as there is between wheels of fair lines and smooth surfaces, and those whose surfaces are rough and lines unfair.

Mechanics' Institute—Tenth Industrial Exhibition.

The annual exhibitions under the auspices of the Mechanics' Institute of this city have become among the most notable events in our local history, and every succeeding year are looked forward to with increasing interest. Each exhibition surpasses the preceding in the number and value of articles displayed, and the popular interest is evinced by the increased attendance which marks its occurrence.

The opportunity offered by these exhibitions for making known the great value of our natural productions, and the skill achieved by our artisans and mechanics in utilizing them is manifest, and one that is not lost sight of by our manufacturers, miners and agriculturists. Last year the increased demands for more room and larger facilities resulted in the erection of the mammoth pavilion in which the ninth annual exhibition was held. This building, situated on Eighth street between Mission and Market, is, we believe, the largest devoted to a like purpose in the United States, and will have its only equal in the structure to be erected in Philadelphia to mark the centennial of our national existence.

The pavilion as originally constructed has a frontage on Mission street of 201 feet, and the same on Market. The length of the building is 541 feet on Eighth street. It contains 6,287,000 cubic feet of space between its walls, has four acres and a half of flooring, and cost upwards of \$100,000 in gold. To this mammoth structure there is now being built on the north side an addition to be known as the Horticultural Garden. At the last exhibition the horticultural and floral display was arranged in the side of the pavilion at the right of the entrance in front of the department especially devoted to machinery. Although the display in both these departments was creditable, the management felt that each was more or less trenching upon the other, and consequently have reserved all the lower portion of this side of the building for machinery, giving two hundred feet additional for that department, the shafting being extended the whole length, affording vastly better facilities, which, no doubt, will be duly appreciated by our manufacturers, and result in a much finer display than in any previous year. The Horticultural Garden is an addition two hundred feet in length by a width of seventy-five feet. The sides are constructed of wood, but the roof, instead of being like the pavilion proper, is covered with canvas stretched upon the arched timbers. This arrangement is believed to be in many respects superior for the purpose for which the Garden is designed. Although not nearly completed, progress is far enough advanced to afford an idea of what the visitor will realize when he comes to see the interior prepared for his reception. A broad entrance from the pavilion leads into the Garden. Fifty feet of the front, extending the entire width, is paved with tile of varied tints, and will be set apart more especially for the pomological and floral display; the fruit, out flowers, etc., being placed upon tables arranged for the purpose. A descent of two steps and the main walk dividing passes around a circular enclosure, in the center of which a fountain will be located. Other walks are being laid out, fountains and rockeries arranged, and the whole interior heightened and adorned with the choicest shrubs, plants and flowers. The Garden will be under the direct control of the Institute, and to give the public an idea of what they may expect, it is but necessary to add that the plan of arrangements is the work of Mr. A. P. Hall, the well known landscape architect, and that Mr. R. B. Woodward is Chairman of the Committee in charge. The additional space under cover acquired by the construction of the Garden is 24,500 feet. Three thousand square yards of canvas will be used for the roof.

Last year the exhibition was attended by 700,000 visitors, and there is reason to believe that the number will be nearly doubled at the one this season, and a good portion of these visitors will be new-comers. It is therefore for the interest of our producers and manufacturers to exert themselves to make a display which will be a credit to them and to the resources of our State. It has been decided to award premiums to exhibitors as follows, viz.: 16 gold medals, 50 silver medals, a Society diploma, certificates of merit, and special premiums as the Board may determine.

The exhibition will open on the 17th of August at 11 A. M. Mr. J. H. Conner, the courteous and competent Secretary of the Institute, is prepared to receive applications for space and afford information to parties interested. He may be addressed or can be seen during business hours, at his office, 27 Post street.

We earnestly hope that the tenth annual exhibition of the Mechanics' Institute may prove a worthy reflex of the wonderful growth and prosperity which marks the career of the Golden State.

In the Lady Washington mine, on the Comstock, the heavy body of water encountered being found difficult to reduce with present appliances, it was concluded to not attempt to contend with it until a first-class pump can be brought to bear in the case. The water is now 120 feet deep in the shaft, but will have to get out of that in due time.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DREW & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., April 13, 1875.

FOR WEEK ENDING MARCH 30.

STEAM GENERATOR.—Sabra R. Mathewson, Gilroy, Cal.
ROTARY REVERSING AND CUT-OFF VALVE.—John C. H. Stint, S. F., Cal.
ORE CRUSHER.—David Trumbull, Jr., Contra Costa, Cal.
GAGE QUILTER AND CORDER.—George Vincent, Stockton, Cal.
GUIDE ATTACHMENT FOR SEWING MACHINE PRESSER FEET.—George Vincent, Stockton, Cal.
FIRE ALARM REGISTER.—Daniel T. Phelps and Charles W. Edmunds, S. F., Cal.

TRADE-MARK.
FOR PREPARATION TO BE USED ON SHEEP.—Redington, Hostetter & Co., S. F., Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue.
NOTE.—Copies of U. S. and Foreign Patents furnished by DREW & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with effect security and in the shortest possible time.

MINING PATENTS ISSUED.—The following mining patents have recently been issued:

California.—Alpine county—Lady Franklin silver mining company, Lady Franklin gold and silver quartz mine. Butte county—D. C. Baldwin, Murphy's ravine diggings. N. D. Rideout and Wm. S. Smith, Porter quartz mine. El Dorado county—C. Weisell and J. N. Nicolvison, Last Chance quartz mine. Levi Shepard, Rose quartz mine. Nevada county—B. D. Evanport, Eagle quartz mine. Mono county—S. A. F. Bryson and Geo. R. Porter, Dunderberg mine. Yuba county—J. P. Brown et al., Nevada mining company's placer. Napa county—J. M. Hamilton et al., Napa Quaker mine, quicksilver.

Nevada.—Eureka county—W. W. McCoy, Ione and Grant lodes.

Oregon.—Baker county—Charles Green, Monumental lode.

Utah.—Salt Lake county—General Hardie, Fairview mine. B. M. Durell et al., Kempton mine. Tooele county—E. H. Shaw, Last Chance mine. E. S. Blackwell, Miners' Delight mine. Box Elder county—Lloyd Aspinwall, Morning Star, Rising Star, Red Cloud, Independence, Confidence, Empire, and Tecoma mines.

The New English Patent Bill, introduced by the Lord Chancellor into the House of Commons, will probably, with some modifications, become a law. The subject of patent reform has been debated in England for about fifteen years, and this bill will probably prove the first step of the English Government towards the American system of examination previous to granting patents. We would call attention to the fact that it is provided that an application for an English patent must be made within six months after the date of a patent for the same invention granted in any other country. Those who have American inventions already patented here, and which they desire to patent in England, will be deprived of the privilege if at the time the new law goes into force their American patents shall have been issued six months.

The Segregated Gold Hill, on the Comstock, is an old location west of the Imperial, formerly worked to good advantage, but after lying idle through indifferent and bad management, it is now, under new hands, being brought out right. The old shaft, which is about 400 feet deep, will be made available.

The "Prospect," an old location on the Comstock, lying about 3,000 feet west of the Occidental, after lying idle for some years, is now to be worked. A large new working shaft of three compartments is now being started about 1,000 feet east of the croppings.

SYMPTOMS OF CATARRH.

Obstruction of nasal passages, discharge falling into throat; some times profuse, watery, acid, or thick and tenacious, mucous, purulent, bloody, putrid, offensive, etc. In others a dryness, weak or inflamed eyes, ringing in ears, deafness, ulcerations, scabs from ulcers, voice altered, nasal twang, offensive breath, impaired smell and taste, &c. Few only of these symptoms likely to be present in any case but one.

To cure take Dr. Pierce's Golden Medical Discovery earnestly, to correct the blood and system, which are always at fault also to act specifically, as it does, upon the diseased glands and lining membrane of the nose and its communicating chambers. The more I see of this odious disease, the more positive is my belief that if we would make treatment perfectly successful in curing it, we must use constitutional treatment to act through the blood, as well as a soothing and healing local application. Dr. Sage's Catarrh Remedy, when used warm and applied with Dr. Pierce's Nasal Donche, effects cures upon common sense, rational and scientific principles, by its mild, soothing and healing properties to which the disease gradually yields when the system has been put in perfect order by the use of the Golden Medical Discovery. This is the only perfectly safe, scientific and successful mode of acting upon and healing it.

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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

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Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

FIEDLER'S QUICKSILVER CONDENSERS, MADE OF IRON.

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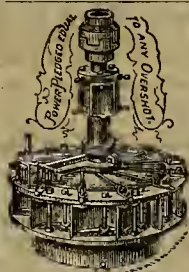
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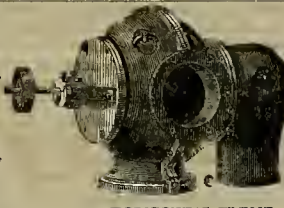
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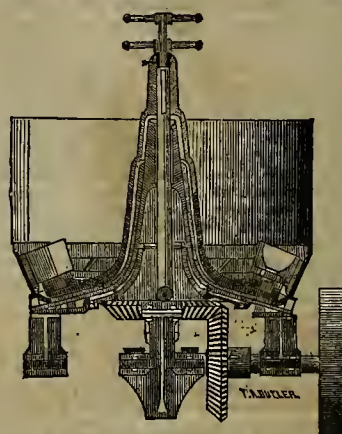
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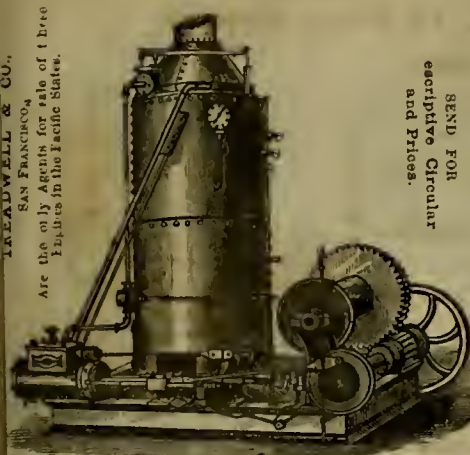
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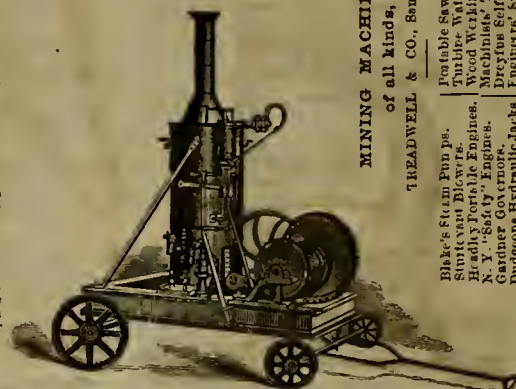
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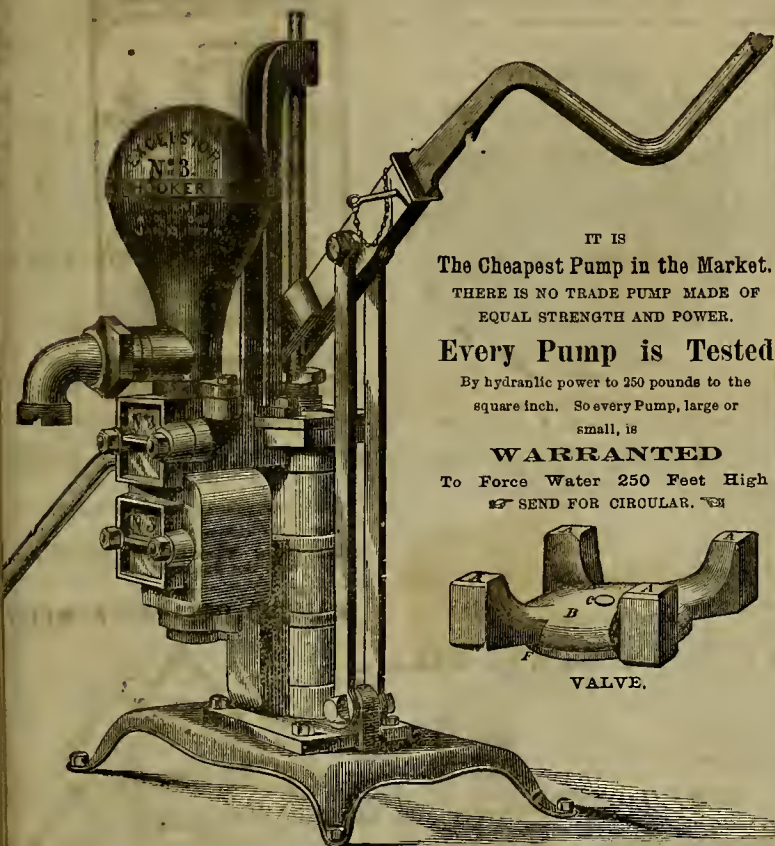
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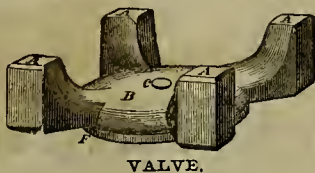
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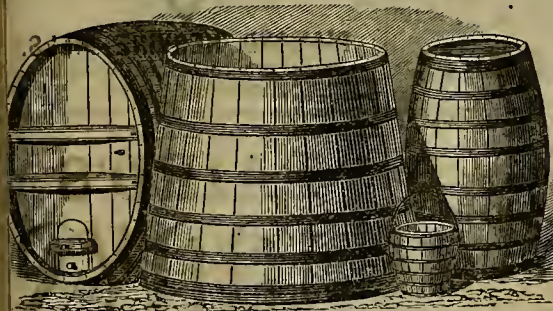
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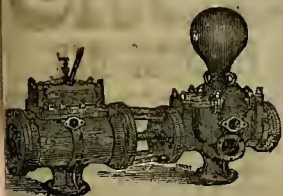
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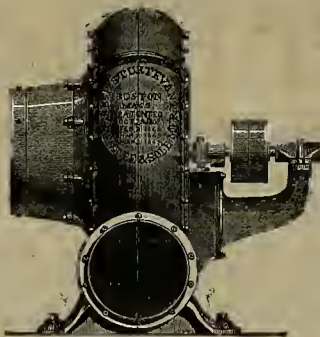
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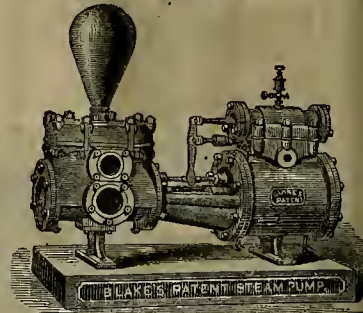
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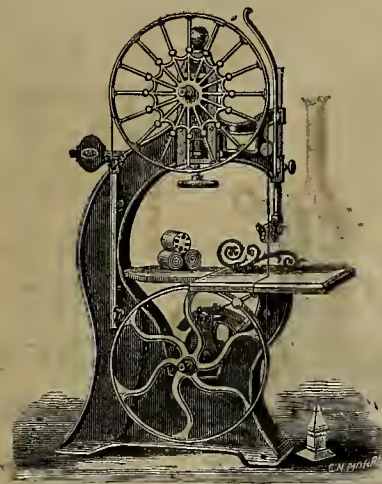
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New Almaden, April 5th, 1875.

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Company to purchase of the Cleveland, Ohio, and New
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, APRIL 24, 1875.

VOLUME XXX
Number 17.

Fitts' Improved Road Steamer.

To move over a common earth surface by means of steam, without rails, is not an easy problem to solve; and a machine to accomplish this feat and at the same time perform labor, must combine lightness, compactness, traction and a perfect control. A machine which the inventor claims combines these characteristics, is shown in the accompanying engraving. The

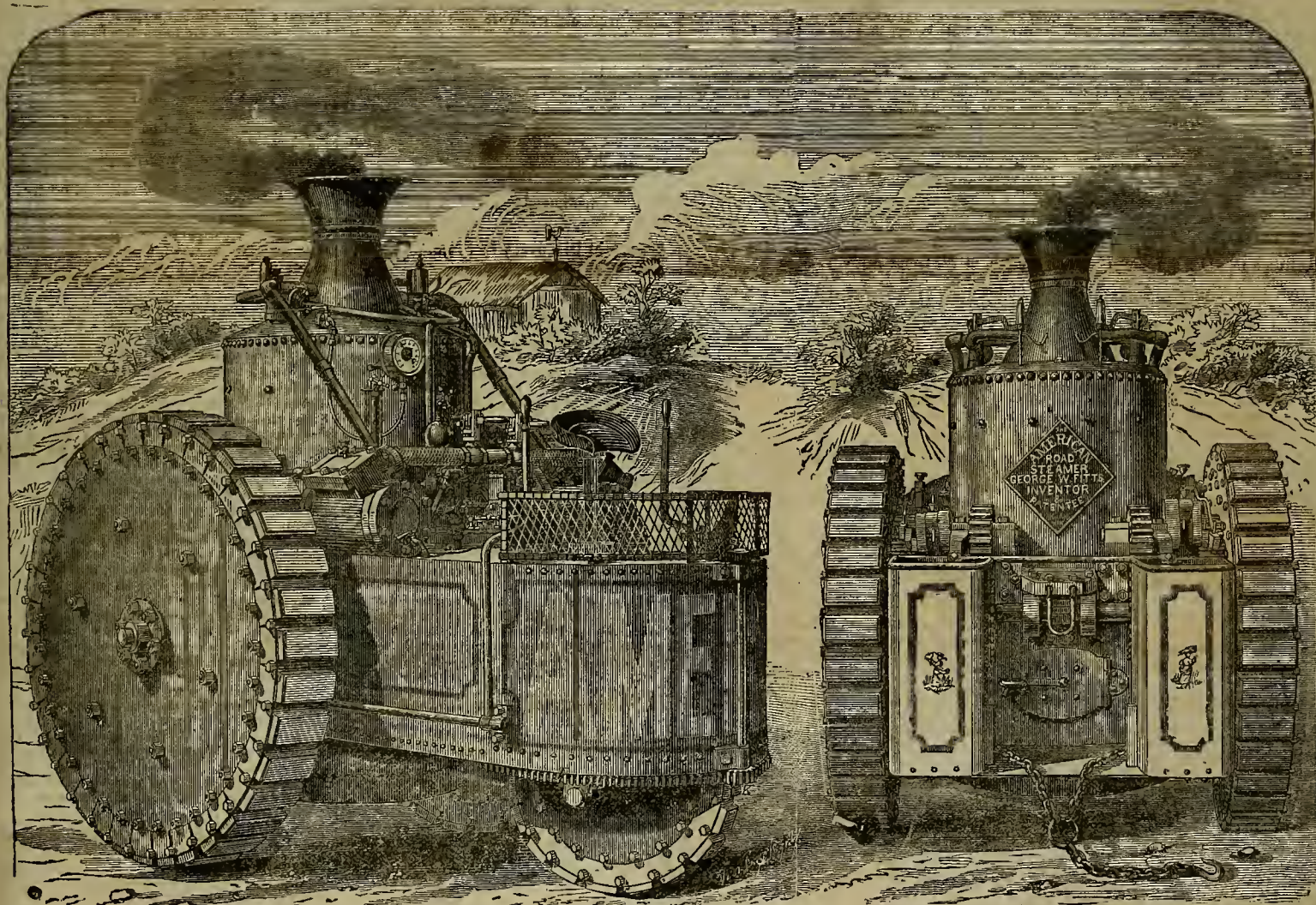
hands of steel, in the rims of the driving wheels, gives the most perfect traction of the driving wheels to the surface and at the same time furnishes all the elasticity necessary for a machine of this kind. The small steam pump placed upon the top of the tank, and working independently of the engines, will draw the water from a well or pond, fill the tank, feed the boiler, or throw the water out of the tank to a height of 50 or 60 feet.

The connection of the guide wheel with the driving shafts in such a manner that the steam

WRITER'S ASSISTANT.—A shorthand reporter suggests that an arrangement of some kind for moving paper along at intervals so as to present a blank surface to the pen or pencil of the writer, would be very useful. The apparatus should also have a guide for the hand of the writer, and should not only move to the left but up from the hand. It seems that something of this kind is within the possibilities of mechanical construction. All who have much

Plumbago.

Several veins of plumbago have recently been discovered in the vicinity of Columbia, Tuolumne county. The *Independent* says but little is yet known of their true value; but specimens have been sent to Nuremberg, Bavaria, where the celebrated Faber lead-pencil factory is located, to have their merits passed upon. The *Call* says that it is believed that the articles will



THE AMERICAN ROAD STEAMER.

cut shows two views of the American road steamer, taken from a photograph of the America.

These steamers may be built of different size and capacity. The dimensions of the one shown—the *America*—are as follows: Boiler, 38 inches by 6 feet 6 inches; driving wheel, 66 inches in diameter by 10-inch face; guide wheel, 31 inches in diameter by 6-inch face; cylinders, 7 inches in diameter by 10-inch stroke; capacity of water tank, 250 gallons; of full bunkers, for 10 hours labor; width of track, 76 inches; length of steamer, 10 feet; total weight, ready for labor, about five tons; pulling capacity, 15 to 20 tons upon tracks.

These steamers are designed and built with special reference to their adaptation to all the various uses that a self-moving power may be applied, such as hauling heavy loads, plowing, reaping, threshing grain, sawing wood, etc. The inventor claims that the arrangement of the rubber blocks in pockets, surrounded by

will turn this wheel in any direction by simply moving a lever, places the steamer under easy control of the driver. By blocking up the driving wheels and placing a band upon them, the machine is converted into a stationary engine, and may be used as such for any purpose desired. These engines are geared to about three miles working speed, but this may be increased by giving the cylinders more steam. The inventor states that the supply of fuel for the *America* for ten hours' labor is 500 pounds of coal, but the consumption of course depends upon the size of the steamer and the amount of labor performed. Arrangements have been made with the Baldwin Locomotive Works for the construction of these machines, and they can be furnished at short notice. The inventor is desirous of introducing these engines in the mining sections for trucking and other work. Those desiring further information on this subject can address George W. Fitts, 333 Walnut street, Philadelphia.

writing to do in the way of note-taking would find it a great convenience to have something of this sort, which would enable them to write rapidly, and at the same time keep their eyes on the witness, lecturer or other speaker. The apparatus would have to be light, portable and simple in construction. It should also be capable of quick adjustment, to move fast or slow according to the requirements of the occasion. Now that we have writing machines, it does seem as if such an apparatus as we speak of would not be difficult to construct. Here is a chance for some ingenious individual to try his hand on an invention.

A new side branch of the railroad to deliver machinery and supplies at the Caledonia mine, on the Comstock, is being surveyed and will soon be pushed to completion. This road will also supply the Overman mine, and can with a very little trouble be extended across Gold canyon to the New York and Lady Washington mines.

only he useful for stove-polish and foundry purposes, as it contains too much foreign matter to be good for pencils.

This is exactly what is the matter with all the plumbago we have found on this coast. None of it is pure enough and even the poorest quality is scarcer than most people suppose. Works were established in this city some time since to manufacture crucibles and they have never been able to get enough plumbago to do any work. They get their plumbago from the East and England to make their crucibles and although there has been a great deal of talk about plumbago mines none of the product of any value has come to light. The proprietors of these works stand ready to purchase all that is of proper quality that they can get, but as yet no one has presented himself with any samples worth having.

The *Reno Journal* is informed that Mackey & Fair contemplate building a narrow gauge railroad from Virginia City to Reno.

Short Lectures on Patents.

BY JNO. L. BOONE.

NO. 1.—FOR THE MINING AND SCIENTIFIC PRESS.

To Invent is to Think.

The process of originating a new idea is the same process as that required to plan houses, railroads and all manner of enterprises; the same that accumulates fortunes, and rules nations. Every person who adds to his own fortune or the public growth does so by a system of invention not dissimilar to that required to produce a new mechanical movement, a new combination of devices, or to originate a new mechanical principle.

It has been said that no man invents a complete machine without aid from others; that an invention is an accumulation of ideas from many persons. Necessity compels thought. Circumstances control necessity. One man suggests; another criticizes. Ideas accumulate until some lucky thinker makes the last suggestion that spans the chasm and the invention is complete. The question arises,

Who Made the Invention?

Our patent law says that the first person who produces a complete working embodiment of the invention and applies for a patent therefor is to be considered as the first inventor. In fact it is a race in which the first person who reaches the goal wins the prize. And this is as it should be. No other allotment would be just.

But before the inventor can successfully carry off the prize he must first comply with certain

Legal Requirements.

He must not only invent but he must explain his invention to the public by filing a complete description, drawings and model in the United States Patent Office, so that when the time of his proprietorship expires the public will be in possession of the knowledge he has been the first to give life.

The law says the patent must be applied for within two years from the time that he publicly uses or exhibits his invention, in order

To Obtain a Valid Patent.

This is for the purpose of preventing the public from being deprived of the invention for a longer period than seventeen years (the duration of a patent) from the time it is first shown to the public. Yet it gives the inventor abundant time in which to complete all of his arrangements and secure his patent without unnecessary haste. It is also considered that in the present age, in which every man is a thinker, and therefore an inventor, that others will, independently, invent the same thing in a short time. In other words there is a second man in the race, and it would be unjust to allow the first man to neglect to give the world the benefit of his discovery, and thus deprive other true inventors from doing so. So long as an inventor applies for a patent for his invention within two years from the date of its first exhibition to the public he is entitled to receive a valid patent therefor and so jealous is our law of preserving

The Rights of a "First Inventor"

That it provides for the issue of a second patent to a second applicant if he can prove that he was the first to invent, and that the invention has not been in public use for over two years before his application.

It thus places the two inventors on an equal footing; both hold a patent for the same invention and

The Question of Priority,

Or which is the true and valid patent, must be decided by a suit in the United States Courts, where all patent cases are tried. To provide against the possibility of defrauding the public by the wrongful issue of a patent for an invention not justly patentable, the law provides that before a patent can be enforced by the owner it must first pass through the ordeal of a suit at law in which the defendants can raise the question as to whether the patent is

Valid or Not.

The proof of illegality, however, must be clear and decisive in order to defeat the first patent, as a patent is prima facie evidence that the invention was new at the time the patent was applied for and that the applicant was the first to invent. The second patent would therefore be under a cloud until the first was defeated. The U. S. Courts as a rule require the most positive evidence that the first patent was wrongly issued in order to defeat it.

Interferences Frequently Occur.

If two or more persons apply for a patent for the same invention simultaneously, the Patent Office decides the question of priority. This is done by declaring an interference between the conflicting applications and requiring the applicants to produce proof as to when each first completed a working model or embodied the invention in some practical form. The testimony of the inventor must be well substantiated by reliable witnesses in order to prevent fraud, and as each party is entitled to be present in person or by attorney to cross-question the witnesses of the other parties little chance is left for fraudulent representations in actively contested cases.

Partial Interferences.

Two pending applications may conflict only in part, or one patent may describe without claiming what another asks a patent for. In

either case an interference is declared and the decision of the Office is ruled by the testimony in the case.

It is therefore plain that our law makers have provided ample safeguards for protecting both inventors and the public from being defrauded and with honest officials in the Patent Office and clear headed Judges on the benches of our United States Courts, we can see no ordinary way for wrongs to occur that cannot be readily remedied.

It is those who are most ignorant of the merits of our patent laws that cry loudest against them. We acknowledge that our patent system is faulty in some regards and we shall in some of our subsequent articles try to point out these faults. But as a rule few branches of legal legislation are more thorough in their action and more complete in their protection.

RAYMOND & ELY MINE.—The *Pioche Record* says: The work of putting in place the pumping machinery is now rapidly approaching completion, and it is possible that during the present week the pumps will be in actual operation. All the rods are in place and connected, also all the pumps and bores; the balances of the latter are now being filled. The spur wheels are also nearly ready for work. The pump column lacks only about 250 feet from the surface. In fact, the tedious, laborious and difficult task of constructing and erecting the vast and ponderous appliances for lifting a large stream of water from a depth of 1200 feet, is about to reach what we believe will be a most satisfactory and successful termination. In consequence of the timbering in that part of the hoisting shaft, about 100 feet from the surface, requiring repair, the work in the lower part of the mine was stopped, and probably will not be resumed until this evening or to-morrow. Before the cessation of labor took place the work of extending the 9th and 10th levels was going on. The appearance in the face of the 9th was not looking so well. In a winze which is being sunk from the 8th the prospect is very good. Taking the outlook altogether, the appearance of matters may fairly be characterized as much improved, and leads us to believe that the bonanza period of Pioche is not far off. As regards the ore being raised, only that quantity is brought to the surface that is taken out in making the various explorations by means of the several drifts, winzes, etc. that are being opened. No ore has lately been shipped to the mills, but shipments will probably soon be recommenced.

MINER OF PARK CITY, UTAH.—The *Marsac* mill, of 20-atampa capacity, is to be changed into a concentrator, as the ore of the Flagstaff mine could not be successfully worked by mill process. The Ontario mine is furnishing constant employment for the McHenry mill. The Switzerland mine has struck a well defined lode of superior richness. The Rock Bar mine has a shaft down 100 feet, and a four foot vein of fine ore has been lately struck. The lead is well defined, and has a heavy clay hanging wall and quartzite foot wall. Woodside mine is still being worked, and regular shipments of ore are forwarded to this city. That is a valuable mine. The Highland Mary, Irish-American, Whelan, Green Monster and Porcupine are looking well. The tunnel of the Pioneer is now in about 300 feet, with an excellent showing. —*Salt Lake Tribune.*

SULPHUR.—Extensive beds of sulphur have recently been located in this county by a gentleman named McWorthy, from Oakland, California. The deposits are situated about thirty-five miles west from Mill City, in the Rabbit-Hole Springs county. McWorthy's information relative thereto was derived from an Indian, who, for a trifling remuneration, piloted him to the locality. A quarter section of the deposit has been located, and James McAllister of Mill City informs us that the locator intends to make the limestone useful by converting it into sulphuric acid on the ground if fuel in sufficient quantity can be found on the adjacent mountains. —*Silver State.*

THE TWENTY CENT COIN.—The design of the new twenty cent piece has been selected and approved by Mr. Landerman, director of the mint. The obverse design contains a sitting figure of liberty, with the word "Liberty" inscribed on the shield, the whole surrounded by thirteen stars. Beneath the figure is the date 1875. On the reverse is the figure of an eagle, with the words "Twenty Cent." The edge of the coin will be perfectly smooth, in order to distinguish it from the twenty-five cent coin.

The *Belmont Courier* says: Eight tons of ore from the Barcelona mine (Spanish Belt District), crumbed at the Monitor Belmont Mill, yielded \$3,105 93, or an average of \$404 per ton.

The *Eureka Consolidated* is to have a new furnace constructed at its smelting works. Four furnaces, it is expected, will be run this season by this company.

The *Ukiah Dispatch* says that gold and silver have been discovered near Calpella, and the prospectors have traced the ledge to the Wurtzburg claim.

The general overhauling of the Richmond furnaces compels their shutting down for the balance of this month.

The *Reveille* mine, Tybo district, Nevada, expects to ship, in the next sixty days, \$150,000 in bullion.

Jefferson District, Nevada.

One of the editors of the *Austin Reveille* has been examining the mines of Jefferson district, Nye county, Nevada, and according to the extracts below, taken from his reports, the future prospects of the mines are very flattering for that camp. He says: "The first mine examined was that of the Jefferson silver mining company, comprising 1,200 feet on the southern end of the Prussian lode. An incline has been sunk on the ledge, which dips at an angle of 65 deg., to the depth of 340 ft. At this point a body of water, just sufficient to supply the steam boiler of the hoisting works, has been struck. Along the length of this incline four levels have been started, every one of which we visited carefully. The vein, both in the incline and in the levels, varies in thickness from three to five feet, and is one of the most uniform and best defined we ever saw, the bottom resting on a stratum of decomposed slate of the consistency of putty, whilst the top is incased in porphyry. The first level was started at 65 feet, and is now in 100 feet northerly and 60 feet southerly, the vein being stoped a height of 30 feet on both sides. The second level was started at 140 feet; it is now in 120 feet northerly and 50 feet southerly. Little stoping has been done on either side. The third level was started at 240 feet, and has now reached 85 feet northerly. The fourth level, 340 feet, has been run a short distance northerly. As we said before, the vein maintains its uniform size and dip down to the bottom of the incline and along the whole length of the drift with remarkable uniformity. The Prussian claim comprises 1,000 feet. They have sunk an incline 250 feet deep, at which point they struck a heavy body of water, which cannot be exhausted without greater pumping facilities than the company now possess. Three levels have been started—the first at 65 feet from the surface, running south 75 feet and north 80 feet; the second, 100 feet from the surface, running south 280 feet; and the third, 200 feet from the surface, running south 260 feet and north 100 feet. Both incline and levels are run on the ledge, averaging between three and a half and eight feet in width. Fourteen dollars covers the entire cost of mining and milling one ton of ore. Each of the companies has a ten-stamp mill, crushing wet, and of the latest construction. They work twenty tons of ore every twenty-four hours. Both mills are under the superintendency of Mr. Thomas Mc-Masters."

Important Discovery in Fresno County.

James F. Dodds, John Bye, Thomas Collins and James Lewis have made an important discovery of a vein of gold-bearing quartz on the Fresno river, about three and a half miles below Crook's ranch, and opposite what is known as Indian Peak. The parties mentioned were employed during last summer and fall in constructing the flume of the California Lumber company, and while so employed they found a number of pieces of float quartz, which showed a large amount of free gold. Search was made for the vein, and it was finally discovered on the 19th of last December. They immediately located a claim of 1,500 feet on the ledge, and styled it the Confidence company. The ledge was traced about two miles and shows a width on the surface of about six feet. The droppings all show more or less free gold. They immediately commenced sinking a shaft on the ledge, and as they removed the rock, the glittering particles of gold, peeping from the fragments of quartz, assured them that they had struck a big bonanza. Specimens of the quartz shown us, (and we are assured that they are fair samples of the ore extracted from the mine), were literally bespangled with gold. The quartz is hard and solid, and has a rusty appearance wherever there are any seams. The walls of the ledge are well defined. A shaft 6x8 feet has been sunk on the ledge to the depth of thirty feet, and the vein is found to widen out as it goes down. At the bottom of the shaft the width of the vein is found to be about thirty-five feet. The gold seems pretty generally diffused through the vein, but there is a stratum in the vein which is exceedingly rich. The quartz increases in richness as they sink on the ledge. This fact, coupled with the widening of the ledge, the general diffusion of the gold, the marked definition of the walls of the vein, and its gradual widening out, indicates that the mine is a true fissure, and not a pocket deposit. They have worked about thirteen tons of the ore in an arastra and cleaned up about \$5,000. The first eight tons of ore yielded a little over \$275 per ton; five tons of ore worked since yielded a little over \$515 per ton. They have an abundance of this same class of ore on hand. The parties have been offered, and have refused, \$40,000 for their discovery. The extensions have been located, and the prospects are that other rich mines will be opened. —*Fresno Examiner.*

ALL work on the Dayton mine is suspended for the present, pending the erection of the new pumping and hoisting machinery. The new machinery is a complete pattern of the new machinery of the Caledonia company, and when ready to run will be second to none on the line of the Comstock.

GEORGE M. DANNALS has been elected President of Julian mining district, San Diego county. Mr. Dannals was a member of the legislature from that county last winter, and has been a resident of Julian ever since the mines were first discovered.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Twelfth Lecture Delivered before the University of California College of Agriculture, on Monday, February 1st, by PROF. C. E. BESSEY.

We take up to-day, first, the myrtles, natural order *Myrtaceae*, a group of tropical and south temperate plants, made up mostly of trees and shrubs, and including about 1,500 species. Most of them are found in Australia, that is, the larger number of species; while in Northern Asia and in North America we find none, so that we have this great group of *Myrtaceae*, without a single natural representative in all North America. The myrtles (Fig. 1), all of them, contain an aromatic oil, which may be considered as the principle which runs through the whole group. It is an important order on account of its timber, its food, its aromatic and its medicinal products.

Under the head of timber, we have standing prominent among the timber trees of the world, the different species of the genus *Eucalyptus*. Of this genus I shall not attempt to say very much, because I find there is no literature on the subject to be obtained here. The trees are all Australian and Tasmanian. As many as thirty or forty species are pretty well known. They are usually trees 100 to 150 feet high, although attaining, in some cases, 300 to 400 feet, and one was measured whose length was 480 feet. It, however, had rather a small diameter; having a diameter of not more than 27 feet, I think; not as large as our large *Sequoias*. They are all interesting, botanically, on account of the peculiarity of their leaves and general appearance. The leaves are broad and regular on the young plants, but they become long and to a certain extent one-sided on the old plants. In the older plants they hang vertically, presenting their edges upward. The species differ very greatly in their value. Some of the species of *Eucalyptus* are exceedingly valuable, others are almost valueless. I will read you what Sir William MacArthur says—and this is in a very rare book. He says, in speaking of these trees: "When fully matured, some of them are not sound at heart, and, even when sound, the wood is very brittle. In several kinds there is a very serious defect, which is called gum vein, the gum or resin passing out through the concentric circles between the layers of wood." It means just this: There is a great tendency to take on wind cracks, so that when you cut a tree you find great cracks between these successive layers, filled with gum. The statement is also made that it is quite apt to split up. I have examined what seem to be the best, taking the Australian authorities. They give them popular names. These popular names cover several species. The most valuable is the *E. sideroploia*, or iron bark. The iron barks are very useful in building railways, putting up buildings and manufacturing implements. Somebody has cited instances where the wood had been used for forty-five years for fence posts, or something like that. It is said to be very durable. It is very strong, and from certain tests made by the British navy, this iron bark was found to be the strongest of almost all the Australian woods; compared with other woods also in England, it was found very strong. While it has all of these qualities, you must remember there is a certain tendency which it inherits with all its common relatives. That is, a tendency to shrinkage. When the boards are put together in a floor, ceiling or anything like that, they are apt to shrink, and so cannot be well used for such purposes. The aptness to have gum-veins and to be hollow at heart when old, also lessens their usefulness. Still, the iron bark you may consider as the best of all, and I should say that these are

The Ones that ought to be Imported.

E. leucocorylon, *E. crebra*, *E. paniculata* and *E. bicolor* are all close allies of *E. sideroploia*, and are popularly called iron barks. Australian gums are largely imported now; why not import these, and especially the first one, rather than those that are brought in? The second best among the species of *Eucalyptus* are what are popularly called the blue gums. We have here what is called blue gum, *Eucalyptus globulus*. *E. terminalis*, *E. hamata*, *E. botryoides* are all blue gums. They are highly prized in Australia, and are used for ship-building and also very largely in wheelwright's work for manufacturing wheels and all other parts of wagons. The *Eucalyptus* are said to possess medicinal virtues.

An allied genus, *Syncarpa laurifolia*, found also in some provinces of Australia, and called there the tridentine tree, is said to be exceedingly valuable for use as piles. You know that in some places an ordinary pile driven into the mud will be used up in five to seven years, depending upon the number of teredos which attack the piles. This *Syncarpa* is said to be teredo-proof; and if you see proper to get evidence of this, go over to the Academy of Sciences, and you will find a specimen pile there that was a long time in the water, driven where teredos abound, and there is no teredo mark on

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MECHANICAL PROGRESS.

Is Wrought Iron Fibrous?

In the adjourned discussion upon Mr. Hutchinson's paper "On Reversing Rolling Mills," by the members of the Cleveland Institution of Engineers, which was published in the last number of *Iron*, p. 361, Mr. Jeremiah Head, a gentleman well versant in the art of rolling plates, questioned the fact of there being really fiber in the plate at all. He said: "I am inclined to think that the term fibrous, when applied to the structure of wrought iron, is really inappropriate and misleading. A truly fibrous material, such as wood, resembles wrought iron only in the appearance of the fracture. But the fibers of the wood are not at all ductile, and therefore its appearance when fractured arises from the broken fibers of which it is built up becoming apparent. But the similar appearance of a fractured piece of wrought iron arises from the ductility of the molecules of iron, the apparent fibers having been made for the first time in the act of bending. If we could see the iron before bending, we should probably find it quite innocent of any fibers, however ductile the quality."

That the fibrous appearance of iron is only disclosed after the bending of the iron, and is really produced by the tenacity and ductility of the molecules of iron is very plausible, and rather novel in conception, but goes dead against all the general notions of those most intimately acquainted with iron in its rolled state. The general notion is that iron not only seems to be, but really is, fibrous; that it is just a bundle of more or less parallel wires, more or less welded together. If a bar of rolled iron be soaked in a weak solution of nitric acid, its fibrous structure will be apparent to the eye, so that, to quote Mr. Head's own words, "we can actually see into the iron before bending," and "find it quite innocent" of the charge he brings against it of not being fibrous. There is not the least doubt about there being actually what we, comparatively speaking, call "fiber" in iron. Yet Mr. Head's idea is eminently suggestive. We know, by bitter experience, that the fibrous structure of axes, etc., seems to be gradually changed into a crystalline state by the force of vibration. We also know that boiler plate, from the continued application of heat, seems to lose its fibrous character and become crystalline.

The president in his opening address alluded to the fact thus: "From some tests I have lately been making of the iron cut from the plates of two boilers which had ripped at the seam, I found that the flame playing at the convex bottom of the boiler had affected the iron at the seam, so as to make it cold-short, of small tensile power, and apparently crystalline in its fracture. On annealing the pieces of iron cut from the seams it was found that the cold-shortness had disappeared, and that the tests both for tensile power and ductility had been restored to their original condition." It is probable that the crystallization is only in appearance—that, in point of fact, the elongated welded crystals or molecules which constitute the fibers have merely lost the strength of their tenacity and ductility—have, in fact, become brittle and not been able, in consequence, to stand the same amount of fatigue. This theory, if correct, fully accounts for the fact which seems so puzzling to explain—that by proper toning treatment the so-called crystalline iron can have its fibrous nature restored so as even to stand its original tensile strain.

A NEW SYSTEM OF DREDGING.—M. Bazin, of Angiers, France, proposes to attach to a steamer with an engine of 60-horse power two pipes on each side at some twelve feet below the water line. These pipes are to be ten inches in diameter, about fifty feet in length, and are to be connected to the ship, so as to swing up or down, and also so as readily to yield to the movements of rolling, etc. The extremities of the couple on each side are united by tubes of like diameter, open at the forward end. In clearing out a quicksand, the vessel is got under way at the speed of eight knots per hour; and on reaching the obstruction the tubes are lowered with the soft mass. The water pressure above the sand or mud, which of itself would force the material into and up the tubes, is aided by the outward motion of the vessel, and the result is that the mud is driven through the tubes and into the hold. When the vessel is full, the apparatus is raised, and her contents hoisted out or otherwise discharged in some suitable locality. M. Bazin says that, with tubes of the size and with the speed above mentioned, 43,200 cubic feet of mud per hour could be raised. He points out that, in case of their becoming obstructed, the tubes can easily be cleared by simply elevating them out of the mass and allowing the water to rush through them.

CAR STARTER.—An improved "starter" for horse cars was recently tried in Baltimore. The invention consists simply of a grooved iron cam that is attached on each side of the axle near the wheel. This cam extends above the axle and affords a leverage of twelve inches. Through the grooves on the top of the cams run two wire ropes that are attached to the gooseneck and double-trees. The cams, by means of a heavy spring, resume their upright position whenever the car stops, and the leverage they offer in starting lessens the work of the horses.

THE EFFECT OF COLD ON IRON.—As a general rule the cohesive force in bodies increases as the atoms or molecules of which the bodies are composed are brought into closer proximity to each other and heat tends to separate the particles of matter, and thus to weaken the cohesion existing between them. In accordance with this well established law, a lump of ice, in which there is a certain amount of tenacity, loses nearly the whole of this force when it has been converted into water by the agency of heat; and when, by further heating, the water has been converted into steam, the cohesive force is entirely overcome by elasticity operating in the opposite direction. A great number of experiments have been made for the purpose of determining the influence of variations of temperature and other circumstances on the tenacity of the metals within the range of their solid condition. In 1844, Wertheim published an elaborate paper relating to this subject in the "Annales de Chimie et de Physique," in which he shows that, although in most instances the metals increase in tenacity as the temperature decreases, it is not strictly so in the case of iron, the tenacity of which increases with increase of temperature up to 212 deg. Fahr., but beyond that point it follows the general law.

MAGNETIZATION.—M. J. Jamin's researches point to an important modification in the construction of magnets. Suppose that a great number of plates, which, after being separately magnetized to saturation, are placed together. The magnetism of the combination will be seen to increase up to a limit which cannot be passed, and which is reached when the polar surfaces are filled. Suppose that ten plates are required. If now we recommence the same experiment, applying the same plates against two iron armatures of a large surface, the intensities will increase much more slowly, because the sum of the magnetism is diffused over a more considerable extent, and the limit will not be reached till this extent is full. For this it may be needful to superpose twenty, thirty or forty plates, and, generally speaking, a number so much the greater as the armatures are larger. The total power of the magnet will, therefore, increase with its armatures.

WELTING.—In welding iron, as is well known, the pieces are heated to whiteness. When iron is to be welded to iron this plan answers well enough, but if iron is to be welded to steel the white heat often destroys the steel completely. To remedy this evil a patent has recently been taken out, which promises to remove all difficulties. By this process the surface of the metal to be welded is moistened with water, and on the wet surface there is sprinkled a compound consisting of 1 lb pulverized calcined borax, 1 lb. fine iron filings, and 4 oz. pulverized prussiate of potash, intimately mixed. The two surfaces are then wired, or otherwise held together, and raised to a red heat, or about 600° to 700° Fahr. When subsequently subjected to rolling or hammering the joint is completed, while the steel is not sufficiently raised in temperature to be at all injured by the operation.

WHAT IS STEEL.—A correspondent writes to the *Scientific American* as follows: I contend that no steel can be made without carbon. My friend claims that chrome steel, by the introduction of chrome ore into the crucible with ordinary iron, secures the different grades in proportion to the amount of chrome used. I claim further that the result of such a process is not steel, but an alloy or chromate of iron. Which is right? That journal answers as thus: It may be steel, because the iron itself contains carbon, the presence of which is, as you say, essential to the formation of steel. The chromium enters, like manganese and other metals, as an alloy, and modifies the properties of the steel.

NEW PROCESS OF ENGRAVING ON COPPER.—The hydrographic office at Paris has begun a new process of engraving on copper which promises, by its rapidity and the moderation of its price to be very widely useful. It consists in substance, first, in covering a plate of copper with a thin shell of adhering silver, upon which is spread a thin layer of colored varnish; second, in drawing thereon, with a dry point, the lines of topography, and lettering, precisely as one engraves with a diamond upon stone; third, in corroding the traced parts by means of the perchloride of iron.

AN IMPROVED WOODEN BARREL.—H. W. Fitzhugh, of Bay City, Mich., has invented a new device in barrel manufacture, which consists in using straight staves having parallel edges, with constricted bands, whose overlapping ends are fastened by a screw extending into the wood. This enables the barrel to be made entirely by machinery, and renders cooping unnecessary.

A NOVEL BRIDGE.—Between the towns of St. Servan and St. Malo, at the mouth of the River Rhone, France, there is a novel bridge. It is a platform supported on wheels which run on rails at the bottom of the estuary. At high tide the wheels are beneath the surface of the water. The top of the platform is level with the quay on each side, so that it is easy of access for both men and horses.

HIGH AND LOW PRESSURE.—Somebody asks, What is the difference between a high pressure and a low pressure engine? A. In one the steam is condensed, in the other it is exhausted into the atmosphere.

GIFFARD'S RAILWAY CAR.—M. Henri Giffard, inventor of the Giffard injector, has succeeded in constructing a railway car, the body of which is so supported on springs that all oscillation and jarring is entirely obviated, and the passengers within are enabled to read, write, and otherwise employ themselves with as much facility as if not in motion. These cars are now in use on the railway between Paris and Lille, France. The platform is supported on heavy springs of its own, and carries at each extremity standards, which, in turn, are surmounted by ponderous leaf springs, to the ends of which the body of the car is suspended. It was found, on a first trial, that the peculiar horizontal oscillation which is so very fatiguing to the traveler was entirely suppressed, and that a light, vortical, elastic movement which remained was easily obviated by adjusting the suspending rods. The weight of the car is somewhat more than that of those ordinarily employed on European railroads, and its cost is higher.

SCIENTIFIC PROGRESS.

Science in the Utilization of Waste.

In no way, perhaps, has science been of greater benefit to the commercial world than in what it has taught us in the way of utilizing the waste products of manufacture. The immensely valuable and now almost indispensable series of dyes which science has of late taught us to eliminate from the hitherto useless waste of gas manufacture is too well known to need more than a mere reference in this connection. Numerous other similar instances might be enumerated; but our present purpose is to call the attention of the reader for a moment to the almost inestimable boon which it has secured to mankind in bringing to his knowledge the organic compound known as Glycerine.

The deprivation of which would now be found a most serious detriment to the world. This sweet principle of oil, which is now largely obtained from the waste of the soap boiler, was first discovered by Scheele, in 1783, and its true nature ascertained by Chevreul, in 1819. From that time until within a very few years it merely held a well defined place as a simple fact in organic chemistry. But the new impulse given to scientific investigation within the past two decades has led a great number of investigating minds to examine and study into the nature and possibilities of this new organic compound. The first inquiries were directed to its more thorough purification, and no sooner was it presented to the world abundantly in its pure form than its use became extended day by day. The principal features connected with the improvement in its manufacture relate to its distillation, and still later to its purification by crystallization by Sarg, and in 1871 he purified in this way twenty-five tons. As for its application, it is now more varied than that of any other substance springing from the chemical arts. It is used in wine-making, beer-making, confectionery, liquors, in cloth-making, in calico-making, in preparing leather so as to remain supple and durable, in the tobacco factory, for lubricating machines and fire-arms, etc., preserving organic matter, filling gas meters to prevent the effect of cold, for making rollers for printing presses, in the art of perfumery, in medicines, etc.

Nitro-Glycerine.

But of all the applications of glycerine, the most curious and important one is that of making an explosive compound for blasting. In 1847 an Italian chemist named Sobrero, working in the laboratory of Pelouze, discovered that the action of concentrated nitric acid or a mixture of nitric and sulphuric acid upon glycerine produced a peculiar oily liquid, having among other properties that of exploding when struck by a hard body, or when heated. At first it was only regarded as one of the many curious compounds that are born every day in the chemical laboratory. Any practical application was not thought of, for the glycerine then was too expensive a substance to enter into competition with other substances used in making explosive compounds. It was reserved for a Swedish chemist named Nobel to make an application of this oily compound called nitro-glycerine, and by improvement in the process of its manufacture, and the consequent impulse it gave to the separation and purification of glycerine, it is now a substance of every-day use by those engaged in mining and in large engineering works requiring the removal of large bodies of rock; and, notwithstanding it is an extremely dangerous substance to handle, and many lives and much property have been destroyed by it, contractors on large works say that they prefer using it to gunpowder, with all its attendant risks.

Dynamite or Giant Powder.

So important and advantageous has its use become as an explosive compound, that in spite of its acknowledged danger, men would use it in many cases in preference to other and safer explosives. And here again science came once more to the relief of mankind and led the way to a preservation of this hitherto dangerous compound in a form almost perfectly harmless, and, in fact, absolutely harmless as an explosive, save when placed in contact with some other explosive, a combination which is practically unnecessary until at almost the very moment when it is desired that its terrible energies should be brought into active play. This is the form which nitro-glycerine is made to assume when presented to the world in the form of dynamite or giant powder.

A NEW PAPER BOARD.—The multiplicity of uses to which paper is being applied is constantly leading to new devices for rendering it more suitable for these applications. The latest advance in this direction is given as follows: A new method of manufacturing paper board, to make that article more generally useful and durable, is described as follows: When a sheet of paper is immersed in an ammoniacal solution of copper, and then dried, it is said to be quite impregnable to water, and does not lose this quality even though the water be boiling. Two sheets of paper thus prepared, and passed through a cylinder, adhere to each other so completely as to be quite inseparable. If a large number of sheets so prepared be cylindered together, boards of great thickness are obtained, the resistance and cohesion of which may be increased by interposing fibrous matters or cloths. The substance so prepared is quite as hard as the closest grained wood of the same thickness. The ammoniacal solution of copper is prepared by treating plates of copper with ammonia of the density of 0.880 in contact with the atmosphere.

NEW MATERIAL FOR DYE-STUFFS.—It is claimed that, according to a method patented by Croissant and Bretonner, many kinds of refuse organic matter, as sawdust, decayed wood, horn, bran, starch, moss, etc., can be converted into valuable material for dyeing. The process rests upon the dehydrogenation of the substances by sulphur at high temperatures, and seems very simple in practice. Thus bran, for example, is simply mixed to a uniform paste, with the proper quantity of caustic soda and flowers of sulphur in an iron vessel, which is then covered and heated in a furnace to 482 degrees to 572 degrees. A portion of the sulphur is taken up by the organic matter, and much sulphuretted hydrogen is given off, and at the close of the operation a friable hygroscopic mass remains which is completely soluble in water of a deep green color, and exhibiting an extraordinary affinity for organic fibers, so that they can be dyed with it without a mordant. The dyes formed, even from the same substance, may be varied in shade by altering the treatment; and some materials require a much higher temperature than others for their transformation.

TEMPERATURE OF THE SUN.—In opposition to the now prevailing theory among astronomers and physicists that the sun possesses an exceedingly high temperature, M. Violle has maintained for some time that this temperature is only about 3,000 degrees. In a recent publication he gives the result of some further researches upon this subject, in which he attempts to establish the solar temperature to be the temperature which must be possessed by a body of the same apparent diameter as the sun, in order that, endowed with an emissive power equal to the mean emissive power of the solar surface, it may emit in the same time the same quantity of heat as the sun. He assumes finally that the mean emissive power of the sun is only equal to that of melted steel.

CURRENTS IN JUPITER'S ATMOSPHERE.—Not content with studying the laws which govern the winds or atmospheric currents on our own planet, Knobel has given a series of drawings of Jupiter's surface, as observed night after night by a powerful telescope, while Dr. Lohze, of the observatory at Bothkamp, is making another similar series. When these are compared and discussed with all other known drawings, it is hoped they will reveal the laws of the winds or atmospheric currents which prevail on Jupiter and produce the rapid changes observed on its surface.

A SIMPLE WAY TO FIND THE MERIDIAN.—Mr. Geo. W. Blunt, the well-known nautical expert of New York city, gives the following simple mode for running a meridian line: Take a piece of board, or any similar material, and describe on it a number of concentric circles. Place this in the sun; over the center hang a plummet. Observe the shortest shadow from the plummet; the sun will then be on the meridian; draw a line to the center of the circle, and that will be the true meridian line. This will do to mark the apparent time or to correct the compass for variation.

MAGNETIZING THE SPECTRUM.—Choquet has communicated to the French Academy the observation that the magnet exercises a peculiar influence upon the spectra of various substances. The spectra of sulphur and selenium become very pale and finally disappear, while the spectra of bromine and chlorine become more intense by the influence of the magnet.

WHY DOES A STAR SCINTILLATE?—Because of the interposed changing layers of air of different densities. The diverging rays are caused partly by the irregular figure of the crystalline lens of the eye, and are partly owing to the pull of the six muscles which move it.

MINING SUMMARY.

THE following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

CALAVERAS.

MINING.—Calaveras Chronicle, April 17: We have nothing startling to record in the way of mining in this vicinity this week, but there is no "letting up" with regard to the briskness with which operations are being pushed. The hydraulics are all in full blast and the tunnel-claims are running full handed. Water is abundant and miners are rushing things while they have a chance. Work will be commenced in Prindle & Duryea's new hydraulic, on Tunnel ridge, reference to which has been previously made in this paper, in a few days. We learn that the laying of the pipe necessary to convey the water to the mine is nearly completed. There doubtless are many places on the ridge, yet unoccupied, that will pay well for working, and the success of the claims now in operation will have a tendency to stimulate prospecting. Tunnel ridge will yet be all washed into Chili gulch.

QUARTZ DISCOVERIES.—We learn that some very rich discoveries in quartz have lately been made in Mosquito gulch. Two leads have been found right in the town that prospect very rich and have every indication of being permanent ledge. The work done upon them has resulted most encouragingly and operations are being pushed forward with vigor. There is no more promising quartz mining district in the county than Mosquito.

CONTRA COSTA.

COAL.—Contra Costa Gazette, April 17: Among the many discovered indications of coal deposits in the county that may yet prove of practical value are those at the head of the Tassajara creek, where lately some prospect was made of a vein on the property of Mr. John Johnson. This vein was prospected to the depth of about 20 feet down from the outcrop, and yields coal of very fair quality; but, as we learn from Mr. Thomas Johnson, son of the proprietor, the vein, which was first increased in width with the depth gained, narrowed with the last eight or ten feet, as though it might soon pinch out; and it is not their intention to work it further at present. Near by, on another tributary of the Tassajara, as Mr. Johnson informed us, Mr. Sangmaster has the indications of a large, fine coal vein, but is not taking any measures for developing it, though he has tested it far enough to feel pretty well assured that it is a vein of much value. There would seem to be no reason why the district south and adjacent to Mt. Diablo should not have the same coal measures as found on the north side, though the angle of the stratification left by the uprising of the mountain are greater, and the measures are probably more broken up.

EL DORADO.

MINING ITEMS.—Mountain Democrat, April 17: Our Greenwood correspondent, "Prospector," has been rambling around among certain mines on the north side of the county, and sends the following items: The Sliger mine and mill have been running for the last two weeks, and judging from the plates outside the battery, this will keep up its high reputation as a "paying institution."

At the Cederberg they are still sinking, but since their Warring drill became disabled they have not made the progress they would under more favorable circumstances. The mine is looking first rate.

The Spanish claim is looking well, with a good prospect of a profitable clean up.

The French claim, under the management of Mr. Desmarchats, one of the original owners, is paying remarkably well.

The Five Cent Hill company made a good showing the last month, having paid a good margin above expenses. This mine is under the able management of Mr. Cornwall.

The International, W. A. Jones, superintendent, bids fair to establish its reputation as one of the best mines in our county, having a ledge 20 feet wide, which contains some of the richest sulphureted ore, according to assay, in the State. The superintendent informs me that he intends to ship several tons of the ore to San Francisco, to be tested by working process, and if it works within 20 per cent. of assay, the company will erect reduction works on the mine.

The Taylor mine is proving a success under the management of Walter Schmidt. The ten-stamp mill never stops unless something breaks, which is not often. The mine will supply 20-stamps, and I think the company is making a great mistake in not having that number set up.

The Rosekranz mine, being the first southern extension of the Taylor, has commenced operations, under the management of N. D. Burlingham, and from the present prospects will rival the Taylor.

The Garden Valley mine, also under the management of Mr. Burlingham, has reached a depth of 80 feet, the ledge being well defined and prospecting "way up," as the miners express it.

The Mansfield mine is looking well, I have been informed, and there is a rumor afloat that this mine has been sold to an English company.

INYO.

ROSE SPRINGS DISTRICT.—Panamint News, April 13: A short time ago a party consisting

of E. A. Culver, Prof. Chas. G. Meyer and P. A. Craigie, made a visit to Rose springs district, some twenty miles north from this camp, in the Panamint range. Following are the assays obtained by Prof. Meyer from ore selected by the party, from eight different ledges, and we doubt if a better showing has ever been made by any district on the Pacific coast: Star of the West, No. 1, \$845.13; Lanzi, \$889.11; Polar Star, \$1,405.33; Maria, \$216.77; Star of the West, No. 2, \$1,099.61; Garibaldi, \$348.73; North Star, 1,363.23; Star of the West, No. 3, \$1,189.13. Total, \$7,357.04. Average per ton, \$919.63. The above assays for the Garibaldi are not up to the usual average of those heretofore made. The ore from that mine has generally assayed from \$628 to \$1,600 per ton. Assays have also been had from the North Star as high as \$1,700. The certificate of the assays by Prof. Meyer had attached thereto (by ceiling wax) the "buttons," and this we believe has been sent down to parties at San Francisco. If any other of a like number of claims in one district can beat this showing, we should like very much to hear of it.

OUR ORES.—For a long time we have been satisfied that our mines were producing a better class of ore than many gave them credit for. The concentrators, which have been pretty thoroughly tested, have demonstrated this fact. Instead of finding so large a percent of copper and other mineral denominated "base," it is shown that there is a much greater amount of chlorides than was supposed in those ores which were not put down in the list of free milling, and they are of so high grade that it is believed that a resort to roasting and finally making the silver bullion right here will prove more profitable than shipping the concentrations to Swansea. In the absence of chlorides concentration does well enough, perhaps, but there is so little specific gravity as between the chlorides and gangue, it is almost impossible to save the chlorides, the richest part of the ore. By preparing the ore in a roasting furnace the chlorides are saved by amalgamation, and where there is so little percent of copper and other base metals, it will be found more profitable to destroy them entirely. We have some ores carrying very little chlorides and with these the concentrating process may be adopted. At any rate we are very glad the company have determined upon the introduction of the Stetefeldt, as the shipments or bullion will advertise our mines to a degree beyond anything else that can be devised.

DARWIN DISTRICT ITEMS.—Inyo Independent, April 17: The latest mining news from Darwin is of the most encouraging character. We are assured by two or three friends that so far as they know, not a mine upon which work is being done (and there are a large number), but is developing splendidly. The Capital, belonging to the Brown Brothers, Baxter, Bell and White, has turned out to be a magnificent mine. This is a tremendous ledge. With respect to the Defiance and Grand, cutting across between the two, and easily traceable from the summit of the hill many hundred feet in either direction. The main shaft is down 85 ft, and the others at different points 10 ft each, and every one in splendid ore, running as high as \$600 per ton. Drifts from the bottom of the main shaft show a deposit of this kind of ore not less than 30 feet in width. The developments in the New York are exceedingly flattering. Some Mexicans are erecting a small furnace on a mine near the Promontorio and will soon have it in operation. The Christmas Gift furnace men and machinery, we believe, are expected at Darwin now in a few days.

NEVADA.

KENTUCKY.—Foothill Tidings, April 17: Kentucky is getting to be the favorite stock for investment among those best posted on Grass Valley mines. The location of the mine, closely contiguous to the Idaho and Eureka, and the now patent fact that the works will soon be started and the shaft be put down to the 400-ft level without delay, leads miners and others here whose memories run back to the time when Idaho stock could have been bought for from \$5 to \$20 a share—only a few months before the big strike which sent it up to \$250—to desire a few shares, and we hear of sales recently made at from four to five times the price of the same stock two months ago.

PLACER.

NICK FINN.—Placer Herald, April 17: All the big chunks of gold are not found yet. Only a few days ago Ben Hawkins, of Ophir, picked up a nugget in a ravine below the old St. Patrick mine, that weighed three ounces and three-quarters of a pennyweight, or \$48.60 at \$16 per ounce. It is true these large chunks of the root of evil are not lying around on the surface as thick as they were twenty five years ago, but evidently there are enough left yet to warrant a person in keeping his eyes open. Next.

PLUMAS.

THE BIG CHUNK.—Plumas National, April 17: We heard a story, the other day, which gives a color of truth to the report of the finding of the two pieces of gold at French Ravine, but the first story is not altogether right. It seems that an old Frenchman who goes by the name of Henry found a piece of quartz and gold at the mouth of French Ravine. He kept still about it, only showing it to one or two, and one of the men who saw it gave it as his opinion that it was worth eight or ten thousand dollars. Several very large pieces have been found in French Ravine, and it is quite probable that this story is true.

GREENVILLE MINING NOTES.—Bachelor shipped \$3,000 for sixteen days' run of the

Kettle mill—twelve stamps. His ledge is over 20 ft wide and improving in richness as the workmen go down. Henry O'Toole is working a full crew of men, and his ledge is turning out first-rate rock. Tanner & Wiles are crushing rock from the old Correlles ledge, which is paying splendidly. The Green Mountain is making good its usual reputation for being one of the best paying mines in the county. The Union company has commenced drifting, with a first-rate prospect. The Baker mine is being worked by a full crew, and is yielding some good rock. The Indian Valley mine is full of men, who are driving ahead briskly under the new administration of Whitlock & Hall. The Greenville mines are decidedly "on the come up," and a brisk season is looked for.

SAN DIEGO.

JAMUL RANCH MINES.—San Diego World, April 17: On the Jamul ranch, a short distance from San Diego, Henry Burton discovered a lead of galena-bearing quartz, which assays \$24 per ton; that the ore of the Jamul mine assays \$44, in gold and silver, per ton; and another ledge has given assays of \$59.85, in silver and gold, per ton. All these mines are on the Jamul ranch, but in different localities. The owner of the ranch is confident of the richness of these ledges, and is anxious to have a company of reliable men take hold of them for the purpose of development, and is willing to give the most favorable terms.

SAN BENITO.

SAN BENITO MINES.—Hollister Enterprise, April 10: This is the name of the quicksilver mines on the headwaters of the San Benito, owned by Messrs. Cody, Tully and others. The mines have been prospected to the amount of several thousand dollars, with the most satisfactory results. Some two years since these mines were sold conditionally to an English company, but after long delays, and failing to meet their obligations, they reverted back to the parties now in possession, who commenced their immediate development. A furnace has been erected, tunnels run, shafts sunk, and everything about the premises indicate business of the most encouraging nature. An abundance of ore of the finest quality being taken out, and we are assured that in a very short time they will be shipping via Hollister to San Francisco, large quantities of bottled quicksilver. Other rich discoveries of cinabar have been made in that locality recently—Sheriff Ross and others being the fortunate locators. It is safe to predict that ere long San Benito will rank the foremost county in the State for the production of quicksilver.

SIERRA.

LOCATIONS.—Mountain Messenger, April 17: The Oro G. M. company has located the waters of the South Fork of the Yuba for mining purposes; head-dam to be between the County Hospital and S. Wood's residence.

J. A. Kluemper, et al, have located 600 feet of mining ground at Fir Cap, commencing on the line of the Fir Cap company's claims.

H. Desrosiers, et al, for the Iowa M. company, have located all the water that flows from their drain tunnel, for mining purposes.

E. Stone, et al, have located a lot of mining ground near Galloway ranch, 2,798x933 feet.

G. W. Perkins, et al, have located the mining ground formerly known as the Dutch mining claims, at Forest City.

Lightfoot company, —James Dunphy, et al, have located ten claims of 100 feet each in Hardscrabble mining district, commencing at the S E corner of Summit company.

Enterprise company, —S. M. Boyce, et al, have located ten claims of 100 feet each in Fair Play mining district, commencing at McMurray & Co.'s N E line.

Honest Miner company, —E. A. Parlin, et al, have located ten claims of 100 feet each, fronting on Fair Play Ravine, adjoining Boyce Bros' claim.

Summit company, —W. E. Atkinson, et al, have located nine claims of 100 feet each, in Hardscrabble mining district, beginning at the N E corner of Last Chance claim.

Owen Owens, et al, have located 3,750 feet of a ravine between Centerville and Topphackin Flat, to be known as the Swansea Ravine, for a tailing claim.

D. H. Cowden, et al, have located the bed of the South Fork of the Yuba for mining purposes, commencing at a point immediately South of Seitz's house and running down the river to a point where M. Mead's water pipe crosses the stream.

Lewis Hill, —Jack Wolf, et al, have located a mining claim 800x3812 feet on the ridge west of Eureka.

Summit company, —W. B. Rnsell, et al, have located a mining claim on the flat between Howland Flat and Cold Canon. The ground was supposed to belong to T. McFarland, et al, they having bought it at Sheriff's sale, but the recent locators claim that it was subject to relocation.

SOLD OUT.—Mr. Williams has sold his interest in the Exchange mining claim, located at Monte Cristo, to P. Thatcher, rumor says for \$6,000. This claim has been paying steadily from ten to fifteen dollars per day to the hand for a long time. This ground was supposed to be worked out twenty years ago and abandoned, we believe. The new company went back into the hill where the wisecrack said there was nothing but bedrock, and found a very rich blue gravel lead. Three other companies are running for the same channel, one being composed of John Zimmerman, David Kime and others, another of F. Eschbacher, Tom Pritchard, et al, and the other is the Swallow company. The first has been taking pay for

several weeks, but the others are not yet in. If prospects indicate anything, Monte Cristo will be a lively camp in a year from now. On the Excelsior side Jim. Patterson is pushing his tunnel ahead to strike the same lead, which he will undoubtedly do. The ridge under which this channel lies is heavily capped with what miners call lava, and the theory which prevails with many, that this lava came up from the interior of the earth immediately under where it now lies, has had a tendency to prevent prospecting. It is now getting to be pretty well known that where you find a ridge capped with lava and cement, a channel may reasonably be looked for under it.

TRINITY.

HOW THE MINES PAY.—Trinity Journal, April 17: We have always held that the gravel deposit of Trinity county are not excelled in richness by those of any other section. Two causes have operated toward placing the product of our mines below, we may say far below, what it would be under more favorable circumstances. The first of these causes, and the easier removed, has been the absence, in years past, of improved mining machinery, appurtenances for the removal of gravel at a low cost and apparatuses for the saving of a larger percentage of the gold contained in that gravel. This drawback has been removed in a great measure, during the past few years, by the introduction of larger iron pipe, Little Giant and other improved nozzles, undercurrents and a more liberal use of quicksilver. In fact our mines are now in excellent condition, and were it not for the extreme scarcity of water would this year have made a noble showing. But scarcity of water is what's the matter; under existing circumstances we are at the mercy of the seasons and the past season has been unmerciful. Our miners are idle; our improved machinery and gold-saving appliances lie unused; our hidden treasures remain buried beneath immense banks of gravel. But that these treasures exist is proven by even the small amount of work done this season. The Weaverville Ditch and Hydraulic mining company, with only sixteen days water, have taken out \$3,100 in the Ward mine on the Oregon Gulch mountain. Trotter & Smiley, at Douglas City, have cleaned up \$4,000 for eighteen days run. These tangible results show that our mines pay handsomely. But even at this rate, two or three week's work during an entire season will scarcely justify the fitting up of new claims. What we require is water, more water, and above all certain water. The caprice of a season is no longer to be depended upon. Ditches must be constructed from our larger water courses to the mines. When such enterprises are entered upon and completed the prosperity of the county will be secure.

TUOLUMNE.

ARASTRAVILLE MINING ITEMS.—Tuolumne Independent, April 10: Frank Prudhomme has found a vein of quartz at Mt. Salter, on this side of the Tuolumne, towards Summerville. Our informant says "it prospects awfully!"

Mr. Easton has enlarged his tunnel and intends putting on a whim for the purpose of sinking.

H. B. Fowlee and Sam. Smith have just started in on their "new find." This vein is about 500 ft from the Hill & Wilson, and running nearly parallel.

G. C. Grey & Co. are opening a good vein half a mile east of Arasterville. They have ran a drift in on the vein and have taken out twelve tons of rock, which, after being run through an arastra, yielded eleven and a half ounces of gold—nearly an ounce to the ton. They are going to sink a shaft in the tunnel, on the chute, which improves as it goes down. Specimens of this rock before us is grayish red, mixed with sulphurets and showing free gold plentifully.

Some Italians, who have been working in a gulch, a short distance from Frank Prudhomme's cabin, washed up last week about twenty ounces of the prettiest kind of gold. From all accounts this is a favorable section for prospectors.

Nevada.

WASHOE DISTRICT.

CONSOLIDATED VIRGINIA.—Gold Hill News, April 15: Daily yield, 450 tons of ore. The ore stops on the 1500-ft are all looking well and yielding the usual amount of rich ore, as are also the stops on the 1400 and 1300-ft levels. The C & C shaft is sunk to a depth of 366 feet, the bottom in good working ground. A new and powerful double cylinder donkey engine is on the ground ready to take the place of the smaller one now in use. The old engine will be used to hoist the dirt from the deep pits that are being excavated for the reception of the huge stone foundations for the hoisting and pumping machinery. The pit for the foundation of the pumping engine is 16 feet in width by 67 feet in length, and will be 27 feet in depth.

CALIFORNIA.—Cross-cut No. 2 on the 1500-ft level is in a distance of 273 feet, the face in low grade ore. Cross-cut No. 3 is in a distance of 251 feet, the face still in rich ore. Cross-cut No. 4 is in 132 feet, the face in low grade ore. Cross-cut No. 5 is in a distance of 54 feet, the face in fine ore. The north drift in the ore vein is still being rapidly driven ahead to connect with the cross-cut No. 4, the face of the drift still in rich ore. The main north drift, or enlarged air gallery, on this level is being steadily pushed toward the Ophir line. No work is being done on the 1550-ft level at present. The joint east drift on the 1400-ft level is being continued across the

eastern portion of the ore vein. This winze on this level being sunk to connect with the 1500-ft level is down 55 feet, the bottom still in ore of a fair quality. The south drift from cross-cut No. 3 to connect with cross-cut No. 2 on the 1400-level has advanced 18 feet during the week, this fact in ore of a fair quality. The joint east drift on this 1300-ft level has been advanced at this rate of $3\frac{1}{2}$ ft per day during the week, the face still in clay quartz and porphyry mixed.

OPHIR.—There is little or no change whatever in the looks of the ore breasts, the daily yield, or the quantity of the ore produced. The north cross-cut at the bottom of the north winze on the 1600-ft level is now in a distance of 130 ft, the face still in fine ore. Five east cross-cuts have been started on this 1700 ft level. The first of these cross-cuts is nearly on the line of the Ophir and California; the second 100 feet further north, and each succeeding cross-cut 100 feet north of the other. These cross-cuts have been pushed out a distance of 40 ft each, and when everything is in complete readiness, it is the intention to drive them all ahead at once, thus cross-cutting the entire ore vein on that level at one and the same time, and prospect it in the most thorough manner possible.

CALEDONIA.—The new shaft is now down 85 ft. The excavation of the pits for the reception of the foundations for the new machinery is making rapid progress, as is also the erection of the double cylinder donkey engine to be used for sinking the shaft until the erection of the other engines is completed. Sinking the incline at the old works is making good progress. Several car loads of the new machinery arrived during the week, and the remainder is expected daily, until the whole is on the ground.

BELCHER.—Sinking the main incline is making steady progress. The south winze is now down to the 1500-ft level, and a drift has been started south to connect with the main north drift from the incline. The bottom of the south, middle and north winzes are all in fair ore. The face of the south drift on the 1500-ft level is still in quartz and porphyry, mixed with clay and small streaks of ore. The timbering of the new air shaft below the 800-ft level is rapidly approaching completion. Daily yield 450 tons, keeping the mills all steadily running.

JULIA.—Sinking the main shaft is progressing $2\frac{1}{2}$ ft per day. The new air compressor is in place ready to start into full operation. The Burleigh drift for the shaft will also be in readiness for operation in a day or two more. The shaft is now down 1266 ft, or 266 ft below the 1000-ft level.

SAVAGE.—The water tanks at the 2200-ft station are about completed. Enlarging the main drifts, retimbering, and the laying of the car tracks on the 2200-ft level is rapidly approaching completion. Driving the north drift on the 2200-ft level is making the usual good headway.

CHOLLAR-POTOSI.—Daily yield, 40 tons of ore, the assay value of which is \$30 per ton. This ore is taken from ore stopes and breasts in the old upper workings of the mine.

SENATOR.—The southeast cross-cut still continues in the ore vein, not having yet reached the hanging wall. The cross-cut has developed 17 ft of ledge, which appears at this point to be considerably disturbed or broken up.

HALE & NORRIS.—The north drift on the 2100-ft level is now in a distance of 310 ft and is still driven rapidly ahead to connect with the Savage on the same level. The face of the drift is still in a mixture of clay, quartz and porphyry.

GLOBE CONSOLIDATED.—A drift north has been started at the 250-ft level station, on the vein of quartz encountered at that point while sinking the shaft. This vein, where it was struck, was about $2\frac{1}{2}$ ft in width. It is gradually widening as the drift progresses, and now begins to look as though it would yet form a body of pay ore.

CROWN POINT.—Daily yield 500 tons of ore from the old upper levels. The prospecting operations on the 1600-ft level are still vigorously prosecuted with no new developments to report. The opening of the 1700-ft station is completed and a drift started to out and prospect the ledge at that point.

LEO.—Making steady progress with the work of prospecting the tunnel level. Material in face of main tunnel continues of a favorable character.

MOORE & MORGAN.—Some very good looking ore, assaying well in both silver and gold, has been found during the week in cross-cutting at or near the surface.

UTAH.—Laying the heavy stone foundations for the new and powerful pumping machinery, is making rapid progress.

WOODVILLE.—All work in the old mine is stopped for the present, and all the force that can be worked to advantage is now being employed in sinking the new shaft.

SILVER HILL.—The erection of the new pumping machinery is making as rapid progress as is possible, considering the nature of the work.

LADY BRYAN.—Sinking the south winze below the 80-ft level is making good progress, the bottom still in ore. The main west cross-cut on the 250-ft level has cut a fine body of white metal bearing quartz.

JUSTICE.—The sinking of the main incline below the 800-ft level and also the main drift south at that level, makes good progress.

NORTH CONSOLIDATED VIRGINIA.—The shaft is down 140 ft, the bottom in vein material,

carrying a considerable proportion of quartz of a fine character, which gives low assays in gold and silver.

BULLION.—The ledge developments south on the 800-ft level still continue to look very favorable for this development of ore.

NACARA.—The ledge in this shaft is looking well, the ore being of an excellent quality. The new hoisting machinery will be set up and put in operation as soon as it arrives.

BALTIMORE.—The new pumping engine has been started up and works with the utmost perfection. The work of putting in the pump rods and connecting the same with pump bob is making steady progress.

SOUTH COMSTOCK.—More and better looking streaks of quartz, clay and other vein material are coming in at the bottom, indicating near proximity to the ledge.

MINT.—The shaft is down 617 ft, the bottom in ledge matter of a very favorable character. Strong hopes are entertained of the development of a good body of ore.

MEXICAN.—The cross-cutting drifts to the eastward, on the 1465-ft level, are showing an improvement, and great faith is entertained of finding pay ore on that level.

KOSUTH.—Driving the prospecting drifts on the 350-ft level is making rapid progress, with somewhat more favorable prospects of an ore development.

OVERMAN.—Portions of the new pumping machinery are arriving at the mine almost daily, and the work of putting it in and getting ready to drain the water from the lower levels is being pushed ahead with all the energy possible.

ROCK ISLAND.—The new station at the 450-ft level is about completed, ready to start a drift to cut and prospect the ore vein at that point.

CORNUCOPIA DISTRICT.

MINING OPERATIONS.—Cor. *Elko Independent*, April 20: The Hussey has a tunnel in sixty feet, sinking shafts from the ends of the tunnel and the cross-cut drifting south. They are down eighty-one feet, working most of the way in ledge matter, and have taken out some horn-silver. Indications are good. Chloride No. 1, north of the Leopard, has a shaft and open cut down about forty-five feet through a ledge of very fine ore, milling over \$600 per ton. Has "pinched," but developments elsewhere indicate that our mines are not on the surface, and I understand that work in this mine will be resumed in a short time. Good results may be expected. The Black Diamond, under the direction of our enterprising townsman, A. D. Meacham, has a tunnel in over ninety feet, working in very good ore and showing a ledge one and a-half and two feet wide, which looks promising. The Constitution and Morning Star Consolidated, wards of the Leopard, have turned out some first-class ore, and rich developments are looked for. The Leopard is "O. K." and as safe as the Bank of California. The Rambling Sailor and other mines and locations in this vicinity too numerous to mention at present, are all claimed to be good and begin to loom into prominence. Business in Cornucopia is getting brisk, and a lively time is expected this spring and summer.

TYBO DISTRICT.

NEW HOISTING WORKS.—On the 14th instant the citizens of Tybo assembled at the Hudson shaft of the 2-G mine, for the inauguration of the new hoisting works, which were on that day set in motion and now give entire satisfaction. Toasts were drunk and speeches made by many of the townsmen to the success of the Tybo Consolidated company. The shaft will soon be sunk the required depth to drive a tunnel to the lower levels. It is estimated that at a depth of 700 feet the ledge will be struck. The furnace of the company is now being re-lined and put in thorough repair. Work on the twenty-stamp mill is progressing, and the clatter of the crushers will be heard in a few weeks. The mines at Reveille are showing good ore. Rich pockets are being found almost daily. Gila stock is selling well. Most of the people here have a little on hand and some are increasing their amount. The Gila mill will be running again on the 22d instant at its full capacity. The future of the Tybo is to all appearances a prosperous one. Underground explorations develop immense bodies of rich ore. Tybo promises to be a lively camp this summer.

JEFFERSON MINES.

NEW DEVELOPMENT.—Cor. *Belmont Courier*, April 14: In this time of drought in the way of mining news, I am happy to be able to report a new development of very rich ore in the Prussian South mine (Jefferson company). The company has been stopping for some time past between the 220 and 140-ft levels, taking out large quantities of very rich ore, from which the mill has been supplied and from which the large shipments of bullion have been made. This vein, or streak of rich ore, when first struck three days ago, was about twelve inches thick, but has become, as progress has been made in the stope, nearly three feet in thickness. And from samples of ore which I have seen, and from what I am creditably informed it assays, will mill several thousand dollars per ton, causing the whole ledge, as taken out, to yield between \$300 and \$400 per ton, without any sorting. The character of the ore is chloride and horn-silver. The prospects elsewhere through the mine are of a most cheering character, both for the stockholders and for the camp.

WINNEMUCCA MOUNTAIN MINES.

WORK AT THE MINES.—Humboldt Register, April 9: In company with our Deputy County

Coroner, Melarkey, we made a flying visit a few days since to the mines in Winnemucca mountain. We were surprised to find so many miners at work, and the vast amount of substantial work which has been done since our last visit to the "diggings" about a year ago. The Humboldt mill and mining company are working 15 men in the Pride of the Mountain mine, and are stopping ore from three different places in the mines, besides sinking and drifting in various directions for the purpose of exploring the mine. They are now getting ore in sufficient quantities to keep the mill constantly running. Al Boyer and Dick Merritt are at work on the first location south, known as the Winnemucca Chief, and are taking out some excellent ore. Last Monday they struck what they believe to be the main ledge, some 60 ft west of the old works. The ledge at this place crops out boldly, and so far as developed appears to be quite regular, containing a strata of pay ore about fifteen inches thick, which assays from one to three hundred dollars per ton.

The Champion, which for several months has been regarded as the mine of the district, is now lying idle. One-third of this mine was owned by the late J. A. Alganer, and at his death all work on the mine stopped until an administrator shall have been appointed to settle up the estate, when work will be resumed. The hills are full of busy prospectors, and we predict that before the summer is over some rich developments will be made in Winnemucca mountain.

WHITE PINE & ROBINSON DISTRICTS.

MILL BURNED.—White Pine News, April 17: The Watson company's 10-stamp mill, at Mineral City, Robinson District, was entirely destroyed by fire last Monday morning. The mill had been lying idle some two weeks, and no fires had been seen about the building during that time. Sunday night at 12 o'clock, the watchman, Mr. Woodman, went to the mill and found everything all right, and then retired for the night. A little later the Canton company's furnace whistle commenced blowing, and from the length of time it continued, startled the inmates of that quiet town from their beds. After the alarm was given, the first man at the mill was Mr. Woodman, and he states that the mill was then on fire in three different places. He did all in his power to put out the fires with a few buckets of water, but his efforts were fruitless, and in fifteen or twenty minutes the building was burned down. We are informed that the building was insured for a small amount. At the present time there is no one suspicious of this great crime.

The burning of this mill is a most unfortunate affair for the people of Mineral City, for nearly all were more or less interested in its success, and it has thrown a large number of persons out of employment. An agreement had just been made by the Watson company to work 700 tons of ore for two different companies in Ward District, which will be a serious detriment to that new and flourishing district.

Montana.

MINING SEASON.—New Northwest, April 10: The mining season is going to be a little late. The break-up seems now to have commenced, but usually heretofore in some localities mining has commenced within a week of this time, the regular "opening day" of the Pioneer company being about the 1st of April. This year, however, the snow still lies deep there. It has been going off the valley rapidly the past day or two. In '67 there were twenty inches of solid, average snow in this vicinity; on 28 out of 31 nights in March the thermometer was below zero, and he first night it did not freeze was on the 14th of April. We can beat that in '75.

Oregon.

SAM'S VALLEY.—Cor. *Jacksonville Times*, April 10: Prospecting and locating claims are yet the order of the day in this vicinity. The field of operation seems to have drifted from the north side of Evans creek to the south. Neither homesteads or entered lands escape the scrutiny of these experts. This mineral has been discovered on several homesteads and also pieces of entered land, which has given occasion for the exchanging of some pretty rough compliments between parties, of such a nature as to give offense to most any one but the good humored prospector, who seems to have more interest in the steady application of the pick than the multiplication of idle words.

Washington Territory.

QUARTZ DISCOVERIES.—Walla Walla Union, April 10: On Thursday we were shown some gold taken from a piece of quartz picked up by S. M. Wait's son, within ten miles of Dayton. The rock was beaten up by Mr. A. H. Reynolds, and there can be no doubt of the richness of the rock, but as yet the ledge from which it was taken has not been discovered. The people of Dayton think they have a "bonanza" somewhere near their town, and if a ledge of such quality as the specimen referred to can be found, it will certainly make the finder rich. We also hear of finding rich float quartz in the neighborhood of Whetstone Hollow, but can give no particulars. It has long been believed that gold-bearing quartz existed in the Blue Mountains on the headwaters of the Touchet and other streams in that direction, and many years ago the Rev. Spalding, who first visited this valley nearly forty years since, was shown rich gold-bearing quartz which the Indians had found in that section. Mr. S. always believed that there were rich mines there.

New Zealand.

ENS. PRESS:—In my former letters I have referred more particularly to the two principal Australian colonies—Victoria and New South Wales—partly because they are the most important, and partly because I am more familiar with them than with the others. I would like to say a few words, however, concerning New Zealand. This colony consists of three islands in a line with each other, and situated about five or six days steaming from either Sydney or Melbourne. Two only of these islands are of any considerable size, and one of them is largely inhabited by the aboriginal natives, called Maories. These natives are a fine, intelligent and warlike race, giving a considerable amount of anxiety and trouble to their white neighbors, but nevertheless slowly dying out. The southern island is comparatively free from them. Of the colony itself, it may be said to be the Great Britain of the southern hemisphere so far as its physical features are concerned and the enormous amount of public debt it has contracted.

The country is said to be very hilly, and abounding in minerals of every description, but too often they are found in altogether inaccessible places, so that for the present a great deal of its wealth lies buried for future generations. The climate is colder and wetter than on the Australian continent, but the people seem to enjoy it, for as a rule they are stouter and ruddier than those of the other colonies. For some time past and for some time to come, at least, there will be pretty general prosperity, by reason of the expenditures of the vast sums of money recently borrowed by their Chief Secretary, Mr. Julius Vogel, and which is being used on public works and in introducing emigrants in large numbers. Whether the prosperity will continue when all the borrowed money has been expended is a problem yet to be solved; but at all events it is, I think, pretty certain that if the new colonists go to work with a will, and especially if they condescend to let their brains guide their work, they will find ample scope for profitably employing all their energies.

From the statistics I sent you some time since you will discover that pastoral pursuits are not so actively engaged in here as in New South Wales, the agricultural interest holding a higher position here than in that colony, whilst the great seaboard offers facilities for the formation of small settlements which are not afforded by the other colonies, and the consequence is that the coast is dotted with villages, which will doubtless develop in due time into important commercial cities. Altogether, there is a bright and promising prospect for this place.

I notice that another American invention is about to be introduced here, a gentleman named Ephraim Chaquette having applied for letters patent for a machine for holding, turning, and shearing sheep. It is to be hoped, however, that he will not stop short with obtaining his patent, but that he will send some of his machines here with a competent man to work them. I make this remark because I notice that when you make inquiries as to where most of the machines patented here by English and American inventors are to be seen, what is their price and capabilities, you can get scarcely any information whatever; and on the other hand I have seen good, useful machines declared worthless simply because the person temporarily in charge knew nothing about them or how they should be worked.

Another invention, entitled "a new apparatus for tying knots," and which I understand is to be used principally for the purpose of tying the string or cord around sheaves, has been brought on the tapis since my last. Its construction is a secret at present, but that it will tie the two ends of the string into a firm knot, close to the sheaf, I can personally vouch for, as I have seen it do it.

One of the most noticeable items of information during the month has been of a very painful character, one of our best intercolonial steamers, the *Gothenburg*, 500 tons register, having been caught in a cyclone during her passage from what is known as the "Northern Territory" (of South Australia) to the Southern colonies, and driven on a reef. Of a total of nearly 110 souls only twenty-nine have been saved.

E. W.

Melbourne, March 9, 1875.

[The machine for holding, turning and shearing sheep was patented in this country through the MINING AND SCIENTIFIC PRESS Patent Agency. The Australian patents have been applied for also through this agency. Mr. Chaquette has constructed a full-sized working machine, and his tests of it have been so satisfactory that he is now making several others. A joint stock company has been organized to exploit this invention, both in the United States and Australia. Our Australian friends will in all probability be supplied with these machines at no distant day. We notice that the invention has been considered of sufficient importance to warrant an unsolicited description and illustration in *Harper's Weekly*. As soon as the inventor has completed his arrangements we will give an extended description, and possibly an illustration of this machine.—Ens. Press.]

Continued from Page 266.

it. It is put down in the Australian books as being teredo-proof. If that is so, if the piles put down in our harbor here are subject to injury from teredos, certainly one of the very first things our people ought to do would be to send over there and get some of this *Syncecarpa*. This book gives its location as exactly this same as for almost all of these eucalypts.

Myrtis communis is a myrtle tree; a small sized tree, growing in Western Asia, of some importance for its timber. It may be said to be of local value. This tree is of more importance, because it gives the name to the group. Many other species are of some value, but they are not yet utilized in commerce. Now, a word as to this myrtle. We have a little bit of a plant here which we call myrtle, a little trailing plant, and we are apt to get our idea of this order from that. In fact, I have seen some quite well-informed people who thought the little trailing plant belonged to this order. This myrtle belongs to an entirely different group, hasn't any relation to it. The "trailing myrtle" belongs to the dogbane family; its proper name is "periwinkle."

Among food plants—guavas, Malay apples, rose apples and a few others are highly prized fruits of moderate-sized trees in the hotter climates of both hemispheres. One of them—a small apple—is very delicious. We get them here only occasionally as preserves. They are never brought, I think, as green fruits.

The Aromatic Fruits.

Among these we have as the most important, the clove tree (Fig. 2), *Caryophyllus aromaticus*, a native of the Molucca islands, now cultivated in India, Ceylon, West Indies, etc. It is a moderate-sized evergreen tree, and the clove is simply the flower before it opens. You can take a clove, after soaking it in water, and by carefully opening it, see the stamens and pistils; all this parts of the flower are then very nicely shown. They are simply gathered just before they open and are dried.

Allspice is this fruit of a little tree very closely allied to real myrtle; it belongs to the species *Eugenia Pimento*, of the West Indies; now cultivated in the East Indies and countries having the same climate. In fact, some of the trees that are brought here and grown upon grounds as ornaments have a peppery or allspice-like taste, and so get this name allspice tree. The fruits are berry-like—little hard berries, and these are gathered and dried, and are the allspice.

Among the medicine products, we obtain an oil from the myrtle, that is, from the myrtle tree, *Myrtis communis*, which is somewhat valuable, and is used considerably in medicine. The pomegranate, *Punica granatum*—and this is the genuine pomegranate—is a small tree of India and Western Asia, cultivated in Southern Europe. The flowers are usually scarlet, and yield a red dye. The fruit is greatly valued in warm countries. The pulp of this is used in the manufacture of cooling drinks, so, of course, is of some value in the treatment of sick people. The rind is quite astringent, and is used in medicine and (especially that of the bitter kind) contains tannin, used for tanning the finer kinds of leather. That used in tanning morocco is largely derived from the pomegranate. The bark and roots of the pomegranate tree are also used in medicine, and are of some value, as they possess astringent properties. The fruit has a tough, leathery rind, of a beautiful deep golden color, tinged with red.

The pomegranates we have here is an ally of this squash. The name is given, I think, because of a slight resemblance in the fruit. It is not the true pomegranate at all, referred to in oriental literature, as you will find by reading carefully in these books that refer to it.

The eucalyptus is valuable for medicine, I am informed. I have been told some very strange things about it. I heard a statement that in China people living in eucalyptus groves were healthy, while others, living in places just the same, but out of the groves, were troubled with all sorts of fevers and similar diseases. [Student—"An Englishman who has been to Australia tells me the people have fevers there right amongst these trees, the same as where there are none at all."] I think it needs a great deal more investigation. The fact is, we find very few if any plants which exert a very marked influence on the atmosphere.

All these stories about plants so poisonous that birds can not fly over them

Will Not Do to Rely Upon.

When we become acquainted with the plant we find it is not so noxious as was represented. On the other hand we find that those which are so exceedingly valuable, filling the air with perfume and all that—we find these stories have to be taken with a great deal of allowance. Although a great deal of valuable matter has been written up here on this coast referring to the eucalyptus, and I have no doubt that from the tree—from this aromatic principle it contains in such abundance—we can obtain a great deal of material which will be more or less valuable, yet it will have to be worked up. There may be a very valuable substance in this tree, as quinine, or that from which it is manufactured, is in the *Cinchona*. The myrtles are ornamental and are grown largely on that account. The eucalyptus is also grown, as it is here, and several species of *Eugenia*; in fact you hardly go into a greenhouse but that you will find them, and here there are more or less of them growing out of doors. The second family,

The Rose Family.

Of the order *Rosaceae*, is made up of herbs, shrubs and trees, found mostly in the temperate climates and partly largely in the temperate zone. It includes about a thousand species and these differ so much that they have been thrown into three, and occasionally four sub-orders. I have adopted Dr. Gray's plan and we will notice these as three sub-orders; taking up the topics by themselves.

First, the food plants. I may say the first sub-order, including Almonds, Peaches and Plums, is made up of plants whose fruits are single; that is, they are single stone fruits. There is a poisonous principle running through all the species of this sub-order, which is allied to the chemical compound, prussic acid, having the same odor and, to a certain extent, the same effects. It is considered by some to be identical with this. It resides mostly in the seeds, leaves and stems. Take the seed of the peach or plum and in its green state you will get an appreciable amount of this prussic acid from it.

The almond, *Prunus communis*, is a native of Persia, and with it we are quite familiar. It is grown here in California pretty largely, and I am told by Mr. Starns that it can be grown as far north as the north line of the State, of course excepting this mountain and hill tops.

The peach, *Prunus Persica*, is a native of Persia also, and it is an opinion of native botanists that the almond and the peach are simply varieties of one original form. Compare the pits or stones of the two and you will see they are very much alike, except one being smoother than the other. While we must retain them for conveniences under different names, we consider them as originally the same. This nectarine is only a smooth variety of the peach. There are also a great many sub-varieties.

The apricot seems a little between the peach and the plum. The apricot is cultivated, or can be cultivated largely throughout almost all parts of California and would be a very paying crop.

The plum, *Prunus domestica*, a native of

The perfumes of the group are derived almost all from the roses. There are several hundred species of them. The place which may be considered as the geographical center of the roses is away over in Southern Asia, just south of the Himalaya mountains, in the northern part of Hindostan, upon the little valleys between the points of the mountains that run away out where the valley of Cashmere is. There the whole country seems to be one great rose garden. Attar of roses, oil of roses and a great many other rich things—all have roses' perfumes.

Medicines.

From blackberry root and some others we get some astringent iocidins. [Student—"What is the difference between the oil of roses and the attar of roses?"] There is a little difference in preparation in Japan, though I don't know just what the difference is.

By the way, it is hardly ever pure. The high price is a great temptation to put in all sorts of other materials.

Other plants belong to the genus *Rosa*. The rose, however, may be considered as the principal one. I suppose it must be acknowledged as the ornamental plant of the world. I think there is no question but that it stands at the head of the list.

In the third sub-order, apples and pears, we have what is botanically called a pome for the fruit. This pear, *Pyrus communis*, is a native of Southern Europe and Western Asia, found throughout Syria and the countries lying somewhat eastward of that.

The apple, *P. Malus*, is supposed to have been derived from the wild crab apple of Europe. I am not certain but it is also found in Western Asia. The quince, *Cydonia vulgaris*, is also a native of Western Asia.

Now just take a glance over these fruits. All the more important ones are from our former home,

The Home of our Race.

Away back there in Southwestern Asia. There we got our peach, and as you have seen, the plum, cherry, pear, quince and apple, all came



Fig. 1. Myrtle in Flower.



Fig. 2. Leaves and Flowers of the Clove Tree.

Southern Europe. We grow a great many varieties.

The common cherry, *Prunus Cerasus*, is a native of Southern Europe and a plant which has undergone a great deal of modification so that we hardly know what its original form was. The peach is thought to be a variety of some original; what this original was we hardly know.

The plum is *Prunus domestica*. That is the name we give it now, but then we are just as much at a loss as to its original form as in the case of the peach. You may say very safely when you give it a name, that its name is *Prunus domestica*. We give it a name, but we do not mean by that, that this form is entirely separate, that is, that it is a separate species. It is simply a cultivated form of the wild plum, which has another name in Europe.

The timber of wild cherry is inclined to be of a reddish color and is used largely for interior work and for cabinet work. I think there is no wild cherry on this coast large enough to be used. Of medicines there are few of value. The most important are derived from the wild cherry of the East. All cherry-like trees seem to have in them more or less medicinal properties. Probably it is on account of that poisonous principle; for our poisons furnish us our medicines, largely.

The second sub order may be called the sub-order of roses, etc. In this group, we have an astringent principle running through the whole.

Among the food plants we have a number of berries. The strawberry is one of the best. There are a number of varieties—*Fragaria onca*, *Virginiana elatior* and others. The *Virginiana* seems to be the best of all.

The Raspberries. *Rubus idaeus* is the European form, which is grown here as well as in Europe. *Rubus occidentalis* (black) and *Rubus strigosus* (red). Those two species are our American forms—that is they are the forms to be found east of the Rocky mountains and the one very largely in cultivation throughout the United States, also on this coast. Of blackberries we have *Rubus villosus*, an American form. There are other forms; these, however, will stand as our representative blackberries and raspberries.

from that same region, so that we have been accustomed to know them now we don't know how many ages.

The Pulse family, *Leguminosae*, of which beans and peas are representatives—a very useful order, by the way—is made up of herbs, shrubs and trees, including more than 6,000 species, standing as you see next to the composites in point of numbers.

Food plants: First, the bean, *Phaseolus*. Of this there are several species. *P. vulgaris* is the pole bean of India, also grown here. The Lima bean, *P. lunatus*, instead of being a native of South America, as the name "Lima" would imply, is a native of India, just a little beyond the home of the Arian rose. Peas belong to the genus *Pisum*; species, *sativum*, a native of the old world. There is hardly anywhere a place they will not grow and in some parts of the world they furnish the poorer classes a great amount of food. In India, there is a species under the name of "Chowler." "Soy" is in India, also the pigeon pea. Lentils are grown in Egypt. The peanut is grown in America. This peanut is a little peculiar in that it sends its pods down into the ground, after it has flowered, and there ripens them.

Forage plants: Under this head we have the tares, which are grown largely in Europe, (*Vicia sativa*) and also in the far East; that is, portions of Asia. The tares resemble, to a certain extent, lucerne or alfalfa. I have seen them grown simply as an experiment. Different clovers come under the genus *Trifolium*. The principal one is the red clover of Europe, *T. Pratense*. Another species and white clover, *T. repens*, are also largely grown in Europe. I saw quite a number of other *Trifoliums*. I take it, growing wild about here. A very great addition has been made to clovers, what is called alsike, which probably would grow well here. These are annuals, biennials or perennials according to the climate where they are grown. In the East, people used to have great discussions whether red clover was biennial or perennial. It was finally decided to depend upon conditions of climate. Lucerne, *Medicago sativa*, is grown in Europe, used as a forage plant and also for green manuring. Within a few years it has come around to us here under

this name, alfalfa. I do not know whether we will succeed in introducing it in the East or not. An attempt was made to introduce it under this old name, lucerne, from England. It failed. Now the attempt is made under this name of alfalfa. Whether it will fail or not I do not know; people seem to like the name alfalfa better than they did lucerne, and are trying it.

Timber plants: From your acquaintance with the order you would hardly expect timber plants in it, yet there are many of exceeding importance. First, acacias, which are largely grown here as shrubs, in Australia are large trees. Their wood is of great value. *Acacia melanoxylon* produces a dark colored, almost black wood in parts of Australia, which is considered almost equal to mahogany; it seems to take on a polish just about as well. Red sandal wood is obtained from *Pterocarpus santalinus*, a native of India. This wood is of a red color, very heavy, cross grained, considerably used for very many purposes. Its wood contains a good deal of coloring matter. This is obtained by cutting the wood into small chips and boiling it. Jamaica ebony, which is sometimes called "green ebony," is obtained from *Brya Ebenus*. It is a small tree some thirty feet high, yielding a hard wood of a brownish color and is used quite extensively.

Rosewood, so largely used in the manufacture of furniture, is obtained principally from two trees, *Dalbergia latifolia*, a smallish tree in India and *D. nigra* of Brazil.

This Brazilian is considered to be the best and so the Brazil rosewood is recognized as standing at the head of the list. Takes any piano—the veneering is usually rosewood. Usually only ordinary wood is covered over with a thin shaving. You need not expect to get solid rosewood, on account of its costliness. I have seen a great many piano lids of ordinary whitts pine covered over with rosewood veneering. In some cases the rosewood itself is imitated. [Student—"Is it not generally true that these very heavy woods check and split off when used in large masses?"] This is a great deal the case. It might however be seasoned and prevent this. Another thing, a lumber might be exceedingly valuable but brittle, strong in certain ways, but would not endure the ordinary wear and tear of everyday use.

Mora wood, *Mora excelsa*—and you will find it in this market under the name mora—is a native of tropical America. It is a large tree, growing one hundred and fifty or two hundred feet high, having a very fine dark brown wood, strong and durable. It is said the Mexicans use it for shipbuilding. It is also suitable for cabinet work. Yesterday I was visiting some manufacturing establishments, and found that they were using some of this mora wood. You take it up, it is almost like taking up that amount of iron. It is very full of a very peculiar, resinous material, which seems to give it its weight. In the Eastern States we have locust wood, from a native of Europe grown largely throughout all the United States. Lately, for making wagon hubs in this State, the wood of *Pseud-acacia*, or false acacia, has been used. The honey locust, *Gleditsia triacanthus* and different species, is a large tree in the Eastern United States, growing sometimes to the size of two feet in diameter, has a very heavy, firm wood, used, like the other, for making wagon hubs. The wood of this last has a dark color, not quite as dark as ordinary walnut. Among the medicinal products is liquorice, from a native of Europe. That is, the liquorice roots are gathered and used. Senna is from the far East. The Calabar bean is also from the Eastern continent.

Gums and Balsams.

First, is gum tragacanth, derived from a species of *Astragalus*, growing in Western Asia. Gum Arabic, so largely used for mudlages, is derived from a species of acacia. The Western Asiatic and a Western African species furnish the most of the gum Arabic that we have. Probably, some of these acacias here would furnish a pretty good gum. Gum kino is derived from some Indian trees. Gum copal, used so much in copal varnish, is from trees of Eastern Africa and adjacent countries. There are a number of other gums of more or less value. Balsam Peru, balsam tolu, and a number of others, are from South American trees, so that the order is remarkably full of this kind of products.

Dyes.

The one of the most importance is indigo, derived from a little plant, *Indigofera tinctoria*, found in the East Indies, and from a wild species, *I. anil*, found in the West Indies. It is a little plant, more or less shrubby, and is cut about as we cut clover hay, brought in green, thrown into large vats and a little water turned on. A fermentation takes place. In time the coloring matter turns dark, almost black. After a while the vats are drained and the matter is found at the bottom and our indigo is derived from it. It is, perhaps, the most widely used of any of the dyes we have.

Brazil-wood, used largely as a dye, is from South America, from the *Caesalpinia*. It is chopped up, and the coloring matter is extracted. Logwood, which furnishes one of the best red dyes we have, is also derived in the same way from one of the South American trees—also a number of other dyes of more or less importance.

We have further the use of the lupines here on our coast in fixing the sands of the beach. In a drive over the other side, across to Seal Rocks and the Cliff House the other day, I noticed great tracts had been tied down, as it were, and the heretofore drifting sand was secured by this growth. It was a novel use for these plants and quite peculiar.

USEFUL INFORMATION.

Lace Leather.

A good lace leather, with which to lace three-horse machine belts, as well as for innumerable other purposes, can be manufactured in the following manner: Make a strong infusion of lime water, in which immerse calf or deer skins. They should be taken out and aired every day until the hair can be easily removed. If the skins are dry they must be soaked in water and rubbed until they become as soft as they were when they were taken off the animal. This must be done previous to being put into lime water. After the hair is removed, immerse for a few days in "brau water" (wheat bran); then scrape the skins on both sides until clean, and hang up until partly dry; then oil them on both sides with fish oil (whale oil), and for want of a pair of fulling stocks pound them with a elmb, or a maul, for an hour or two; roll them up and let them lay a couple of hours; oil and pound them again; hang up and air a short time; then repeat the process of oiling and pounding—the longer and oftener the better; after which hang up and dry by the carefully managed heat of a stove. Then stretch and soften them by drawing them over the edge of a shovel; you will then have a "whine leather" that will stop all whining.

A USEFUL TABLE.—The following table, computed from actual experience, will be found very useful in calculating the weight of loads, etc.—or the weight of any of the articles mentioned, in bulk. It shows the weight per cubic foot. All that is necessary, therefore, is to measure the bulk; ascertain the number of cubic feet in it; multiply this by the weight per foot, and divide by 2,000, when you have the weight per ton:

SUBSTANCE.	WEIGHT PER CUBIC FOOT.
Cast Iron.....	450 lbs.
Water.....	62½ "
White Pine, seasoned, about.....	39 "
White Oak ".....	52 "
Loose Earth.....	95 "
Common Soil, compact.....	124 "
Clay about.....	135 "
Clay with stones.....	150 "
Brick.....	125 "

HYGIENIC BOOT SOLES.—Is there any method of making the bottoms of boots so moisture will not pass through them? This is a practical question—several methods have been tried. One is to have a cork layer between the inner and outer sole; but this thickens the boot bottom too much. Another is to cover the bottom of the boot with rubber; but the rubber soles are apt to come off, as they have to be cemented on. Still another way is to have a rubber sole with a leather margin pegged on, and this we think has proved more or less satisfactory; but it is difficult to introduce it. What is needed is that common leather should be so prepared as to be impervious to water. It can be done—who of our hygienists will do it?

HAIR can be turned blonde, or, in other words, killed, by washing in a very weak solution of soda twice a day. We happen to know that two of the leading belles of New York society owe their much-admired golden tresses to this simple recipe. A piece of soda about as big as a small hickory nut to a quart or so of water is the right proportion. Less soda gives the hair a reddish tone. Perhaps this may not be considered strictly useful information? We give it simply as a matter of general interest, but do not advocate any such interference with nature.

IMITATION OF TORTOISE SHELL.—The appearance of tortoise shell may be given to horn by brushing it over with a paste made of two parts of lime, one part of litharge, and a little soap-lye, which is allowed to dry. This is the same as the Indian hair-dye, and acts by forming sulphuret of lead with the sulphur contained in the albumen of the horn, producing dark spots, which contrast with the brighter color of the horn.

A SIMPLE, cheap and efficient protection for steam pipes may be prepared as follows: One hundred pounds of clay are mixed with water, and one hundred pounds of fine ash added and well kneaded, then mixed with one pound of hair. This mixture is well incorporated and allowed to stand until needed to use. Just before using, ten pounds of ground plaster of Paris are mixed with it. The mixture, of course, soon sets, and cannot be kept over twelve hours after the plaster is added.

POWER REQUIRED FOR THE CIRCULAR SAW.—We find the following in an exchange; "A circular saw requires one horse power for every seventy feet of lumber cut per hour. Periphery of the saw should run six thousand feet per minute. A thirty horse power driving a saw of four feet diameter five hundred revolutions per minute, will cut two thousand feet of boards in an hour, when in good order."

CRAYONS FOR DRAWING ON GLASS.—Melt together equal quantities of asphaltum and yellow wax; add lampblack, and pour the mixture into moulds for crayons. The glass should be well wiped with leather, and in drawing be careful not to soil the glass with the fingers. In timing these crayons, the point may easily be rendered very fine.

Fresco painting is so called because executed with water colors upon fresh plaster. This plaster is made of slacked lime and fine sand, and is applied upon a coating rough enough to make it adhere to it. The fresco needs a wall from materials tinctured with saltpetre, and the colors must be such as the lime does not change. When the artist has polished and made very smooth the surface to be painted, he traces upon it the previously prepared composition. The designs, of the size of the picture, are called cartoons, because prepared upon large sheets of paper glued together. Upon the wall the drawing is traced with a point of ivory or wood, or the contour of the drawing is pricked with a pin and a tampoona dipped in charcoal passed along the lines of the holes, which fixes the design on the plaster. Afterward the artist follows the tracing with a sharp pointed pencil or stylus, and the indelible contour is called the nail of the fresco.

A NEW white pigment is, according to the *English Mechanic*, demanded by the exigencies of modern industry. The paint should be as good a coverer as white lead, not easily discolored by the chemical action of gases, and, when mixed with oil, should work easily under the brush. The white pigments in general use are white lead, sulphate of baryta, Spanish white and zinc-white. The latter does not become discolored under the action of sulphuretted gases and sulphur vapors, not because sulphur gases and vapors do not form sulphides of zinc, but because the sulphide of zinc which is formed is, unlike other sulphides, destitute of color. Of course an essential quality of the new pigment must be cheapness.

AMERICAN PHOSPHORUS.—The only phosphorus works in the United States are located on the Rancocas creek, in Burlington county, N. J. At present the establishment is running at one-half its capacity, turning out about seven hundred pounds of phosphorus per week. It is a noteworthy fact that during a suspension of the former proprietors the prices ran up 25 per cent., but now have dropped back to their old figures.

PLANISHED SHEET IRON, said to be superior to the best Russian sheet iron, is said to be turned out by a company recently organized in Pennsylvania. The company has hit upon a very happy device for a trade-mark. It represents the Russian bear lying upon the broad of his back, with an American eagle crouching over and holding him helpless with talons and beak. The idea is spoken of as a very "good hit."

GOOD HEALTH.

MEDICAL LITERATURE.—The medical profession publish, in the United States, over one hundred journals. If one-fourth of this medical literature could be popularized and given to the people, instead of being confined to the profession, more good would be accomplished. Information in relation to sanitary reform, etc., published in the journals of the day, would be more beneficial to the people at large than all the medical journals of the country. We hope to see the time when police records and detailed accounts of crime will give way in our ordinary journals for articles on scientific, educational and industrial subjects.

For cold feet the best remedy is, dip them every night and morning in a basin of cold water, and afterwards rub them dry with a coarse towel. To harden the feet, tannic acid has been used with success. Employ it in the proportion of five grains to a fluid ounce of water. To correct offensive smell of the feet, bathe them in a weak solution of permanganate of potash; one scruple to eight ounces of water. For absorbing excessive perspiration of the feet, mix together several ounces of the carbonate of magnesite, two ounces of powdered calamine of alum, seven ounces of orris root, and half a dram of powdered cloves.

WHAT A MAN CONSUMES.—"Having ascertained the weight of what I could live upon, so as to preserve health and strength," says the Rev. Sydney Smith, "and what I really have lived upon, I found that between the ages of ten and seventy years I had eaten and drunk forty-four horse wagon loads of meat and drink more than would have preserved me in life and health! The value of this mass of nourishment I consider worth seven thousand pounds sterling! So by my voracity I must have starved to death fully a hundred persons; a frightful calculation, but irresistibly true."

REMOVAL OF FOREIGN BODIES FROM THE EAR.—Let the operator take six inches, or as much as he pleases of horse hair, double it into a loop, then having the patient placed on his side, pass the loop into the ear as far as it will go; turn it gently, and at first or second withdrawal the foreign body will come out in the loop. It gives no pain, and cannot do damage.—*Med. and Surg. Journal.*

ELECTRICITY AND DISEASE.—The increasing use of electricity in medical practice is worth notice. It is now applied as a remedy for toothache—a current of electricity being ingeniously applied to the seat of the pain. The instrument employed is delicate and specially contrived for the purpose. Chillsblains, it is said, are also speedily cured if treated by electricity.

How the Brain is Supplied with Blood.

The brain, says the *Herald of Health*, is supplied with blood by four arterial trunks which enter the cranial cavity at no great distance from one another and then unite into the "Circle of Willis," from which are given off the various branches that distribute arterial blood to every part of the brain substance. After traversing this, the blood returns by the veins, greatly altered by its chemical composition, especially as regards the loss of free oxygen, and its replacement by various oxygen compounds of carbon, hydrogen, phosphorus, etc., that have been formed by a process analogous to combustion. Now, if one, two or three of the arterial trunks be tied, the total supply of blood to the brain is diminished, but in virtue of the "Circle of Willis," no part is entirely deprived of blood, and the functional activity of the brain is still maintained. If, however, the fourth artery is compressed so as to prevent the passage of blood there is an immediate and complete suspension of activity, the animal becoming as unconscious as if it had been stunned by a severe blow, but recovering as soon as the blood is again allowed to flow through the artery. In fact a "stunned" state produced by a blow on the head is not directly dependent upon the effect of that blow upon the brain, which may have sustained no perceptible injury whatever, the state of insensibility being due to the paralysis of the heart and suspension of circulation induced by the "shock;" and the like paralysis, with the same result, may be produced by a blow on the epigastrium (acting on the great "solar plexus" of nerves), or some overpowering mental emotion. Again there is a curious affection termed hysterical coma, which consists in the sudden suspension of complete insensibility and the equally sudden and complete return of conscious intelligence without any other indication of brain disorder. The insensibility may come on while the patient is talking, so as to interrupt the utterance of a sentence, and the moment that it passes off the series of words is taken up and completed, without the patient being aware that it has been interrupted. With our present improved knowledge of the action of the vaso-motor system of nerves in producing local contractions of the arteries, and of liability to be influenced by those emotional irregularities in which hysteria essentially consists, we can scarcely doubt that the affection is due to temporary disturbance of this circulation through that agency. Further, if the blood transmitted to the brain, though not deficient in quantity, be deprived in quality by the want of oxygen and the accumulation of carbonic acid, (as in asphyxia), there is gradually increasing torpor of the mental faculties ending in complete insensibility.

The Heroic Treatment.

As an illustration of the power of one poison to counteract another in the human system a recent case in South Bend, Indiana, furnishes a highly important and interesting instance. We give the statement as reported in the *Tribune*, published at that place:

Dr. Harris was called to the relief of a would-be suicide, and administered the successful antidote. The person had taken between forty and fifty grains of opium, and was fast dying. He could no longer swallow, his extremities were cold and had turned black, while his respirations only numbered between six and seven to the minute. This last of itself seemed to indicate that all hope was gone, as anything less than eight respirations had heretofore been known as a sure precursor of death. As a last resort the doctor determined to try what is known as the heroic treatment, and he accordingly, with a hypodermic syringe, injected two-thirds of a drachm of nuxvomica, dissolved in a teaspoonful of water, beneath the skin over the heart, stomach, spine, and on each arm above the elbow, and on the calf of each leg. The quantity of nuxvomica would have been the death of any well man in existence, but in antagonism to the opium it was in this seemingly hopeless case an agent of life, and in fifteen minutes the man was sitting up in bed, conscious, and rapidly recovering.

Another Case of Heroic Treatment

Is told by the Springfield (Mass.) *Republican* of the way B. A. Leonard, a dumb man, residing in Southbridge, recently recovered his voice. He lost it about a year ago, while recovering from an attack of cerebro-spinal meningitis, but a few mornings since he was awakened about four o'clock by a sense of oppression and faintness. He became conscious enough to understand that gas was escaping from a coal stove, and that he would soon die unless he could get to fresh air; so, after many falls andumbles he gained the outside of the door, where he fainted, but was soon aroused by the lapping and tugging of a faithful Newfoundland dog. Then the thought came to him that his wife and child were in the house, and though he had not spoken for months he called loudly for help. His cries, united with the howls the dog set up, soon roused a neighbor, to whom he told his troubles, and again fainted, and was insensible for two hours. On recovering he was unable to talk, but the doctor, on hearing the case, caught an idea, and ordered him to visit the gas house and breathe air in the purifying-room. After spending an hour and a half there he could talk in a whisper, and has since steadily regained the perfect use of his voice.

DOMESTIC ECONOMY.

Snail Eating in France.

A correspondent of the St. Louis *Globe* writes as follows: Some of the dishes of Paris are peculiar. Snails, for example, are greatly relished. You can see them in the windows of the third-rate restaurants, and they may be had at the first-class places, but not generally. Snail-eating is an ancient Roman custom, still practised in Italy. The old Romans regarded the mollusk as a great delicacy, taking unwearied pains to cultivate it. The wealthy epicures had malleries, causing snails to be fattened with boiled spiced barley and aromatic wine. They were imported from Sicily and the Balearic Isles, and commanded a high price.

The snails in the Paris market usually come from the wine-making regions in the vicinity. They are very fond of grape leaves, on which they are found, and sent in quantities to the capital. They are sold wholesale to the Halles Centrales and other markets for from twelve to sixteen sous a hundred, and are retailed for from one to three francs a hundred, according to quality and size. The French often snack them out of the shell, as "Yankees" do oysters; but, generally, they boil them in the shell, and eat them with a batter composed of butter, pepper, salt, herbs and eggs.

There may be—probably there is—something abhorrent to you in swallowing a snail. It is all a matter of education. I once had a feeling of repulsion concerning the little slimy creature, but I have overcome the feeling. The snail greatly resembles the oyster, except that it is terrene instead of marine. If we had never eaten oysters, we should shrink from the idea of eating them, and yet we devour them with the greatest satisfaction, and count persons foolish who have not learned to like them.

There is no more intrinsic reason to recoil from a snail. I remember the first time I swallowed one. It was a year ago in Venice. I had seen the Italians undergo the suction without a shudder—nay, with gusto. I swallowed a snail by a pure effort of will, and with the greatest difficulty prevented myself from imitating Vesuvius. My imagination played me sad tricks for a few minutes. I fancied I could feel it crawling within, that the flavor was disagreeable, that it had nauseated me, etc. I was sure it was a delusion, and so it was. The cause was the novelty of the experience. I swallowed more snails, and discovered that they tasted not unlike shrimps. Once to get rid of the idea of what they were, was to relish them—at least moderately. I prefer them cooked to raw. They are excellently cooked here, and I am confident that every one who enjoys shell-fish would enjoy snails, were he left in ignorance of their name. Persons who want to cultivate their taste in this direction should begin with the mollusks boiled and served with butter.

The Burgundy snail, so called because it is found in the domains of the old province, is the largest and best in this market. It is about two inches long, and might easily be mistaken by the palate for a small oyster.

The police, who always supervise everything here, whatever the change of government, do not neglect the snail market. It is essential they should not. The animal has a partiality for unwholesome and poisonous plants, particularly tobacco and belladonna; devouring them greedily and without ill consequences. Still, if it were eaten in any quantity, after continuous feeding of that sort, its effect on the human stomach could not be healthful, and might be disastrous. The snail, therefore, undergoes inspection. Its activity and rearing must be watched for, and its condition ascertained before it can enter the gates. The mollusk is best after it has fasted for several days, and most appetizing to the stranger, doubtless, after he has also fasted for some time.

OYSTER PIE.—Fifty oysters, two eggs, two teaspoonfuls of flour, a quarter of a pound of butter, a little vinegar, chopped parsley, pepper, salt and nutmeg. Beat the eggs until they are light, drain the oysters from their liquid, put them in a stew pan, and let them simmer for five minutes. Melt the butter, and stir the flour into it perfectly smooth. To the butter add the beaten eggs, parsley, nutmeg, pepper, salt and vinegar. Mix well, and to this add the oysters. Let them simmer together for ten minutes; then put into the paste. Place in the oven immediately and bake.

WASHING COTTON GOODS with not injuring the colors is done by placing the goods in a bucket of rain water so hot that the hand cannot be held in it, and added to this as much bran as an eighth part of the fabric would weigh. Stir it lightly with a stick and let it come to a boil. Let it cool until the goods can be washed out as usual, then rinse and dry, and you will find the clothes pure and clean, and the colors bright as ever.

MINCE PIES.—Five pounds lean beef, three pounds suet, or two and a half pounds, as you like; two pounds raisins, two pounds currants, one pound citron, three or four pounds of sugar to taste, quart of good brandy, spice and lemon juice to taste.

The above is to keep on-hand awhile, and as you make the pies add chopped apples, say two medium sized ones to a pie.



W. B. EWER.....SENIOR EDITOR.

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San Francisco:

Saturday Morning, April 24, 1875.

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Rock-Breakers and Batteries.

A rock-breaker at a quartz mill, making 170
strokes of $\frac{1}{4}$ of an inch a minute, is capable of
a preparatory crushing of seventy-two tons of
quartz—the crushing capacity of a heavy
30-stamp mill—in twenty-four hours. This,
of course, does not crush fine, but simply breaks
rock small enough to feed the battery; coarse
quartz only is passed through. It is estimated
to increase the capacity of a mill, on an aver-
age, twenty per cent.

In feeding a battery by hand a good feeder
knows the requirement of each stamp by the
sound of the stamp stroke, and keeps all fed as
equally as possible. Machine feeders are used
to a great extent and work very well. In Cali-
fornia the number of drops of the stamp per
minute varies from fifty to seventy; the lesser
number corresponding to the heavier, the greater
to the lighter stamps. A battery of twenty
stamps, weighing 550 pounds per stamp, with
sixty-one drops of ten inches per minute,
crushes forty tons of quartz in twenty-four
hours without the aid of a rock-breaker; while
a battery of twenty stamps, weighing 700
pounds per stamp, with sixty-eight drops of
ten inches per minute, crushes thirty-two tons
of the same rock. In both trials from which
these figures were deduced a No. 6 screen was
used. The results are on mill rock of average
hardness.

The proportion of power necessary to do the
work of the heavier to that of the lighter
stamps is as 850x61.700x68, and the work ex-
pected therefrom would be as near thirty-five
tons for the heavy as thirty-two tons for the
lighter stamps. But the former crush forty
tons, an additional quantity of over five tons
in favor of heavy stamps. When a rock-breaker
is used in connection the proportional result is
nearly the same. The limit of weight has never
been determined experimentally, though
stamps are satisfactorily employed in this
country weighing over 900 pounds, with a ten-
inch drop.

A Phenomenon at Yosemite.

Formation of Hail in the Spray of Yosemite Fall.

Professor Wm. H. Brewer, at the last meet-
ing of the California Academy of Sciences,
described a peculiar phenomenon which occurs
in the Yosemite valley, which is interesting,
not only in a scientific point of view, but also
to the public generally. On the 19th of this
month, in company with Mr. Galen Clark,
Custodian of the valley, Mr. Brewer visited the
foot of the upper Yosemite fall. In the winter
a great "ice cone" forms in front of this fall,
mostly, it is probable, an accumulation of
frozen spray. At the time of his visit it was
much reduced by thawing from what it was
a month since. When Professor Brewer saw it
the cone extended below the fall several hun-
dred feet, bridging the chasm to an unknown
thickness. The two persons most familiar with
it respectively estimated its thickness that day
at "sixty to one hundred feet, and nearer two
hundred feet." The outer side of this cone
slopes away from the fall; the inner side rises
like a wall in front of the sheet, which falls
mostly behind it, with deep, thundering sound.
The water flows beneath the mass and emerges
from an icy arch at its foot. The stream was
so high from the melting of the snow that it
dropped from the extreme top, not clinging to
the rounded crest, as it does when the water is
lower, but leaping out so that the actual leap
is perhaps 1,550 feet to the rocky bottom, and
to the top of the ice cone nearly or quite 1,500
feet. Over the ice cone the spray is driven
furiously by the powerful air-blast produced.

Professor Brewer says that the day of his
visit was a warm and clear one, and the time of
observation between 12 m. and 12:30 p. m., and
the fall was in its brightest illumination, as it
faces nearly south. As they neared the ice
cone certain appearances suggested to Profes-
sor Brewer that the spray which drifted over it
was (in part at least) snow. To examine this
they ventured on this cone further than strict
prudence dictated, and in the tempest which
stung their hands and faces like shot, they
found the spray in part to be hail or ice pellets.
The exact character of these pellets could not
be studied in the blinding blast to which they
were subjected. They appeared to be hard
like hail-stones, tolerably uniform in size, and
Professor Brewer estimated them at about
one-tenth of an inch in diameter. They accumu-
lated in thin sheets on the rocks which rose
through the ice near its edge, and were abun-
dantly hurled along on the ice cone.

The ice cone, which had been very white
during the winter, had been sullied by sand and
dirt carried over it in the spray of the heavy
storm of the week previous to the visit referred to.
Near its lower edge, however, were many
depressions filled with what appeared to be new
and pure snow, which they believed to be in
reality fresh accumulations of these ice pellets,
but from their position it was impossible to
examine them. Mr. Clark and Professor
Brewer, however, pushed their way back to the
rocky wall beside the fall, and as near the
sheet as it was possible to breathe or stand.
Professor Brewer says that if any of the pellets
occurred there he could not prove it. He could
not feel them, and the water so blinded him
that nothing could be distinctly seen. On re-
turning they kept on the rocks and noticed no
ice pellets there. They had no thermometer to
test the temperature of the freezing hail.

At Leidie's hotel, which is one and three-
eighths miles distant and about 1,000 feet
lower, the thermometer stood at about 52° F.
at 6 A. M.; 78 $\frac{1}{2}$ ° at 2:30 P. M.; 79° at 3:15 P. M.,
58° at 9 P. M., and 50° at 6 o'clock the next
morning. They had no wet bulb to determine
the dryness, but that the air was very dry was
proved by the rapidity with which their sat-
urated clothes dried.

When this fall was visited by the State Ge-
ological Survey, in June, 1863, the idea was
suggested that they examine the temperature
of the water above and below the fall, to see
if any actual heating of the water oc-
curred as a result of its concussion after
falling from so vast a height. The dryness of
the air was then so great that it was thought
that evaporation would counterbalance, or at
least vitiate any results that might be theo-
retically based on the mechanical equivalent of
heat; so the experiment (which would have
cost much labor and time) was not tried. The
objection to the experiment was made by Pro-
fessor Brewer himself, at that time attached to
the Geological Survey.

On seeing this new phenomenon the hypothe-
sis which immediately suggested itself to him
as an explanation was that it was due to evap-
oration; that the fall is fed by melted snow,
much of which still lies near its top; that the
great volume of ice-cold water chills the adja-
cent air to nearly thirty-two degrees; that the
air-current thus cooled, as it is drawn into and
along with this descending mass, is a very
dry current, and that its rapid saturation by
the evaporation of a portion of the spray is
sufficiently chilling to freeze drops of water up
to a certain diameter. Had the ice pellets been
portions of the ice cone, torn off from its edge
and hurled outward with its spray, such a uni-
formity of size as Professor Brewer observed
could not be expected.

Professor John Le Conte, on Professor
Brewer describing the phenomenon to him, has
suggested another hypothesis. It is that the
air carried down and cooled by the water is
somewhat condensed at the base of the fall, and
that by its expansion as it gets away from the
pressure, sufficient cold is produced to freeze
the drops.

Academy of Sciences.

A regular meeting of the California Acad-
emy of Sciences was held on Monday evening
last. The following new members were
elected: E. T. Tarbox, James P. Clifford, Al-
fred E. Regensberger, M. D., Arthur C. Tay-
lor, Charles Francis, J. R. Stanton and F. P.
Hertney. A number of propositions for mem-
bership were received and referred.

The additions to the museum were a few
specimens of salmon trout, donated by Joseph
Clark, of Mendocino county. Professor Eisen
presented specimens of pine cones from Mono.

T. J. Butler, of the Arizona Miner, sent up
a specimen of bug captured on Agua Fria
river, Yavapai county, Arizona.

The Secretary read a paper by Henry Ed-
wards on Pacific Coast *Lepidoptera*, No. 11,
giving an account of the *Sphingidae* of Cali-
fornia and adjacent districts, with descriptions
of new species. In this paper Mr. Edwards
furnishes a complete catalogus of the species
of this interesting group of *Lepidoptera* as far
as known to him to inhabit the Pacific Coast,
and offers descriptions of what appear to him
to be forms as yet unrecognized by science.
The number of species compared with those of
the Eastern States is, but small, but extended
exploration of our little known mountains and
valleys may furnish others.

Prof. Brewer read a paper describing the for-
mation of ice or hail pellets in the spray of this
Yosemite fall. This is referred to in another
column.

Mr. T. J. Lowry, of the U. S. Coast Survey,
read a paper on "Hydrographic Surveying,"
which we will shortly publish.

Col. George E. Gray offered the following
resolutions, which were adopted:

WHEREAS, The California Academy of Sci-
ences has learned of the resignation of Prof.
Daniel C. Gilman from the Presidency of the
University of California, and of his contem-
plated removal to Maryland; and whereas, the
important services rendered by Prof. Gilman
to the University and the cause of higher edu-
cation in California are known and appreciated
by the Academy; therefore be it

Resolved, That the California Academy of
Sciences expresses its appreciation and ap-
proval of the work he has accom-
plished, its confidence in his ability and its
testimony to the energy and devotion which
he has exhibited in the performance of his
duties as President of the University of Cali-
fornia. That we thank him for the services he
has rendered to the cause of higher education
here and elsewhere; that we regard his removal,
so far as it affects this community, with regret,
tempered by the conviction that in the new
field of labor upon which he is about to enter,
his varied acquisitions, combined with many
fortunate personal qualities, will prove fruitful
in benefits to the entire country; that he will
carry with him our respect as a fellow-worker
and our esteem as a fellow-member and man.

Resolved, That the Secretary is hereby in-
structed to transmit a copy of the foregoing to
Prof. Gilman and to the Trustees of the John
Hopkins University at Baltimore.

The Pacific Rolling Mills.

At the Pacific Rolling Mills, on the Potrero,
the only works of the kind on the coast, every-
thing indicates a flourishing business. New
machinery is constantly being added as the
work demands it, and improvements of different
kinds are always being made. The mill proper
originally consisted of one eight-inch or guide
train and one eighteen-inch train, the former
making round iron from one and one-quarter
to three-sixteenths, and proportional sizes of
"flats." The latter turned out round from five
inches down to one and one-quarter, and flats in
proportion. With the mill were worked six
heating furnaces, their combined capacity being
thirty tons of finished iron per day.

They have now in operation, besides the
above, one twelve-inch guide train, one three-
high eighteen-inch train for rails, one pair
coffee mill squeezers, and an eighteen-inch
paddle mill. The last two are attached to five
new puddling furnaces and are making wrought
iron from pig.

The capacity has thus been increased from
thirty to 105 tons per day: sixty of rail and
forty-five of finished iron. About one-third of
the finished iron is manufactured into different
shapes for the market, such as machine bolts,
lag screws, square and hexagon nuts, ship, boat
and railroad spikes, barrow teeth, etc. They
have now in course of construction another
twelve-inch train and a wire mill, which will in-
crease the capacity twenty tons per day or 125
tons per day in all.

The forge remains as before, three hammers
and three furnaces. They have increased the
capacity of the blacksmith shop by the addi-
tion of another steam hammer and five more
fires. It is now full of work on heavy ma-
chinery for the Comstock mines. This class of
machinery is done to order and for some time
past the mill has been very busy with it. It
consists principally of heavy pump bolts, cam
shafts, stamp stems, bolts, etc.

The whole mill is now running to its greatest
capacity full handed, employing about 350
men. They are putting up hot pressed nut
machinery which will make nuts from small
sizes up to those for two and a-half inch bolts.
The wire mill will be the first one here and
will of course lessen the importation of rods.

Microscopic Determination of Minerals.

The uses of the microscope are manifold, and
one of the uses to which it has lately been put
is the examination of minerals. It is gradually
supplanting the pocket eyeglass formerly so
much in vogue. It is found that an object seen
with an achromatic microscope, especially if it
is monocular, presents to the vision of the ob-
server its true character, and all its details are
brought out by the instrument. The simple
lens, owing to its short focus and optical
defects, gives a distorted image, and although
not by any means to be despised, cannot be
compared to the compound microscope.

The objections to the microscope have been
its cost, inconvenience of carrying and want of
skill in its use. In fact too much is expected
of the instrument and too little of the manipu-
lator. A microscope having much accessory
apparatus must necessarily be costly, and to
bring such an instrument within the means of
ordinary buyers excellence must be sacrificed.

Mr. Henry G. Hanks, of this city, who has
had large experience with microscopes, and has
made a specialty of the microscopic examina-
tion of minerals, has planned a "miners' mi-
croscope" which we examined this week and which
obviates the difficulties mentioned above. It
has been constructed with a special view to
simplicity, good optical parts, quick work, ab-
sence of superfluous apparatus, with a strong
stand and having those powers only that have
been found most useful to the miner and mi-
neralogist. By keeping these points in view the
instrument has been made so that it can be
furnished for fifty dollars, while it fully equals,
as far as it goes, the more costly instruments.
These microscopes are made by one of the
most celebrated London opticians for the
special wants of a mining community. They
are perfectly adapted for examining minerals,
ores, tailings, furnace products, so that they
are useful not only to common miners but
superintendents and others. Mr. Hanks will
send a photograph of this instrument to any
one who is interested enough to apply to him
by letter.

We feel confident that, now a microscope of
this character is on the market, more interest
will be taken in the microscopic examination of
ores and minerals. After a little study the
character of a rock will be recognized at a
glance, saving costly analysis otherwise neces-
sary. It is difficult to realize without experi-
ence how much an instrument of this kind will
reveal and how important they are in the exam-
ination of minerals. A piece of rock may be
placed under the glass and on looking at it the
observer can almost see into it, and if familiar
with the rock can recognize it at a glance. The
study of minerals under the microscope is a
new one as yet, but is advancing rapidly and is
destined to become very important to all
miners, as they can determine questions them-
selves which they are now compelled to leave to
experts.

Hydraulic Mining in California.

No. 22.

This water is supposed to be subject to any
desirable pressure, and might be used at these
drop-boxes under enough pressure to keep the
quicksilver and other matter in the drop-box
in perpetual motion, and thus assist in the
liberation and amalgamation of the gold.

A further sifting or reduction in size of the
gravel can be accomplished by straining it
through a grating with $\frac{1}{4}$ inch interstices be-
tween the bars; the refuse matter may either
be thrown at once into the main sluices, or, in
case an abundance of water is at hand, carried
in a separate box to the place of general de-
posit. Should the refuse pebbles be thrown
back into the main sluice all future gratings in
the latter must be fine enough to retain these
refuse pebbles in the main sluices, and thus to
prevent needless shifting of material.

The water which the main sluices loses by
the repeated tapping must be supplied by pure
water from the supply-pipe. The size of the
main flume or sluice must also be reduced as
the water stream and solid material lessens.

It would be advisable to supply all the
sluices for the finer or sifted gravel with riffles
made of 2 by 3 inch scantlings, which are not
only considered the best gold-catchers, but are
easily removed and replaced, and durable
enough for the washing of fine gravel.

In the history of gold mining the washing
process can claim priority over all others, no
matter whether the gold was found in the sands
of a river or in a solid ledge of quartz. If in
the latter the solid quartz was first reduced to
sand, and then treated like river sand, by
washing over sloping platforms covered with
blankets or skins, in which the small parti-
cles of gold settled, while the lighter sand
flowed off with the water.

The platforms of our under-currents are only
a repetition on a far larger scale of the above-
mentioned primitive mode of gold-washing,
and they illustrate well the soundness of the
principle: to pour the gold-bearing matter in a
shallow stream, over an inclined platform,
provided with a rough surface, on which the
small particles of gold can be caught.

Condensed from an article by Charles Waldeyer, in
the last Annual Report of the U. S. Commissioner of
Mining Statistics.

A New Roasting Furnace.

Ernest Heilgendorfer of Cerro Gordo, Inyo county, California, has invented a roasting furnace for the proper oxidation and chlorination, and for the extraction of gold, silver, copper and other metals. Mr. Heilgendorfer sends us a description of this furnace, which we give in his own words as follows:

When a minute particle of ore is exposed to hot oxidizing or chlorinizing gases, this particle is instantly oxidized or chlorinized. Far different is the result, when a bulk of ore is roasted in a common fire. The smoke of the fire is reducing and works directly against oxidation. The roasting gases also find too small a surface to act upon; the interior parts will therefore at once cake to larger or smaller globules, which resist even a long continued roasting.

When only a simple oxidation of sulphurets is intended, these caked lumps retain some sulphur and are generally afterwards separated by sifting and roasting over again.

For chlorinizing purposes the ore used to be mixed with salt, which may do well enough for the chlorinization of silver; not so, however, for other metals, that almost constantly accompany silver ore. The salt producing chlorinizing gases during the whole roasting process is an additional obstacle to oxidation. There will consequently remain in the roasted pulp a number of combinations and single elements, imperfectly oxidized, which are most injurious to amalgamation. Chloride and sub-chloride of copper consume the iron millers of the pane and prevent grinding; chloride of lead envelopes chloride of silver, preventing its amalgamation, lead also imparts a soap-like quality to the amalgam; arsenic renders quicksilver foamy; free sulphur, left unburnt in a smoky fire, changes quicksilver into cinnabar. The chlorides of base metals, especially of copper, are amalgamated together with the chloride of silver, and deteriorate the fineness of the bullion. Even iron enters some way into the amalgam, (perhaps as protoxide), and disturbs retorting. These and other difficulties will frequently puzzle the mill-man and cause, in many places, roasting to be a disagreeable operation of doubtful utility.

All these disadvantages, however, are merely due to imperfect roasting. A correct roasting process must not only volatilize sulphur, arsenic, antimony, etc., and chlorinize gold and silver, but it must also work up all the chlorides, such as chloride and protoxides of the accompanying base metals and turn them out as oxides. The oxide of copper, lead, bismuth, iron, etc., do not cake, nor do they exert chemical influence on the machinery, nor on the quicksilver; and what is equally important, they do not enter into amalgamation. The bullion produced is therefore fine silver and gold, however late the ore may be. At the same time, the consumption of quicksilver diminishes, because various causes of its detriment have been removed.

The question, how roasting may be done with such correctness, is already answered above. Every particle of ore must be exposed to hot currents of purely oxidizing and chlorinizing gases. Under such conditions the effect is instantaneous and complete, and roasting finished before the pulp reaches the bottom. Though some furnaces complete chlorinization in the receiving bottom, there is no chance there to improve the lacking oxidation. I will now show how my furnace accomplishes the task.

(a) To convert the dry crushed ore into a fine dust. Cold pulp is sticky and liable to form little balls, some of which would fall through the fire entirely crude. In a moderate heat, however, the pulp becomes more and more thin, and almost as easily flowing as a liquid, and partly by sifting, partly by falling some distance through the air, will form a dust shower no minute particle of which may escape the roasting gases.

(b) A clear fire, free from smoke, of the highest oxidizing power, and of any required volume and temperature, is formed by alternating currents of air and burning gases. The quantity of oxygen introduced must not only be sufficient to consume the smoke, but there must be beside a surplus provided for the purpose of oxidation.

(c) For chlorinizing purposes the upper part of the fire is mixed with chlorinizing gases, the lower part being always purely oxidizing. In this way the ore dust falls first through chlorinizing and afterwards through oxidizing gases, whereby the chlorides of base metals are changed into oxides. Chloro-silver is unchangeable, chloro-gold is decomposed and metallic gold left.

The adjoined sketch shows that the pulp, coming from the hopper in small and constantly renewed quantities, falls first into the inclined and revolving cylinder, *E*, of about 12 feet in length by one-half foot diameter. The pulp is heated during its passage through the cylinder to the desired degree of temperature and fluidity, and passed on to the sieve, *F*, where it is spread and screened by machinery. The shaft, *G*, connects the sieve, *F*, with the furnace below, and is from five to ten feet high, for protecting the sieve from the fire and giving the pulp a chance to drop in a fine

spray or dust shower. The pulp reaches the fire, at the mouth of the shaft which consists of alternating fire and air currents and eventually also of other roasting gases.

In our sketch the fire is formed by four currents of air and three currents of gases of combustion, with a combined thickness of six feet, sufficient for the majority of cases. If the single fires were burning on common grates, a great deal of heat would be lost before reaching the furnace. It is therefore a saving of fuel to use gas generators, the gases of which will not burn before mingling with air. Only one of the fires, the lower one, has a common fire place; being next to fire bridge, no part of its heat is lost, and it serves to ignite the gases and to prevent explosions. This arrangement offers also an opportunity to finish roasting, when required, under an increased heat. As a general rule, though, roasting needs far less fire than millmen often suppose. Oxidation is itself a burning process, and when properly done will produce considerable heat of its own.

I wish here to remark that the engraving is not so much intended to be a plan for building as to illustrate the principle upon which this furnace is based. It will, for instance, be more convenient to supply the two upper fires from one common gas generator, which can also feed a small flame, to pass through the interior of the heating cylinder.

In the passage between the fire bridge and the upper arch all the different gases are thronged together, whereby the air is heated and the fire purified from smoke, and all reducing elements.

For chlorinizing purposes the ore is not mixed with salt, but the chlorinizing gases are prepared separately, and, together with air,

few cases in which extraction may be adopted to great advantage.

Oxidation of Sulphurets, not Containing Arsenic or Antimony.

Sulphurets of copper will best be roasted to oxidize and given over to extraction. Connecting a lead chamber with the roasting furnace, the resulting sulphurous gas may be utilized for sulphuric acid, with which to extract the oxide of copper. The bluestone produced is already marketable; it can also be oxidized again and smelted to metallic copper.

Sulphate of iron can, when it pays, likewise be manufactured from pyrites.

These sulphates can be procured directly from the ore. Lowering the temperature of the fire, by letting in more fresh air and mixing at the same time the fire with steam, (as also with sulphurous gas when the ore does not contain a sufficient quantity of sulphur), the sulphates of copper and iron are formed directly, and can be extracted with water.

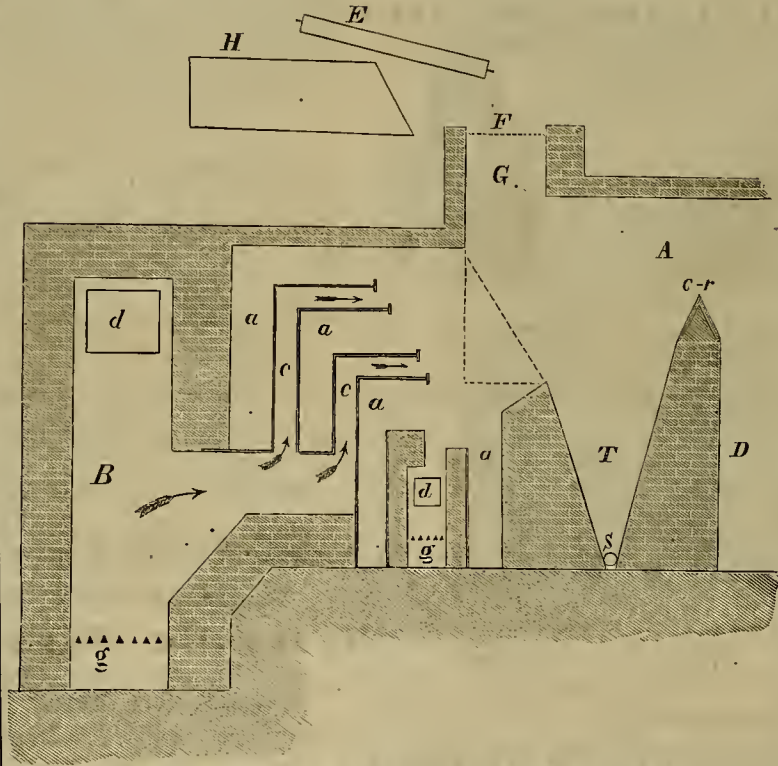
Silicates and oxides of copper want only crushing to be extracted with sulphuric acid.

Doing the extraction under steam pressure the quickness of the operation will be suitably increased.

Chlorinization.

Ore containing arsenic and antimony can be thoroughly roasted only by volatilizing these two troublesome ingredients. The silver contained in the ore is at the same time advantageously changed into chloride of silver; gold is left in a metallic state. The accompanying base metals, after having been roasted to oxides, are no longer nuisances; some of them, especially copper, may even contribute to the profits of the enterprise.

The advantage of extraction will be seen by



HEILGENDORFER'S FURNACE FOR ROASTING ORES.

introduced into the upper part of the fire. This method will not only favor the final oxidation of base metals, but also make chlorinization entirely independent of the character of ore. A considerable saving of salt will be gained besides.

As the pulp during its fall through the fire is carried away to a certain horizontal distance, as indicated by dotted lines, the fire bridge is correspondingly advanced into the furnace and extended upwards in an inclined diagonal direction, to which the upper arch or ceiling is made parallel. The outlet, *A*, which leads to the dust chamber and chimney, is lying in a continued line of said passage. This construction gives the lower part of the fire the same efficiency as the upper part, and also counteracts the pressure of the falling pulp.

As the fire hardly finds any obstacle to overcome, the draught can be slow, and the quantity of dust will therefore be a minimum.

The roasting process from beginning to end can be overlooked and controlled with a single glance, and any disorder may be promptly discovered. In regular working order the fire is perfectly transparent, becoming perceptible only as a bright shine. A most lovely sparkling is caused by the vigorous action of the roasting gases, and various colors of a surprising beauty indicate the different substances contained in the ore. These colors, which are not visible in a common fire, will become an excellent criterion to the roasting process.

After having passed the fire, the roasted pulp drops into the receiving space, *T*, from where it may be removed hourly by a trap door, or constantly by a screw.

Though a correct roasting process greatly improves both smelting and amalgamating, it affords for numerous classes of ore a still more desirable mode of reduction, viz.: the extraction. The following lines will briefly show a

an example of ore that, as frequently happens, contains a great many different metals. After the roasting process has volatilized sulphur, arsenic, antimony, tellurium, etc., there may be left in the roasted pulp, gold, chloride of silver, oxides of copper and iron, as also a small percentage of oxidized lead, bismuth, etc. From this mixture the gold can be extracted with chlorine water, and the chloride of silver with hyposulphate of soda (or lime). Neither of these liquors dissolves any oxide: the products are therefore fine gold and fine silver, every one separate. Ore containing gold and silver together could so far never be successfully roasted. Gold wants little salt, silver a great deal. With this excess of salt the gold combines in some way, not exactly known, and becomes inaccessible to either amalgamation or extraction. Using, as I do in my furnace, chlorinizing gases instead of salt, the danger of this loss is avoided and the simplest mode given to separate the two metals. The oxide of copper remaining in the twice extracted pulp can now be extracted with sulphuric acid.

An analogous treatment of chlorinization and extraction may, even in the absence of gold and silver, be given to copper and nickel ore, when accompanied with arsenic and antimony.

As sulphuric acid is always wanted for extraction as well as for preparing hydrochloric acid from salt, a lead chamber for the fabrication of sulphuric acid appears to be a most necessary addition to the roasting furnace. Almost every class of ore contains sulphur; the cost of sulphuric acid will therefore be a mere trifle. The other liquors required for extraction, can also be prepared at such prices that extraction will, probably in every location, be cheaper than amalgamation.

A difficulty to extraction arises from a high

percentage of lead. The oxide of lead combines with sulphuric acid as well as with the hyposulphate of soda. A small percentage of lead, however, would scarcely be felt. When the portion of lead increases the chlorosilver may be extracted with a boiling solution of salt, or with ammonia, which have less dissolving power and therefore work slower. To extract copper or nickel from ore, that contains much lead, would take disproportionate quantities of sulphuric acid.

Considering the enormous value of noble metals yearly lost by the usual methods of reduction, it is certainly an object worth attention how these losses might be prevented or lessened. To talk of free milling ore, when the wet process realizes only 65 per cent. of silver, as is the rule in the first silver producing place of the world, is a mere illusion, which ought to be given up at once. It seems more reasonable to calculate the expenses and profits of an improved method. I am confident the mode of roasting I have tried here shortly to describe, will become a remedy to some serious disadvantages under which a permanent branch of the mining industry is laboring. A judicious examination will prove the justice of this opinion and ratify all that has been stated here.

The Emma Mine.

The Vice-Chancellor of England has decided against the petition to wind up the Emma silver mining company, and has ordered a meeting of the shareholders to express their wishes in the premises. The winding up of the company would be compulsory and would prevent the shareholders from realizing anything. So says a dispatch recently received. We do not see, if the mine is worked out, how the shareholders will realize anything, whether there is a compulsory winding up, or whether they continue to work. It seems to us that if they have no more ore to count on they had better shut the mine down, sell the machinery, and stop talking about it any more. If they continue to work with no encouraging prospects and lose more money, they will have no one to blame but themselves. The Vice-Chancellor does not doubt that the concern was originated in fraud and says expressly that the shareholders have been cheated; that the mine is not worth working, and it is his opinion that a compulsory winding up is best; that if anything could be got out of the original offenders by a suit in the United States, an official liquidation commission, appointed by a British Court, can conduct the suit better than anybody else. Glass, council for 21,000 shares, however, insists that there is some hope of getting something from the mine. His sanguine clientele desire to supplant the present Directors with new ones, and go on. Glass insists that the company has no debts and is getting out \$10,000 in silver monthly, which pays expenses.

Several mining engineers of ability and reputation reported that the mine was worked out and stated that the future of the mine depended entirely on virgin ground, as in any new mine. Clarence King, Director of the U. S. Geological Survey of the 40th Parallel; E. S. Blackwell, Manager of the Ophir mining and smelting company, of Utah; Andrew Murray, F. L. S.; and George Attwood, Manager of the Emma; all told the same story and told the stockholders they must spend large amounts of money before there was even a chance of realizing anything more from the mine. King said "the great Emma bonanza, the object of such wide celebrity, the basis of such extravagant promises, is, with few insignificant exceptions, worked out, and the future of your company is hung on a mere geological chance which may be eternally against you, and if in your favor, may only be secured by wise expenditure of much time and money." This was as far back as June, 1873. The statements made in all these reports have been borne out by the results, though interested parties have endeavored to make it appear otherwise. Any one interested may look back in the files of the Press, June 6, 1874, and see by diagrams on what Mr. Attwood based his calculation that the ore body was worked out.

There is no doubt but that there are parties who would like to get hold of this famous mine as agents for the English stockholders, and who would endeavor to get the stock up again so that some of those interested could sell to the confiding public. We think, however, that this will be a difficult undertaking. The proposed meeting will no doubt be a stormy one, but we hope to see good judgment prevail and see the stockholders get out of the whole business without further loss.

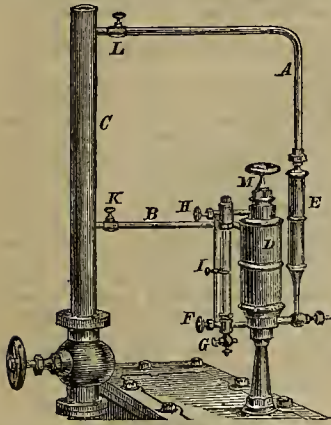
The new pumping engine of the Consolidated Virginia mine will have a forty-inch cylinder, a seven-foot stroke and a capacity of 600-horse power. The hoisting engines will be two in number and will each have a capacity of 200-horse power.

A vein of hematite iron has been struck, on the line of the Utah Western railway, at the point of the mountain.

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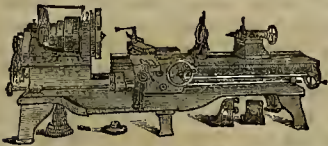


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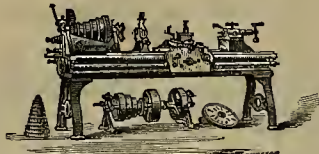
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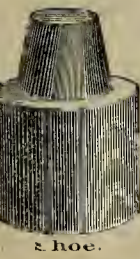
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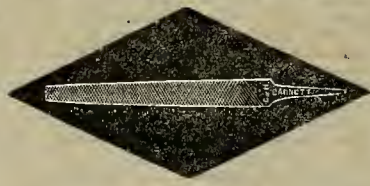
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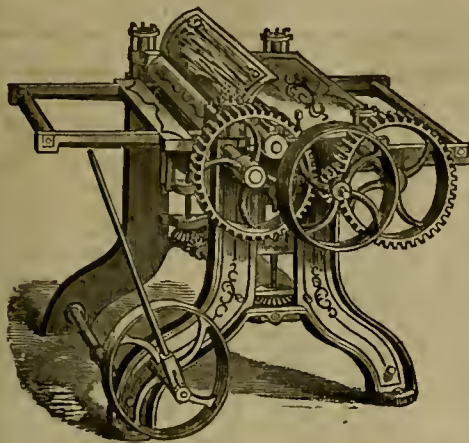
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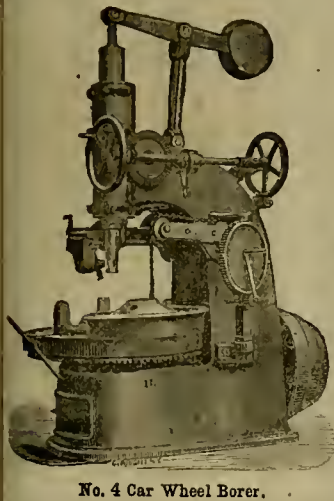


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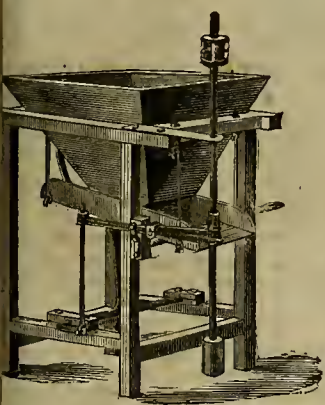
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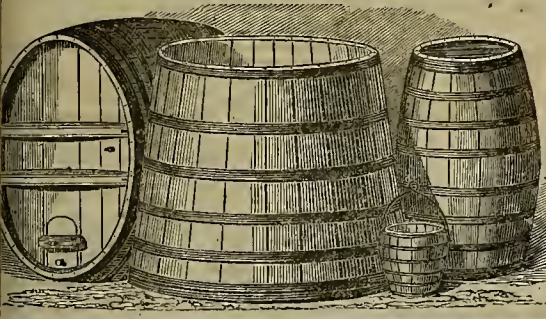
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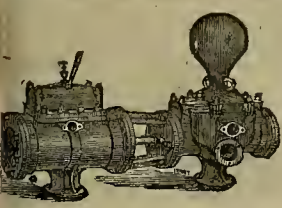
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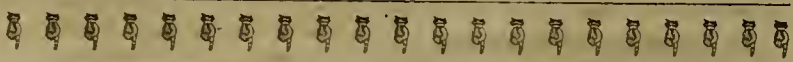
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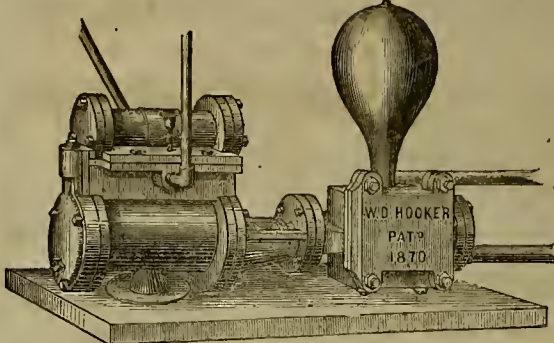
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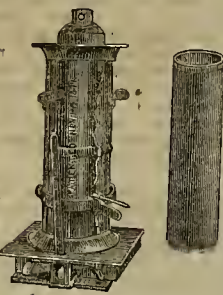
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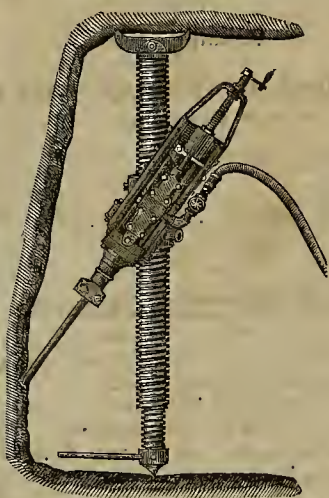
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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

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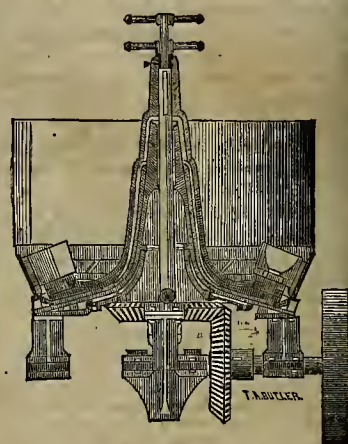
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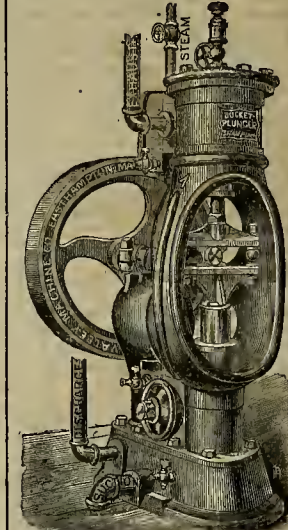
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For Sale at TREADWELL & Co. Machinery Depot, San Francisco.



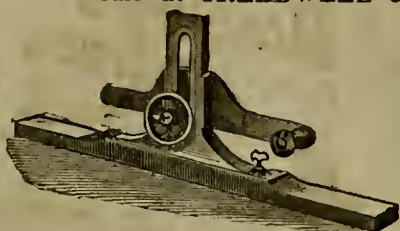
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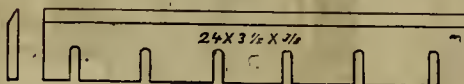
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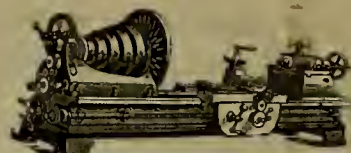
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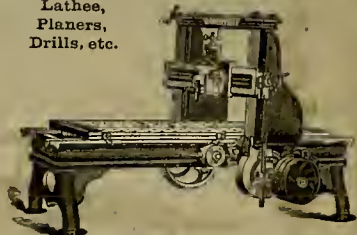


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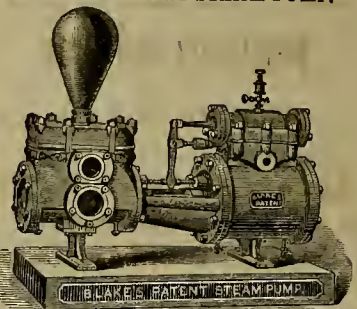
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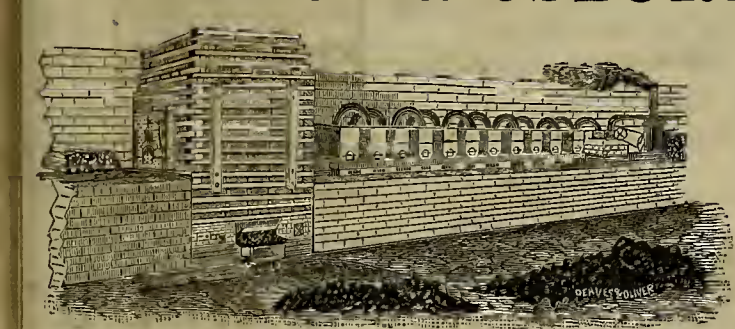
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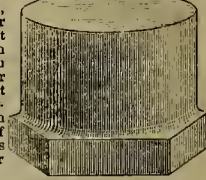
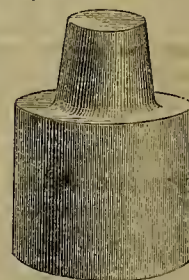
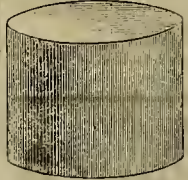
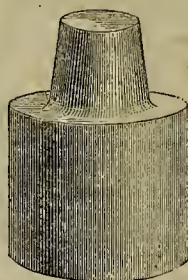
Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.

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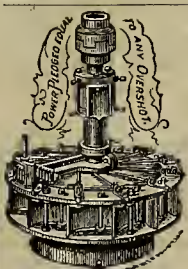
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The only Blasting Powder used in Europe and the Eastern States.

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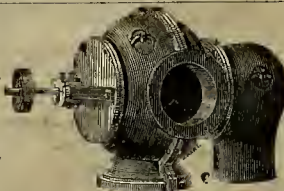
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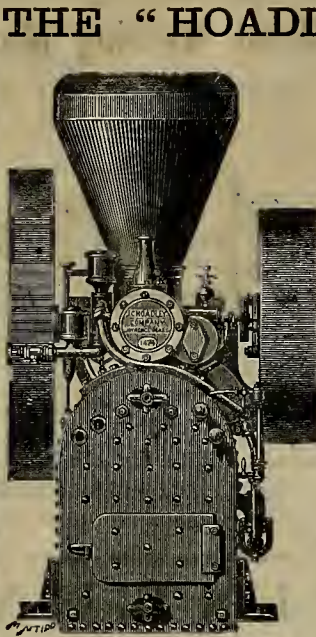
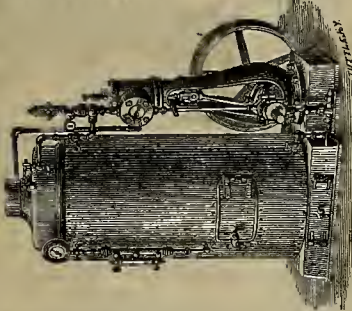
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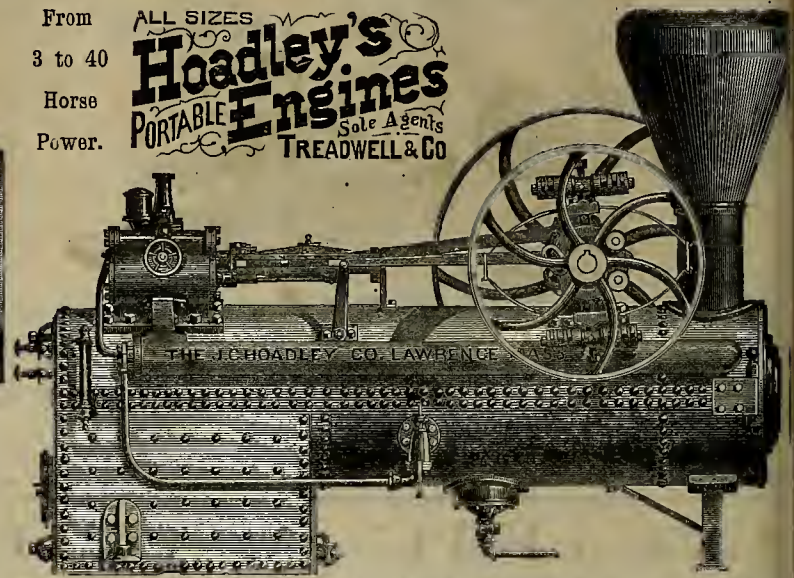
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ALL SIZES
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Varney's Patent Amalgamator.

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For rapidity pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the greatest number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pan being filled, the motion of the muller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

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SAN FRANCISCO, SATURDAY, MAY 1, 1875.

VOLUME XXX
Number 18.

The Bruckner Revolving Furnace.

The Bruckner revolving cylinders for roasting ores, engravings of which accompany this

article, are now used at a number of mills in Colorado and New Mexico for the purpose of roasting and chloridizing silver ores, with satisfactory results, even from those cylinders of small size, erected before the many improvements of recent date. The larger improved cylinders are used at the Tennessee reduction works, Silver City, Grant county, New Mexico, and those which were built in 1871, at the celebrated Caribou silver mills and mines, Colorado, a mining enterprise which proved so satisfactory as to have been sold some time since to a Holland company for a very large amount. These cylinders, as now constructed by Messrs. Lane & Bodley, of Cincinnati, Ohio, are shown in the accompanying cuts, in which Figure 1 is an elevation in perspective, Figure 2 a longitudinal and Figure 3 a transverse section. Our correspondent, W. C. Quimby, sends us the following description of the furnaces:

The exterior of the cylinder is a sheet of boiler iron, twelve feet long by five feet six inches in diameter. The ends are partially lined with similar material, leaving in the center a circular opening about two feet in diameter, surrounded by a flange projecting several inches. Upon one side is placed an opening closed by a hinged door. Upon the outside of the cylinder are bolted three bands as shown in Fig. 1, in which the section of the first is square and that of the third semi-circular; the second or middle band is a strong spur gear.

Passing through the cylinder are six pipes parallel to one another, in a plane at an angle of fifteen degrees to the axis of the cylinder; these pipes also lie in this plane at an angle of thirty to thirty-five degrees to the longitudinal axis of the plane, as shown in Fig. 3, where the internal arrangement of the cylinder is seen, a perforated diaphragm being formed through part of the cylinder by means of perforated plates placed between the above described pipes, the plates being held in place by longitudinal grooves upon these pipes.

The entire cylinder is lined with brick (common building brick have been found to answer the purpose very well), the brick being placed in the following manner: The entire side of the cylinder is covered with one layer, laid flatwise, thus forming a lining about two and a half inches thick; there is an additional layer extending from each end of the cylinder about fifteen inches to the center of where the nearest pipe passes out; the additional concentric layers are added thereon, until the

cylinder is contracted down to the size of the opening in the end, which is also lined, and each layer falls short of the preceding one about two inches, thus giving the end linings a conical form, the entire lining being laid in a

rotary motion is given to the cylinder by means of a pinion placed under the cylinder and gearing into the spur wheel band. Upon the other end of the pinion shaft are placed ten bevel wheels, into which gear two match

screws, by which it can be moved horizontally to or from the center line of the machine, thus giving entire control of the lateral and perpendicular adjustment of the cylinder which they support.

The circular flange of one end of the cylinder loosely projects into a fire box best seen in section to the left of Fig. 2. The other end projects into an opening communicating with dirt chambers and a chimney. There is placed in the bottom of the fire a shoe projecting into the cylinder, which catches such dirt as may fall back and returns it into the cylinders in lieu of allowing it to escape through the crevice between the cylinder flange and the opening into the fire. A door is placed in the fire, opposite the opening, through which the interior of the cylinder and its contents can be readily examined at any time.

Method of Operating the Cylinder with Refractory Silver Ores.

A fire having been kindled in the fire-box, the cylinder is allowed to slowly revolve until heated to a dull red, and is then brought to rest with the door on top. In this position about 4,000 lbs. of pulverized ore, and 200 to 400 pounds of salt are introduced; the door is closed and securely fastened and the cylinders are made to revolve at the slower speed of from one-half to one turn per minute. The fire is so regulated that after an hour's time the sulphur contained in the ore commences to burn, the ore in the cylinder being retained at a dull red for some time. (In those ores containing a large amount of sulphur, little or no additional fuel is required for desulphurization.) During the whole of this and the subsequent operation, the inclined perforated diaphragm causes the heated ore to traverse alternately backward and forward the entire length of the cylinder, also sifting it through the flange, thus insuring a uniform heating, mixing and exposure to chemical action.

The diaphragm, in the meantime, is protected from destructive action of heat by the cooling effect of external air circulating through the pipes, and from corrosion by the formation of a basic scale or coating, resulting from reaction of the iron, pulp, etc.

The desulphurization being completed, the heat is gradually augmented to a full red. The pulp soon assumes a spongy appearance, technically known as "woolly," in consequence of the double decomposition of the sulphates (formed during desulphurization) and salt (chloride of sodium), liberating chlorine gas, etc. After an hour's time, or soon as a sample taken from the cylinder evolves the odor of chlorine unaccompanied with that of sulphurous acid, which indicates that the chlorination is complete, the door in the cylinder is opened, and the cylinder revolved by the more rapid moving gear, and the chloridized ore is quickly

Continued on Page 289.

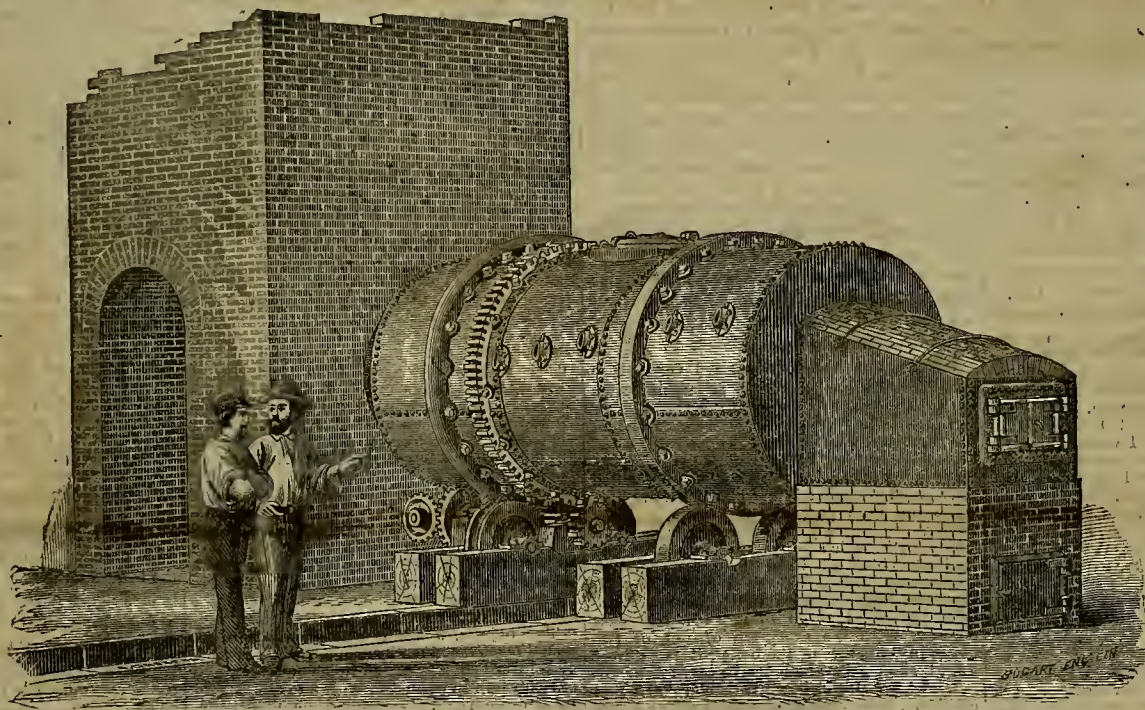


Fig. 1. THE BRUCKNER REVOLVING FURNACE.

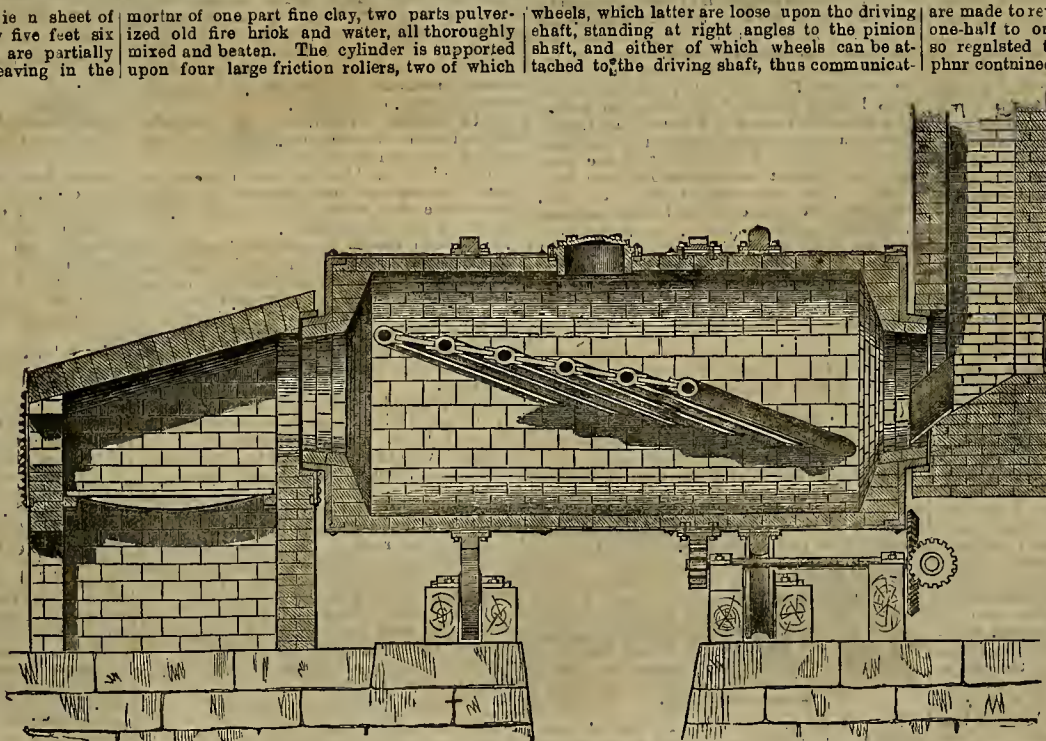


Fig. 2. Longitudinal Section through Axis of Bruckner Revolving Furnace.

are grooved upon their periphery to loosely fit the semi-circular band, thus holding the cylinder longitudinally in place. The other two friction rollers are made without a groove and bear upon the square band, thus accommodating themselves to the expansion and contraction of the cylinder, or any irregularities in form. These things are shown in Fig. 1. Ro-

ing the speed of revolution of one or the other of the bevel gears as may be desired. Inasmuch as by wear or settling the axis of the cylinder may possibly be thrown out of the proper line, the following means of adjustment are provided, but not shown in any of the engravings, viz.: Each journal box of the friction rollers is held in position by adjusting

the speed of revolution of one or the other of the bevel gears as may be desired. Inasmuch as by wear or settling the axis of the cylinder may possibly be thrown out of the proper line, the following means of adjustment are provided, but not shown in any of the engravings, viz.: Each journal box of the friction rollers is held in position by adjusting

CORRESPONDENCE.

Letter from Reveille.

[From our Regular Correspondent.]

EDITORS PRESS:—The Gila company appears to be on the high road to success, to judge by the prosperous condition of its mine, quantity and character of ore now being mined, and the excellent results obtained from the first lot of ore milled.

The mill was originally fitted up for wet crushing, and for purely quartz ores this process would have suited well enough, but for the Gila ores it would not answer, consequently the Superintendent resolved to turn it into a dry crusher, and has accordingly shut down for the purpose of carrying out as rapidly as possible the necessary alterations. These will, of course, absorb much time on account of the delay attendant upon procuring the proper materials from Belmont, the nearest point at which lumber, castings for drying kiln, etc., could be procured. Brick, also, had to be burned, ere any steps were taken in the matter, and since these will be ready for use by the 19th, it is hoped the mill will be ready to resume operations by the 25th inst. at the farthest. The sooner the better, for there are several hundred tons of first-class ore mined awaiting reduction. The forty-eight tons which have been worked by wet crushing, produced \$12,000, equal to \$250 per ton, and this, too, it must be remembered, without being sorted or graded, as is the custom where ores are found to be as rich as these. These forty-eight tons were taken at random from a pile of 300 tons lying on the dump, that have been extracted since the purchase and incorporation of the mine on the first of last February. It cannot be denied that these are highly successful returns, yet, however inspiring, I am now fully satisfied that future workings will give even greater products than the above; for these 48 tons were mostly taken from the first lot extracted from the apex of the vein. There are now in the neighborhood of 400 tons of this same quality of ore mined. I visited the mine on the 10th inst., which was company pay-day, and I am free to confess that I was very agreeably surprised with the outlook.

Work has been energetically pushed ahead in every quarter since I last wrote, and brilliant and all though the prospects were then, I cannot avoid saying that they have been largely augmented since that period. I notice by the issue of the Press which came to hand yesterday, that I addressed it last on the 13th ult., a much longer space than I was aware had elapsed.

The inside winze mentioned in that letter as having been sunk 30 feet on the vein, has been drifted from a distance of 60 feet south along the lode, through ore of a remarkably fine grade, without encountering any dead spaces in that extent of ground. The vein, as now worked, is fully five feet between foot and hanging wall, and these are among the best defined in structure, smooth, clean and uniform throughout, that I have ever seen outside of the Two G mine at Tybo, of which I will soon again have something fresh to give to your readers, now that the new hoisting works are nearly completed. From two samples of ore taken by myself from the face of this south drift, assay values of \$375 and \$289 were obtained, and these were got from a class of ore that to my judgment did not look like being as rich as it has proved. But it is very deceptive, and differs from any of the Nevada milling ores with which I am at all acquainted.

The bullion ranged in fineness from 650 to 915, and one or two bars showed 989, thus showing how small a percentage of the base metals there are associated in place with the ore. Thirteen bars have already been shipped per Wells, Fargo & Co.'s express from Tybo, consigned to Daniel Meyers of your city, at whose office they can be seen by the public. There is now ready and partly soaked enough of ore to produce \$100,000 worth of these shining bars, which in a few weeks (days) will begin to flow from there to still further add to the wealth and grandeur of San Francisco. From the upper tunnel, which courses south parallel with the above winze, there is at present taken some very fine ore from a stratum four feet thick, and the indications are strongly in favor of the opinion that it will soon effect a junction with the main portion of the vein, for it is now opening as though a bonanza development was to be the next thing to transpire.

The tunnel run from a point on the east to cut the ledge a depth of nearly 100 feet is rapidly approaching completion. It is now in over 112 feet, and hopes are entertained that the next 15 feet run will strike the vein, and this is reasonable to suppose when the character of the ground through which it is being driven is considered, for it shows that the ore is not far distant.

There have been several new and important strikes made in the vicinity of the Gila lately, the ore assaying well and giving evidence of soon becoming plentiful. But of these I will

speak again when not so hurried as at present, and with this assurance I will close these hastily scribbled remarks. J. D. P.

P. S. Since writing the foregoing, one of a very high grade has been struck in the outside tunnel at a distance of 120 feet from its outer orifice. The ledge is perfect in formation as far as uncovered, and the ore clean and apparently very rich. This important development adds to the value of this property immeasurably, and sustains the high opinion which, as I have shown in the Press, I have from the first always entertained of it, and it unquestionably is, from present appearances, destined to become, and that too at no distant day, the greatest and grandest mining property outside of the bonanza that lies under the giant shadows of Mount Davidson. But of this more anon, from J. D. P.

Reveille, Nevada, April 15.

Locomotive Engineering—"The C. P. Huntington."

EDITORS PRESS:—About two years ago C. P. Huntington met with a terrible accident, and got most fearfully smashed out of form and shape. I do not mean the gentleman who bears that name, and who occupies so conspicuous a position in railroad affairs on this coast, but his namesake, the engine Number 1, belonging to the S. P. R. R. Number 1, or C. P. Huntington, was one of the engines that had the misfortune to be engaged in the collision that occurred on that road, when one engineer, White, was killed, and Jerry Sullivan, and old McSawyer and other employees of the road were badly injured, and if I remember right, there were some three or four passengers killed also. The engines met face to face while they were going at the rate of twenty-five miles an hour, so that it can be easily imagined that they must have been pretty severely handled; indeed they were literally shattered to atoms. Engine Number 2 was repaired right away, but engine Number 1 was stowed up for a time, and it was not until the last few months that the administration determined to rebuild it again.

Last week it was finished, and certainly a peculiar looking craft it is. The engine is of a most unique pattern, there being but one or two others like it on the coast. The front of the engine rests on a truck somewhat in the same manner that other locomotives do, but there is but one pair of driving wheels, which are located immediately in front of the fire-box, while the hind part of the engine and the tender, which are joined together, rest on a single truck, which brings up the rear. The engine has been rebuilt in the most thorough manner by Messrs. Wilson & Smith, and all the latest improvements in locomotives have been put on, that go to make a first-class engine. With the exception of one or two plates in the centre of the boiler, it is entirely new, being built at the boiler shops of the company, by Mr. J. Kelschaw. There are also new cylinders, steam-chests, steam-pipes, dry-pipes, and indeed, nearly all the main parts of the engine, with the exception of the wheels and a few other items, are new, so that as she stands to-day, it is more as a new engine than one that has been simply rebuilt. One of the Westinghouse air brakes has been put on, but the position of the air drum, and the various pipes leading thereto, tend rather to detract than otherwise from the looks of the engine, giving it a clumsy and muddled appearance. It has been painted throughout in the most sombre colors that could possibly have been thought of, without making it black altogether, and looks in striking contrast to the gay and bright looking engines that come out here from the East. With the exception of the bottom part of the smoke stack, which, strangely enough, has been painted a flaming red, the engine and tender is of a dark brown color, relieved at places by the brown having a greenish tint given to it.

On the side of the cab is the name of the engine, C. P. Huntington, put on in gold leaf, and Mr. Wilson, the painter, has placed some very pretty designs directly underneath, with the words, "Enterprise, 1863," and on the next panel, "Progress, 1875," intending to show the enterprise and indomitable energy that in 1863, began to work and fight its way onward, in spite of all the difficulties that obstructed its path, and now in this year of 1875, we can mark the extensive progress that has been made, and the great results that have been achieved in so short a time on this new line of road.

Taken altogether, it is a peculiar looking thing, blending as it does, in its own being, some of the crude ideas that prevailed at the time it was originally built, and also carrying with it some of the latest and best improvements that human skill and thought have been able to suggest in the engineering world. S. C.

NEW MODE OF MARBLING METAL.—A new process for ornamenting metal surfaces has been recently invented. It consists in plating, electro-plating, or otherwise covering a plate, bar, or ingot of soft metal with a thin film of harder metal, and then rolling out or pressing the ingot into a sheet; whereby the coating is broken into irregular forms, and a marbled appearance produced on the surface of the sheet.

Worms in the Teeth.

At the last meeting of the San Francisco Microscopical Society, among other microscopical slides, Mr. C. Mason Kinne presented a slide which was mounted with what were claimed to be worms taken from diseased teeth, and in presenting this slide Mr. Kinne read a short paper, which explained the matter and is given in full.

Worms (So Called) in Teeth.

To the student in microscopical, who feels a just interest in original investigations—original at least so far as relates to himself—there is always a field, wide and extended, which waits his attention, yet oftentimes after careful and patient study, the application of tests, and comparison with the obtainable results of others, he finds what is apparently new to have been looked into and treated just as carefully by some plodder before him. To my mind, the time spent in such cases is never lost, and the satisfaction found in obtaining definite results by microscopical analysis is materially enlarged if found to agree with the deductions of others unknown to the time.

Whether the slide I present this evening, mounted as it is with objects which seemed to demand more than a cursory examination when brought before me, will prove to be new or not remains to be ascertained, and for that purpose and to give the members of the Society the information I have obtained that they may, if needs be, pursue the matter further, I make these statements.

A gentleman, well known for his genial qualities as a pioneer, his executive ability as an underwriter, and his desire for the advancement of science in a general way, suffering from an intolerable neuralgic toothache, casually learned of a person who declared, unhesitatingly, that the affliction could be removed, when proceeding from diseased teeth, without the use of the dentist's cruel forceps and loss of serviceable molars. The printed advertisement of this philanthropist reads as follows:

"TOOTHACHE CURED WITHOUT PAIN.—A PERMANENT CURE IN FROM SEVEN TO TEN MINUTES!—I use a steaming process, with a purely vegetable matter, that can be eaten without the least harm. I can convince anyone having the toothache, by relieving the pain in a few minutes, and showing them the worms on the receiving iron as they drop from the teeth. I have taken as many as thirteen worms from the teeth of a single person. I am no doctor, and do not pretend to cure but this one thing. I have cured a great many, but never charged anything up to the present time. No cure, no pay!"

Suffice it to say, in the spirit of despair a trial was made, and after allowing the smoke from a quantity of the medicine, placed on a heated iron, to enter the mouth by means of an inverted funnel, some twelve or fifteen worms (so-called) were found attached to the inner side of the funnel, and handed to me for investigation, which resulted as follows:

The objects, which certainly appear to the casual observer much like round, white worms, average one-fourth of an inch in length and one-thirtieth in diameter, with a tough integument quite regularly striated longitudinally. Its substance is of a waxy consistency and somewhat moist. Treating the "worms" with heat, water, ether, liquor potassae, acetic, nitric and sulphuric acid, benzine and "Mille's test," brought out various results. The cell structure was plainly shown in several instances, and I exhibit herewith drawings from the microscope, of the same.

Without entering into details, the invariable result of each of the tests made was conclusive, and I feel certain that there is no animal matter in the "worms," but that the objects are a peculiar formation arising from the substance used for the cure, which is the secret of the owner and jealously guarded.

There can hardly be a doubt but that the object is entirely of vegetable origin, and from the shape and reticulation of the cells cannot be of fungoid growth, and never had anything to do with diseased teeth. Whether this fact will detract from the permanent result in those cases where the pain has been allayed by the smoke or steam from the substance, remains to be seen.

The object and drawings of its cell structure were observed with interest, which was much enhanced by a verbal statement from Dr. Harkness, who fully confirmed the deductions of Mr. Kinne, and stated that some years ago he had studied the phenomena, arrived at the same conclusions, and having an opportunity to carry the investigation still further, ascertained that the remedy used was onion seed mixed with butter, which, on the application of heat, caused the germ to separate from its investment and lodge against the damp sides of the funnel; and further stated one essential point to be that the patient should be convinced that there were worms in the teeth, so that success depends upon the credulity of the subject of the experiment.

CURIOUS EFFECT OF COAL.—A curious effect of coal is related to have occurred in Meadville, Pa., recently. A strong bottle had been filled with water, and a cork placed in the nozzle. During the night the water froze solid, and the expansion pushed the cork from its place and formed a column of ice above the top of the bottle three inches in length and half an inch in diameter, the cork still remaining on the top of the shaft of ice.

A Home For All.

Every living thing should have a home. "Foxes have holes," and all burrowing animals excavate domiciles suited to their need; why should man, of all other animals, neglect to provide a home for himself and family—or allow himself to depend upon his neighbor for such a necessity? Endowed to the highest degree with the faculty of "inhabiteness," why should he either choose or be compelled to curtail his natural desire for the luxury or rather necessity of a home? It should be one of the first duties of every man to procure for himself either a temporary or permanent home—one that he should be able to call his home, and from which no power or circumstances should be permitted to drive him, save important public necessity, or fire, or flood. Especially should this be the case with every married pair. A home of his own fixes a man as few other things can, and takes away both the necessity and desire for the too prevalent necessity of "moving," a ruinously costly practice, and one which is alike destructive of prosperity or pleasure to both parents and children.

The lack of ability to provide a costly or elegant home should be no excuse for a total neglect of the duty under consideration. An extremely humble home in proprietorship is far more honorable and praiseworthy than a more costly and showy one the possession of which depends upon the caprice of a landlord. At the same time no man should be content to live in an old rookery who is able to provide his family with a comely and convenient home.

Many who own homes are quite too indifferent to give their domicils that care and attention which is necessary to ensure a proper degree of comfort and love for the homestead. Children should be taught to love and feel an honest pride in their homes. Inducements should be held out which will naturally lead to such a result. Ornament your homes, as you may be able to do from time to time. A few shade and ornamental trees, a little flower-garden, a tidy fence around the homestead, cost but little and add wonderfully to the love which will be begotten in a son or daughter for their home.

As a general thing it is difficult to place money where it will insure more pleasure or profit than when invested in a home. Better spend money in building and improving a home than for thousands of things of which we soon tire or finally throw away as worthless.

What Constitutes a Perfect Home.

That which combines the most instrumentalities for comfort and domestic enjoyment, is the thing that should be most sought for in a home. That is the first and most rational end in dwelling. In order to secure a reasonable degree of comfort the sanitary conditions of both house and locality should be taken into consideration. The house should be so placed as to secure for its rooms a proper amount of sunshine—modified, of course, according to climate. In the hot valleys shade is more desirable than on the sea coast. Too much sun can scarcely be thrown into a house in San Francisco.

Ventilation is another important matter which should be taken into consideration. Of this there should be a perfect control, in a manner to avoid drafts directly upon the inmates. Every human being requires a copious and constant supply of pure, fresh air; to ensure good or even passable health. The kitchen conveniences should form a prime consideration in every dwelling. Much depends on the arrangements for wood and water, and for sink, cooking and closet room, as regards the ease and facility with which the work in the family may be done. Practical housekeepers know that it takes nearly twice the labor to do up a given amount of work in rooms house than it does in others. Who can tell the amount of fretfulness, ill-temper, to say nothing of unnecessary exhaustion and sickness which an unhandy house occasion?

In building much depends upon the selection of the best spot for building. The same money will often build a good house on one spot which will be required to build a very indifferent one in another. But be your choice what it may, the house and site should be adapted to each other, and to the wants of the family. An elevated site best secures a fresh, dry atmosphere and general health. A valley or low place is much more generally subjected to the unhealthy influences of fogs, miasmas, etc. Good water is always one of the first essentials.

If you propose to put up anything like an expensive house, an architect should be consulted by all means. Such an expense may perhaps be avoided when a mere cheap, temporary house is to be provided, until financial possibilities will enable you to do better by adding on or tearing down. We propose to notice this subject further in a future number in which the architectural considerations will be more fully discussed.

At the Miner's Foundry they are making six drills for the Diamond drill company in this city. They are also making two steam engines for service at the Comstock mines.

SCIENTIFIC PROGRESS.

Condensation of Air on the Surface of Platinum.

After taking the weight of a clean platinum vessel, then wiping it thoroughly with a dry rag or soft paper and replacing it on the pan of the balance, it will be found to have lost weight; if of the ordinary size used in quantitative analysis, it will be found to have lost two milligrammes or more. If allowed to remain on the balance for fifteen or twenty minutes, it will be found to have recovered its weight. This change has usually been attributed to moisture; but it has recently been clearly established that such is not the case. The following is the result of some accurate experiments:

A new flat-bottomed capsule, four centimetres in diameter and two centimetres deep, having about fifty centimetres square of surface inside and outside, was first thoroughly cleaned by boiling in a solution of caustic soda. After thorough washing in distilled water it was heated to redness, allowed to cool, and in one hour weighed. It was now taken from the balance and wiped with clean filter-paper, taking care to touch, as far as possible, all parts of the surface, without using any violent friction. After being submitted to this operation it was replaced on the balance, and it was ascertained to have lost two milligrammes, and after being allowed to remain for twenty minutes its original weight was restored.

The vessel was now transferred to a drying receiver over sulphuric acid, and allowed to remain six hours; placed on the balance it weighed exactly what it did when placed in the drying receiver. It was now wiped as before, and on being replaced on the balance had lost two milligrammes, which it recovered, as before, in fifteen or twenty minutes.

The vessel was now transferred to a receiver in which the air was saturated with moisture from wet paper, placed on the glass support.

After six hours the capsule was placed in the balance, when it was found to weigh just the same as it did when it was introduced into the moist atmosphere. A dry atmosphere or a moist atmosphere was then shown to have no effect in producing this temporary loss of weight in the capsule.

From these experiments it shows very clearly that there is air condensed on the surface of platinum that a little rubbing will remove; but it will soon return to the platinum after this treatment. The importance of this fact will be manifest to the analytical chemist, and make him cautious about taking the tare of his platinum vessels too soon after wiping them.

POPULAR TREES AS LIGHTNING CONDUCTORS.—Who has not heard of the perils which environ people who live near rows of tall Lombardy poplar trees, such as were formerly so common in many places in New England and which are still cherished for their beautiful stateliness in some parts of Europe. Their great height and tapering form seems to fit them especially as a medium for conducting the electric fluid earthward. The danger arises from the tendency manifested by the fluid to glance off before entering the ground, and commit sad havoc in and about the adjacent dwellings. To avoid the necessity of sacrificing these ornamental trees to the well grounded fears of their owners, M. Colladan, of Genève, has published an essay on the subject of turning them into properly constituted lightning conductors by inserting in the lower part of the trunk a metallic rod, which he connects with the earth by a chain, so that the fluid can not leave the tree to dart at any object placed within a short distance, as at present so often happens.

CURIOUS ACTION OF ELECTRICITY ON IRON.—We made brief reference some months since to the remarkable phenomena first observed by Prof. Gore, a distinguished European electrician, which consists in the very perceptible twisting of a bar of iron by the joint effects of currents of electricity, passing longitudinally through and also around such a bar by means of the insulated wire of an enveloping helix. Subsequent experiments have shown that such twisting may be made to reach full one-quarter of a revolution. It has also been ascertained that both currents are necessary to the development of the phenomena. Either current, when applied separately, simply produces the ordinary effect of magnetizing the bar. The direction of the twist is definitely related to the direction of the current in the helix. In order to produce the fullest effect the currents must be simultaneous. When they are successive a perceptible twist results in a lesser degree.

THE FLIGHT OF BIRDS.—Birds have a more or less instinctive knowledge of engineering. When a bird commences its flight, if there is any wind, unless forced to take wing too suddenly, it will generally lean toward the wind at the start. The reason for such action is obvious. In order to readily ascend, each stroke of the wing must come in contact with a fresh volume of air, which could not be the case unless the bird either made a progressive movement or the air itself was wafted past the bird, as in a wind current. The downward impulse of successive strokes would be greatly impaired in their efficiency by heating largely upon air which comes in to fill the space from which the air has been removed by the preceding stroke. Hence, the onward movement of a bird plays an important part in the efficiency of the action of the wings.

Important Researches on Explosive Substances.

Recent experiments have shown that two different kinds of explosion can be produced in all explosive substances. The first is *deflagration*, the second is *detonation*. The deflagration of dynamite (gunpowder) is quite harmless; while its detonation, as produced by fulminate of mercury, develops an explosive force four or five times that of ordinary gunpowder. Gunpowder is no exception to this rule. When its deflagrating power, (ordinary discharge by a fuse) is represented by 1, its detonating power, when properly fired by fulminate of mercury, is 4.34.

Roux and Sarrazin have recently been making some careful experiments in this direction, which are reported in *Comptes Rendus* as follows: The reciprocal of the weight (due corrections made) of each substance, which when exploded in one and the other manner sufficed to send similar cast iron shells, gave the relative explosive forces. Some results of the experiments are given in the following table, the explosive force of gunpowder ignited in the ordinary manner being taken for unity:

NAME OF SUBSTANCE.	EXPLOSIVE FORCE.	
	2nd Order.	1st Order.
Mercury fulminate.....	1.00	9.28
Gunpowder.....	1.00	4.34
Nitro-glycerine.....	4.80	10.13
Gun Cotton.....	3.00	6.46
Floric Acid.....	2.04	5.50
Potassium picrate.....	1.82	5.31
Barium picrate.....	1.71	5.50
Strontium picrate.....	1.55	4.51
Lead picrate.....	1.55	5.94

Of the highest practical importance is the discovery of the detonative explosion of gunpowder induced by the detonation of nitro-glycerine (itself set off by the fulminate of mercury); for the force of the explosion is more than fourfold greater than that obtained by igniting gunpowder in the ordinary manner. (The increased force of gunpowder and gun cotton, when exploded by the agency of detonation, was fully demonstrated by Ahel six years ago). The authors observe that the mass of the substance employed for exciting detonation must usually bear a certain proportion to that of the substance to be exploded, but in some cases the action is propagated throughout the latter when once up at any given point.

A READY METHOD OF SHOWING THE ABSORPTION OF HYDROGEN BY PALLADIUM.—In the beautiful and important investigations of Graham upon the absorption of hydrogen by palladium, he describes a very pretty method of making this absorption very apparent to the eye, viz., to take a strip of thin palladium, place wax or other non-conducting and pliable substance on one surface of the strip, and then attach it to the proper pole of a galvanic battery, and plunge it into water acidulated with sulphuric acid, when the hydrogen that is evolved at that pole, instead of escaping as gas, is absorbed by the palladium, which now bends and coils up on itself in virtue of the expansion of the exposed side.

This same result I have been in the habit of exhibiting in my laboratory, with a small piece of very thin palladium about one and a half centimetres wide, and eight centimetres long. Light a small sized Bunsen burner, hold the piece of palladium in the upper part of the flame; it will get red hot, but remain in the same form as when introduced in the flame. Lower it now into the flame, until the unburnt gas from the center of the flame strikes the bottom of the metal; when it will immediately coil upwards, and can be made to double on itself. Carry it back to the upper part of the flame, and it will straighten itself again. There are some interesting chemical questions connected with this experiment that are worth working out, and at some leisure moment I will look into them; as for instance, the absorption of gas at the high temperature, and as to whether or not simple hydrogen is absorbed, the palladium thereby decomposing the hydro-carbon, etc.

MUSIC FROM NOISE.—A curious instrument has been exhibited before the Academy of Sciences, which is called by its inventor an "analyzing cornet." What we describe as noise is of course made up of an infinite number of musical notes, and these the cornet is designed to analyze just as a prism separates a ray of white light into its colored components. In appearance, the instrument is described as resembling a trumpet, having a nozzle to fit to the ear instead of a mouth piece, and furnished with holes, like a clarinet. Provided with one of these instruments, it is said that the roaring of a cataract or the howling of a tempest may be resolved by the listener, skilled in the necessary fingering, into the softest melody, which is heard, however, by himself only.

The chromo-lithographic process is described as follows: In place of using a special stone for each color, necessitating as many separate impressions as there are colors, the entire subject is drawn upon a single stone, and a proof is taken on a thin sheet of copper. This sheet is then cut out carefully according to the desired contour of the colors, and upon each of the portions is fixed a solid block of color, previously prepared. The whole is combined into one form, and is printed on an ordinary lithographic press, all the colors at once, the moisture of the sheet being sufficient to take off and hold the colors as the sheet goes through the press.

MECHANICAL PROGRESS.

Railway Platforms—a Crying Evil.

Among the innumerable plans ever being proposed and patented for saving the lives and limbs of railway passengers, says a New York journal, it is strange that one which requires no patenting should be lost sight of. We allude to the remodelling and levelling up of platforms at railway stations. Inquiries into the causes of the numerous railway accidents of last year have elicited the fact that many of them were, directly or indirectly, due to the unpunctuality of trains. How essential, then, to adopt all measures likely to promote good time-keeping! The varying height of railway platforms is a deadly enemy to punctuality. How are travelers—unless previously trained as acrobats and "gymnasts"—hurriedly to climb up to or get out of carriages, the floors of which are sometimes three feet, or three feet six inches above the platforms? Yet these facts have to be attempted by passengers of both sexes on many lines of railway, and especially during the excursion season. Muscular young men may succeed in the operation, but the old and the halt, as well as the very young, and ladies who have regard to decency, find it impossible of accomplishment. They must be helped in or helped out, or carried too far, or left behind, or, worse than all, meet with an "accident." Delay to the train is, at any rate, inevitable, and delay is the parent of unpunctuality and disaster. When four hundred or five hundred persons have to enter a train almost simultaneously, as frequently happens during the summer months, why should they be compelled to run the risk of breaking their arms, legs or necks? Common sense would suggest that every possible facility should be given for ingress to and egress from the carriages. In place of this, it seems to have occurred to the constructors of railway stations in general, that their best plan was to create stumbling-blocks, so as to make both processes as difficult and perilous as possible. The "rule of thumb," now generally denounced by scientific men is the only rule which has prevailed in the formation of platforms at railway stations. Scarcely two of them correspond in height on any single line of railway. Some are high, others are low, and others are medium. Very few indeed are what they ought to be, namely, level with the floors of carriages. It should be made as easy to enter or leave one of the latter as to step from the parlor to the hall or passage of a dwelling house.

[The evil complained of above is as serious in this vicinity as it is in New York, and hence the above is equally as applicable here, as there.—Eus. Press.]

A VALUABLE INVENTION.—Monsieur C. Jeanne, late an officer of the French Navy, is the inventor of a self-acting apparatus intended to show and register the speed of a ship, the number of miles made good, and the actual courses steered. It is to the last point the inventor more particularly invites attention. Attempts have been previously made, with more or less success, for the self-registering of speed, etc., but the automatic registration of a ship's course is something entirely new. The helmsman cannot vary a quarter of a point without its being shown. This part of the apparatus can be disconnected from the others and used alone, and from the practical experience of the inventor there is good reason for believing in the practicability of his invention. In the case of collisions, although the apparatus cannot, of course, prevent them, it would truthfully register the course steered by each ship, which is now one of the most debatable points with which official assessors have to deal, for this invention claims to give truthful evidence, and would thus far materially assist a correct decision being arrived at as to which vessel was right and which wrong, thus preventing maritime insurance companies from being unintentionally defrauded. This is a matter well worth the attention and consideration of underwriters, for with such a truthful "tell-tale" on board the wrong people could not well be called upon to pay.

AN IMPROVEMENT FOR LAYING DOWN STREET RAILS.—The President of the Third Avenue Railway Co., of New York, writes as follows to the *Scientific American*:

One of the greatest needs of street railroads is some simple and economical invention to keep the rails, where they meet, in a level condition; or, in other words, to prevent the end of the forward rail from sinking below the end of the rear rail. The device at present used is an iron plate placed under the junction of the two rails; but this does not entirely prevent the evil. I invite the attention of inventive minds to this subject.

BENDING HEAVY IRON.—It is now possible by the aid of hydraulic machinery to bend iron shafts of twelve inches in diameter to any required shape. Incredible as this statement may seem to an expert, crank shafts are now so made, instead of by the slow, laborious and expensive method of forging. The bent shafts are also said to be much better than forged ones, from the fact that the fiber of the metal runs in one direction continuously, whereas in forged ones it is often across the line of strain.

Fire-Proof Pillars.

The introduction of iron columns is now the leading characteristic of modern ordinary construction. Hardly a store-front is erected but we see a few slender pillars supporting an immense superstructure of stone or brick. The columns are all that can be desired under ordinary circumstances. They are strong and sturdy; they do not occupy much space. Their great drawback is in case of fire. A column that will support a certain given weight when cold will, when heated far below the melting point, give way under a fractional part of the weight, or if when heated it is played upon by a stream of cold water it will fly to pieces and down comes the superstructure, crushing in its fall the contents of the building and perhaps also, sundry luckless firemen. We see in an Eastern paper that a patent has been secured by the Rev. Geo. Bruce, of Aurora, N. Y., for an iron column in which these defects are to a great extent removed. It is described as follows:

The invention is a simple one, and consists in applying the principle of the fire-proof safe to an iron column. As in the case of the common iron pillar, a solid cast-iron column sustains the whole weight of the superstructure, but outside of this solid column is a thin cast-iron shell, and the space intervening between the outer shell and the inner column is filled with plaster of Paris, the non-conducting properties of which are well known. No weight is allowed to rest on the outer shell or the non-conductor that is used as filling, their only mission being to protect from the effects of heat the real support of the building, the inner column. These columns will be surrounded by an iron T girder, which is enclosed in a fire-proof casting of a similar nature, and the junction between the pillar and the girder is so formed that only the protected portion of the one touches the protected portion of the other, while the casing forms a tight joint, making the fire-proof armor complete. These columns are intended to take the place of the ordinary iron columns in ornamental fronts of buildings, as well as the interior of large warehouses where such supports are needed.

What is Steel?

Mr. Ralph Crooker, of Boston, and well known throughout the New England States as a rolling mill man, asks and answers the above question very concisely as follows:

"Steel.—A combination or an alloy of iron, that will forge, harden and temper."

There are various kinds of steel—such as carbon cast steel, tungsten cast steel, chrome cast steel, cyanogen cast steel and titanium cast steel; and several other metals have been alloyed with iron to make steel.

There is also blistered steel, which is made from malleable bar iron, by a process called cementation; German steel, which is made directly from the ore, and sometimes from pig iron, in the Catalan forge; and steel which is made by other processes.

The line between cast iron and steel is—when it is capable of being forged it is steel; and when it will not forge, it is cast iron. And the line between malleable iron and steel is—when it will harden and temper, it is steel; and when it will not harden and temper, it is malleable iron.

Cast steel will harden slightly when it contains from 0.25 per cent. to 0.30 per cent. of carbon, and ceases to be capable of forging if it contains much more than 1.75 per cent. of carbon.

BATTLE WIRE.—Some statements of Dr. Van der Weyde, in the *Manufacturer and Builder*, will be found of interest in connection with the use of telegraph wire, which it seems is not always what it should be. He tells us that the wire in use by the New York city police and fire alarm telegraph consists of steel and copper, was erected by contract, and cost the city at the exorbitant rate of \$1,360 per mile. The Western Union telegraph company uses an ordinary galvanized wire that cost it scarcely \$50 per mile. The heavy snow storm of December 20 last broke the city wires in every direction, and in such a way that they were an utter wreck, and the telegraph services of the Police and Fire departments were totally suspended until repairs were accomplished. At the same time the wires of the Western Union suffered little or no damage. In other words, the city was swindled with worthless telegraph wire at a cost twenty-six times greater than that by which a private corporation furnished itself with a serviceable article.

IRON FURNITURE. made of hollow iron, has recently been introduced into Germany. A large factory devoted to this class of manufacture has recently been established there. Ribbon iron, of the best quality, is taken and converted into tubing in pieces of about eight metres long, which can be bent cold into any form suitable for the making of bedsteads, chairs, tables, etc. Hollow iron is stronger than solid iron, such as that usually employed heretofore, and possesses this special advantage, that rivets hold better, and that it does not itself break so easily, as is frequently the case in solid iron, which gives way where there is a flaw.

KRUPP OUTDONE.—Quite a sensation has been produced in military circles in Vienna recently by some brilliant trials of new Austrian guns in steel and bronze. They proved superior to Krupp's cast steel guns.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

HYDRAULIC MINING.—*Amador Ledger*, April 24: A few days ago we paid a visit to the St. Mary's gravel claims, to observe the working of the Little Giant, now in operation, and from our observations made upon the ground, the immense power of 500 inches of water and 240 ft pressure, the vast quantity of earth, gravel and stone carried off in a given space of time, we came to the conclusion that we saw for the first time hydraulic mining in the county. Although the Giant stood at least 100 feet from the bank of gravel, yet the volume of water passing through the nozzle would strike the bank with astonishing force, hurling over and over boulders that it would require a stout man to move. In playing upon the bank for a few minutes, immense slides of earth and gravel would occur, which in an incredible short time would be passing through the sluices. We had no means of accurately ascertaining the number of tons removed in a given space of time, but we think we are within the bounds of reason when we say, 500 inches of water through the Little Giant, will remove in 12 hours more dirt, gravel and boulders, than could be picked down, shoveled up, and removed by a thousand men in the same length of time. The St. Mary's claims are now in fine condition, and present a very flattering appearance, and will undoubtedly prove valuable property.

CALAVERAS.

PROGRESSING.—*Calaveras Chronicle*, April 24: Work upon the quartz ledges recently discovered at Mosquito is progressing favorably, and the town wears a livelier appearance than it has before for years. Rich rock is being taken out and prospects for the development of paying mines are good. Labor upon a number of older claims in that vicinity is also being well remunerated.

REN HILL.—Work is being pushed steadily ahead in the hydraulic claim on Red hill, near the Buckeye. The claim is not yet sufficiently opened to work to advantage, but it is being got in shape as rapidly as circumstances will permit.

HAPPY VALLEY.—Things are running smoothly in Emerson's hydraulic claim in Happy Valley. New ground that prospects well has been reached, and piping goes on without interruption. It has been a long, tedious job to open the claim, but the mine will last for years and amply remunerate the owner for his labor and outlay.

CONTRA COSTA.

COAL.—*Antioch Ledger*, April 24: Richard Milie, of Somersville, has discovered a vein of coal on Corcoran's ranch, south of town, distant six miles. It is reported to be a two-ft vein, and preparations are being made to work the same the present summer.

WEST POINT DISTRICT.—Chick & Co. just cleaned up a large quantity of ore, at the rate of \$58.50 per ton. The large overshot wheel and hoisting works of the Josephine are nearly ready for action. The Champion main shaft is now about 140 ft in depth; ore as rich as ever. The whistle of the Anderson Flat mine has resumed its familiar scream. It is said that a new Superintendent will take charge of the mine, and that it has changed owners. The Good Faith tunnel is driven ahead steadily. The tunnel will not alone drain five veins, which yielded well in early times, but will also give the owners about fifty vertical ft of backs on each vein. A number of teams are employed hauling ore from Mentzel & Co.'s mine to the custom mills. Contractors are sinking on the old "Cheno," owned by F. Novella & Co., of San Francisco. A large and rich body of decomposed ore has recently been discovered near the Soap Root gulch.

FRESNO.

THE NEW DISCOVERY.—*Mariposa Gazette*, April 24: The accounts received from the mine recently discovered on the Fresno, corroborate fully the statement of the richness of the mine first published. The vein is about 35 feet in thickness; the extremely rich streak is from six inches to two feet wide, and pays from \$400 to \$800 dollars per ton, while the remainder of the entire vein will pay from \$40 to \$50 per ton at the point where the work has been and is now being carried on. We would hesitate to give publicity to such a statement as the foregoing were it not that we have been so frequently assured that it is no exaggeration. The rock is of a blue, flinty character, such as miners say rarely contains gold. The parties are now down about 30 feet, and the rock is richer at the bottom than any other part of the vein yet uncovered.

INYO.

ANOTHER ENTERPRISE.—*Panamint News*, April 22: To-day we made a visit to the new trick-yard just commenced by the company, where we found a large number of men actively engaged in moulding brick, putting up machines, preparing the yard, building roads and grading for a kiln. There are now thirty-six men employed, giving a lively business aspect to that portion of the town. The yard is under the supervision of C. B. Ricker, foreman, who informed us that the work of moulding was commenced yesterday, when over 4,000 brick were turned out. Three mud-mixing

machines, run by horse-power, are already in position, and a fourth will be added to-day. The material, found right at hand, is a clay loam, and from all appearances will make a very good article of burnt brick. The water is led in pipes to each machine, doing away with the labor usually experienced of either pumping or hauling it. When everything is in readiness—which will require but a day or two more—Mr. Ricker thinks they will be able to turn out fifteen thousand molded bricks a day. This kiln will contain one hundred thousand. Another will be started as soon as the first is finished. Wood for burning is found on the hill just above the yard, only requiring little labor to throw it down. The brick now being manufactured are to be used in building a huge stack for the company's mill, in setting the four large boilers, and for the Stedfeldt furnace. Some two hundred thousand will be required.

THE JESSIE MAY.—The Panamint mining company are pushing the work on their mines vigorously. The tunnel is progressing rapidly, making four feet per day, and the shaft on the lead is down fifty ft, and the vein steadily increases in width and richness. Superintendent Dolan is about to ship ten tons of ore to San Francisco to test its value by milling process. As an evidence of the confidence felt in the mines of this district, Superintendent Dolan has purchased for his company another one, called the Vanderbilt, which is situated near the noted Jessie May. This is believed to be a very valuable mine, the parties from whom Mr. Dolan purchased having refused an offer of \$7,000 from Senator Stewart some months since. The Panamint Consolidated company are now in possession of six mines, all showing well.

DARWIN DISTRICT ITEMS.—*Cor. Inyo Independent*, April 24: The miners feel sanguine that they have located in the best smelting district on the coast, and say they defy any camp to show as much ore on the dumps, for the amount of work done, as is to be seen here in Coso district. The mines are showing up well, and on every dump may be seen a large pile of first-class ore. It does seem strange that some one does not put up a custom furnace, I am certain he could get more ore than he could possibly smelt, and at a reasonable figure. As for the facilities for working, they are better than any other smelting district I have ever seen—and that is every one of note on the coast. Plenty of wood but ten miles off, and down grade the entire distance to haul it. As for water, Mr. Beaudry told me yesterday that he could furnish 150,000 gallons any time there is a demand for that quantity. And, in this connection, let me say that his first load of pipe arrived last night. Laying it will begin immediately. He has the ditch for it completed to within plowing distance of town, and can finish it in two days.

KERN.

KERN MILL.—*Kern County Courier*, April 24: We saw a statement a few weeks ago that a 70 stamp mill, the largest and finest in the State, was to be erected on the Consolidated Virginia. This county claims the largest and finest mill in the State. That on the Big Blue at Kernville has 80 stamps, and that of the Consolidated Virginia cannot by any possibility be better constructed or finished.

NAPA.

COPPER ORE.—*St. Helena Star*, April 22: Ten tons of copper ore were shipped last week by Friedberg & Co., from their mine near the mountain mill house. The ore averages 25 per cent. Messrs. Parks & Michel, near the same place, have a well defined lode of the same metal, south and joining the Friedberg mine; they will commence taking out ore as soon as they can finish their tunnel, which they are running to tap the lode 70 ft lower than the bottom of the shaft now sunk; their ore is high grade black oxide, running from 25 to 40 per cent. copper, and from \$3.50 to \$15.00 gold. A Middletown company have struck the same metal two miles northwest from them, on the same range. As yet they have not developed enough to say what they may have.

NEVADA.

NEW YORK HILL.—*Grass Valley Union*, April 24: Splendid ore has been struck in the New York hill tunnel, at a distance of 900 ft from the mouth of the tunnel. The ledge there is two ft thick and shows gold and heavy sulphurets. Superintendent Snyder is proud of his success and he is right.

HOWARD HILL MINE.—This mine is being worked under the superintendency of Captain John White. The work of pumping out and repairing the old works is progressing favorably. A ten inch pump is now at work, and about 300 gallons of water every minute are thrown to the surface. An additional pump will be in place at work to-morrow, and then 430 gallons a minute will be pumped out. A good looking ledge, parallel to the original Howard hill ledge, has been discovered on the company's ground and several rich specimens from it have been sent to San Francisco. Howard hill is about to be a good mine.

WORK AT NEW YORK HILL.—*Foothill Tidings*, April 24: In company with our friend J. D. Meek, we visited this mine on Thursday, and found superintendent Snyder driving things along as fast as possible. At the new hoisting works all is life and bustle. The new incline shaft is nearly completed to the tunnel or adit level—will probably connect this week—and is a fine piece of work. It has two car tracks and a pump and foot way. The quartz shows free gold quite frequently and the crushings they have had proclaim unmistakably the presence

of this precious metal; the last 500 loads worked out a round \$45,000, or over \$77 per ton. At present the force is working at a great disadvantage, but in the course of two or three weeks the machinery will be running, the heavy hand work will be over, and Old New York Hill will resume its ancient position of one of the heavy bullion producing mines of Grass Valley.

PLACER.

MINING.—*Placer Herald*, April 24: The Auburn gravel mining and ditch company, we understand, is driving things ahead rapidly. On the new ditch, which is taken out of Bear river ditch, above Clipper gap, to carry water to the claim, there are about 125 Chinamen at work. This ditch is to be three and one-fourth miles in length, beginning as above mentioned and running to top of hill back of Watson's ranch. From this point to the claim, a distance of about two miles, the water will be run through iron pipe 22 inches in diameter. This pipe is to be laid under ground, the ditch for which is also being dug by Chinamen. For fluming on the line of the ditch and fitting up the claim the company, we understand, will use about 100,000 feet of lumber, for furnishing which G. Van Geison, of the Sugar Pine mill, has the contract. The contract for cutting the bed-rock tunnel on the line of the new ditch is let to members of the company, and T. H. Gordon, we are informed, has the contract for placing the pipe on the ground. It will thus be seen that work on all parts is now, or very soon will be commenced; and almost without a doubt the entire work will be completed and the mine opened ready for operation within the prescribed time; viz., July 1st, 1875.

PLUMAS.

PROVIDENCE HILL.—*Plumas National*, April 24: Rush creek has been one of the richest streams ever discovered in Plumas county, and the Providence hill company are making good its high reputation. They took out \$50,000 for their run last season, and the pipes are running on equally good ground this year, but water is short and will not last for a long season's run. Mr. J. T. Serrin is unimpeachable. We are told that this company have more ground than they can work for years to come.

SAN BENITO.

CINNABAR.—*Watsonville Pajaronian*, April 22: T. Beck, J. A. Blackburn, N. Short, Mr. English and Mr. Hunt, have lately made discovery of a valuable quicksilver mine in the Staton mining district, San Benito county. Work already done there indicates a large body of ore, and imperfect assays of the top rock show 25 per cent. quicksilver. The Gray Eagle quicksilver mine looks now like a very good thing.

The Comstock quicksilver mining company, which was mentioned a short time since, seems to be progressing rapidly. We notice in front of Griffin's store four flasks of quicksilver, or about 300 pounds of metal, lately retorted at their mine. A larger force of workmen is soon to be set at work.

SONOMA.

LOCAL ITEMS.—*Russian River Flag*, April 22: The following quicksilver shipments were made from Calistoga last week: California Borax company, 282 flasks; Great Western, 95 flasks; Kearsarge, 5 flasks.

The Oakland mine, on the Hogsback, is doing well with its retorts; 100 flasks of quicksilver were shipped from there through Holsburg within the past week.

The Mt. Jackson furnace, after having had its condensing capacity trebled, was fired up last Friday and is working satisfactorily, without losing any metal. The yield of quicksilver is now from one to one and a half flasks a day.

The Great Eastern is turning out excellent ore in large quantities.

SIERRA.

QUARTZ.—*Mountain Messenger*, April 24: The owners of the Johnson ledge (we don't know its other name) near Rock creek, are now working five men, pushing ahead their lower tunnel. There are good indications that they will not have much further to go. The rock is rich, as demonstrated in the workings above.

BUNKER HILL.—We understand that the Bunker Hill mining company, near Little Grizzly, have found exceedingly good pay in their diggings. Within a space of two sets of timbers they are reported to have taken out thirty ounces, not long since.

ROCKY POINT.—Mr. Pickett, superintendent of the Rocky Point quartz mine, arrived here on Sunday afternoon, and at seven o'clock Monday morning had a gang of men at work in his tunnel. When he left last fall he had just reached the ledge. He will put the tunnel through the ledge as rapidly as possible and will thoroughly develop the mine, of the value of which there now remains no doubt.

WORK.—The Oro mining company will immediately put a force at work in their mine to develop it more fully by following the ledge into the hill. They have about one hundred feet of quartz above where the ledge was tapped, and from the pitch of the ledge on the surface this will increase rapidly as they go back. Bids for constructing a mill and machinery will be opened Saturday, 24th.

TRINITY.

FROM CINNABAR.—*Trinity Journal*, April 24: A friend writes us under date of April 18th, as follows: "Most of the parties here are doing nothing toward prospecting their claims, but Micawher like are waiting for something to

turn up. There is nothing new or exciting here. H. C. Wilt is still getting good prospects in his claim. Worland & Butler got in the first load for their furnace yesterday, which I understand they intend to erect immediately. Lytle & Hawtett are running their retorts, smelting selected ore, and are making two hundred pounds of quicksilver a day; they say they will make five hundred pounds a day as soon as they start in on concentrated ore."

Mr. J. A. Lytle was in town this week and informed us that his firm would commence retorting concentrated ore to-day, and expect henceforth to make from 100 to 150 flasks of quicksilver per month. They have completed three and a half miles of ditch, from Crow creek to their mines, and have their concentrating works running satisfactorily. Mr. Lytle thinks quicksilver can be produced cheaper in this county than elsewhere, owing to the richness of the ore and the facilities for mining, concentrating and reducing.

TUOLUMNE.

A PUBLIC BENEFIT.—*Tuolumne Independent*, April 24: The Tuolumne hydraulic mining company contemplate making extensive repairs of their Hydraulic Ditch in time for next season's water, and work will be commenced without delay. They will start in at the north fork of the Tuolumne river, follow the old line of ditch and convey the water from the river to their reservoirs on Sullivan's creek. The object of the company in making these repairs is to supply the dry season with water until nature herself showers it over the country. About four years ago this ditch was in running order and gave a good supply for mining and irrigating purposes; but this season the ditch is supplied by the reservoirs alone, and not having the usual amount of spring rain, is the cause of the scarcity of water at the present time. When the works are repaired to this river an abundance of water will be supplied from this source. The ditch will furnish the necessary element to Kincaid Flat, Algerine, Poverty Hill, Montezuma and the lower section of the county. In this section it waters Sonora, Union Hill and Shaw's Flat, and so on down through the Rough & Ready section.

THE NEW ALBANY.—Dr. Walker, superintendent of this mine, informs us that they will start in immediately to put on a first class ten-stamp mill, with all the modern improvements. The iron work will be done by the Sonora foundry company, their work being noted as much superior and finer in finish than the San Francisco foundries turn out; besides other advantages in having this work done at home, where alterations, repairs, etc., can be more satisfactorily and cheaply accomplished. The example of the New Albany in patronizing our local mechanics is one we hope to see followed by other companies, as being a benefit not only to themselves but to the locality wherein they expect to find their reward. The mill buildings will be put up as soon as lumber can be obtained. About 20 men will go up next week to prepare roads for hauling the lumber for the flume, which, with the ditch, will extend to two and one-eighth miles above the mill site, to a point on the north fork of the Tuolumne, for furnishing water. Its capacity will be about 250 inches, with a fall of 300 feet at the mill.

The old Summerset mine, owned by Thos. Whitto, Benny Sonlsby, John Sherwood and J. D. Redmond, started up last week. The mine is about a quarter of a mile from the Spring gulch, and it is the intention of the owners, at present, to haul the rock thither for crushing. They have cleaned out the tunnel of this old mine and are engaged in stoping and sinking on the chute, and have come upon rock that will mill as high as \$20 and \$30 to the ton.

Nevada.

WASHOE DISTRICT.

JULIA.—*Gold Hill News*, April 22: There is a slight increase in the flow of water at the bottom of the shaft. The main south drift on the 1000-ft level is still driven vigorously ahead, the face in porphyry, mixed with broken quartz of a little harder character than has been encountered for some time past, although it is still good picking.

OPHRE.—Daily yield, 150 tons of ore, mostly from the ore stopes and breasts on the 1455-ft level. The north drift from the 1600-ft station in the north winze has been extended along the ore vein a distance of 60 feet, at which point a cross drift has been run due east 80 feet and another west 50 feet, the face of both drifts still being in rich ore, and neither having yet reached the walls of the ledge. The east drifts at both the 1500 and 1600-ft stations in the main shaft are being pressed forward to connect with the north winze works, as rapidly as the nature of the work will permit.

CALIFORNIA.—The joint drift on the 1400-ft level is in 215 feet, the face in fair grade ore. The winze from the 1400-ft level is down 58 feet, the bottom still in good ore. The south drift in the ore vein from the winze is in 197 ft, the face in rich ore. The face of cross-cut No. 2 on the 1500-ft level is still in low grade quartz and ore. Cross-cut No. 3 on this level is in 263 ft, and has not yet reached the east ore vein. Cross-cut No. 4 is in a distance of 145 feet, and cross-cut No. 5, 70 ft. The face of the north drift to connect with cross-cut No. 4 is still in rich ore. Enlarging the main north drift on the 1500-ft level is making good progress.

SOUTH CALIFORNIA.—The fine large three compartment working shaft being sunk, is today down about 90 feet, and excellently timbered throughout. The rock at the bottom

is of a porphyrite character, with regular cleavage allowing of very good progress. The ore vein, which lies on the east side of the shaft, is a fine looking species of reddish quartz, giving good assays in silver and gold, and widening out as farther depth is attained.

BELCHER.—Driving the south drift from the bottom of the south winze on the 1500-ft level is making good headway, the face still in ore. Sinking the middle and north winzes below the 1400-ft level is making very fair headway, the bottom of both still in ore. The ore breasts are all looking well throughout the mine, the quality of ore having shown an improvement during the past month. Daily yield 450 tons of ore.

CALEDONIA.—Sinking the new shaft is making fine headway. The new powerful air compressor is on the ground ready for erection, and should the flow of water interfere with the sinking, a six-inch pump will be put in and run until the heavier machinery is ready to start up. A drain tunnel has been started which will tap the new shaft at a depth of 120 feet from the surface, saving that amount of lift for the water.

SAVAGE.—A large new giraffe has been placed in the main incline ready for use. The water tanks at the 2200-ft station are about completed, the car tracks laid on that level, and the new incline machinery ready to put into full working operation, so that it will be but a very short time now before the development of the ore vein on the 2200-ft level can be commenced in good earnest.

CONS. VIRGINIA.—Daily yield, 450 tons of ore. The ore breasts and stopes show no change on either the 1400 or 1500-ft levels. Owing to the repairs being prosecuted at the Gould & Curry shaft, no work is being done on the 1550-ft level. The joint drift on the 1400-ft level has not yet reached the ore vein. The C & C shaft is down 375 ft, at which point large water tanks are being put in to catch the water, which is believed to be only a surface vein. The mills are running up to their full working capacity, and the prospects of the mine are more flattering than ever before.

YELLOW JACKET.—The three new pumps in the main incline were all in position day before yesterday, all working with the greatest perfection. Draining the water from the incline below the 1740-ft level was immediately commenced.

SIEBNA NEVADA.—Sinking the new shaft is making the usual good progress. Sinking the old shaft is also making fine headway. Driving the northeast drift from the 700-ft station of the old shaft to prospect the ore vein and connect with the new shaft for air purposes is making good headway, the face still in a very encouraging character of ledge material.

HALE & NOBSCROSS.—The north drift on the 2100-ft level is in a distance of 331 ft, and will probably connect with the drift from the Savage on the same level in a day or two more, giving a much needed circulation of air, and greatly facilitating the developments on the lower levels in both mines.

SUTRO TUNNEL.—Very good progress has been made until last Monday night, when from lack of requisite timbering quite an extensive cave occurred between the face of the header and shaft No. 2, completely blocking up the tunnel. The men working the header were fortunately warned in time and made their escape. The work of tunneling through this caved mass, "catching it up" by means of spilling driven ahead, is already commenced, and the difficulty will soon be disposed of.

MEXICAN.—The quartz and ore on the northeast drift, on the 1465-ft level, are showing a decided improvement, and the prospects of finding a paying mine are becoming more favorable every day.

BULLION.—The east cross-cut from the north drift on the 1750-ft level of the Imperial is now in 70 ft, and will reach the ore vein in a very short time.

EUROPA.—The face of the drift is now in a solid body of quartz, which is no doubt the main ledge itself, showing bold and strong, but giving no high assays as yet.

LADY BAYAN.—The main west cross-cut on the 250-ft level is in 430 ft, the face still in low grade ore and white quartz of a very favorable character. It is undoubtedly a continuation of the same body found in the south drift, on the level above. Cross-cut No. 3, on the 80-ft level, is still in fine ore.

CHOLLAR-POTOSI.—Daily yield 35 tons of ore, the assay value of which is \$29 per ton. Both the south drift on the 1150 and 1250-ft levels are advancing steadily.

SILVER HILL.—The erection of the new pumping machinery is nearly completed and will undoubtedly all be ready for action by the first of May next. The ore prospects at the third level are looking more favorable.

SEC. GOLD HILL.—The new steam hoisting works have been started up and are now in successful operation.

OVERMAN.—Every possible effort is being made to get the new powerful pumping machinery running at the earliest moment. It is confidently expected that everything will be in readiness to start up by the first of May.

BALTIMORE AND AMERICAN FLAT.—The new pumping machinery is all running and works with the utmost smoothness. The water is being rapidly drained from the shaft. Cross-cutting the ore vein on both the 750 and 850-ft levels in both the Baltimore and American Flat ground will be commenced immediately.

LEO.—The ledge in the face of the main tunnel continues well defined, and carries a very favorable character of vein matter. The cross-

cut from this north drift is now in 20 ft in very promising formation.

IMPERIAL-EMPIRE.—The main south drift on the 2000-ft level is still driven vigorously ahead, the face in clay, quartz and porphyry.

ORIGINAL GOLD HILL.—The ore body developed by the cross-cut and raise of the south drift, is opening out splendidly, showing plenty of good milling ore, which gives very satisfactory assays.

GOULD & CURRY.—The erection of the new powerful pumping engine is making good progress, but will not probably be in readiness to run for a couple of weeks yet.

JUSTICE.—The water continues about the same as at last report. The rock in the face of the south drift at the 800-ft level is a little softer.

PHIL. SHEPIDAN.—The rock in the face of the drift is getting softer, with more streaks of black clay, and the stringers of quartz are coming in smaller and more numerous.

AMAZON.—The new working shaft is down 83 feet and thoroughly timbered throughout. When a depth of 100 feet is attained will be opened and a drift started to cross-cut the ore vein.

UTAH.—The flow of water from the face of the north drift on the 400-ft level, and also that from the bottom of this shaft remain unchanged.

SENATOR.—The south cross-cut has not yet reached the hanging wall of the ledge, but probably will very shortly, when drifting both north and south following the vein matter will be commenced.

MOORE AND MORAN.—Sinking in the shaft is about being resumed, and valuable developments may be looked for, as there are more indications, and really good ore, at the surface of this mine than anywhere along the east range.

NIAOABA.—The ledge at the bottom of the shaft continues to show improvement. Everything is working finely.

CORTEZ DISTRICT.

A SPOILT STORY.—Austin Reville, April 22: Many of our State exchanges, of late, have contained flaming accounts of the big bonanzas recently developed in Cortez district. We never like to spoil a story of a mining strike, but in this instance we have the most reliable information that "the component parts" of the ore in this mine are "principally lead." Indeed, to such an extent has the bonanzas increased in galenaic wealth that it is impossible to mill it, even with reverberatory furnaces, and the mill has been shut down. The Mexican pack train which had been employed in packing the ore from the "bonanza" to the mill, passed through Austin yesterday on its way to Birch creek, where it will be used in the wood business. The "bonanzas" may do smelting, however.

EUREKA DISTRICT.

RICHMOND SMELTING WORKS.—Eureka Sentinel, April 22: Since the closing down of the furnaces of the Richmond company the greatest activity prevails about the premises in repairing the works and introducing new improvements. The three old furnaces are being thoroughly overhauled, and when again brought in use will be in better condition than for a year past. The new iron furnace, designed for coke burning, now in course of erection, will be completed in a short time, and should the experiment in using this style of furnace prove successful it will doubtless produce an innovation in the art of smelting the ore from the mines of the district.

The wooden fine of the fume arrester, which has afforded us so many items, is also being attended to; the wooden portion is being torn away and is to be replaced by iron, which will prove more serviceable than its predecessor, which was continually catching fire and delaying the progress of the work. Superintendent Rickard is indefatigable in his efforts to have work resumed as soon as possible, and hopes to have everything again in motion the first of next month. The refining works of the company continue in active operation in the crystallization of the bullion to pure metal. Immense cakes of bullion, weighing ten tons each, are to be seen about the building in the various stages of transformation preparatory to the cupellation process. The second set of crystallizers are at work, and the third will soon be erected. The management feel highly gratified at the success attending the working results of this new department, as it insures them far better returns on their gross bullion than formerly, when compelled to pay the various charges incident to the transportation to the refinery in New York.

PEAVINE DISTRICT.

THE MINES.—Nevada State Journal, April 22: All of the mining companies are actively pushing ahead work. The different ore breasts in the Consolidated Poe are all looking well, and ore is constantly being hoisted for the mill. The ground for the new hoisting machinery is all graded. Breking through the large shaft on the Golden Fleece to the surface is getting along finely. Their machinery will consist of a double-acting engine, pump, etc., and will soon be on hand, to be erected on this shaft; then the incline will be sunk down about 500 ft further, when the most valuable ore will be taken out. Sinking the shaft of the Mineral Chief progresses; several feeders of quartz have been struck in descending the shaft. Water is coming in just in the direction the ledge pitches. The Carr tunnel is in a distance of 280 feet, and a contract has been let for another 100 ft. The Mountain View company have a fine 6 ft ledge,

much of which is high grade ore, assaying up into the hundreds. Work is being vigorously prosecuted on this claim. They are now on their ledge a distance of 40 ft, and will commence shipping their high grade ore in a few days. The New York tunnel is in 500 feet.

WHITE PINE DISTRICT.

RICH ROCK.—White Pine News, April 24: Uncle Johnny McCann has shown us some very rich specimens of ore, taken from the Bowie & Brown mine, situated on Blaine Hill, only about half a mile from Hamilton. The ledge is three feet wide, and has well defined walls. Some ore from this mine was worked at the Smoky mill two or three years ago which averaged \$129 per ton. It is considered a good mine.

LOOKING WELL.—The Summit tunnel company are running their tunnel on the east side of White Pine mountain, and are progressing finely. Their prospects are very flattering, having recently struck a body of ore which assays beyond the expectations of its owners.

SILVERADO MINE.—This mine is situated at Silverado canon, in this county, and is astonishing its owners with its wonderful yield. It has long been a paying mine, but recently, at a depth of 250 ft, they have struck a four foot ledge with well defined walls, and good judges estimate that the ore will not go less than \$200 per ton in silver alone. Mr. Shoenbar, the owner of the mine, is now engaged in sinking an artesian well at that place, with a view of putting up a furnace, if he can get a sufficient supply of water to run it.

Arizona.

SALE OF QUARTZ.—Arizona Citizen, April 16: Mr. S. Frederick purchased of Jack Goodwin, on Monday last, one-quarter interest in 2400 ft of the Senator ledge for the snug little sum of \$10,000 cash. This is none of your bonding nonsense, but an up and up sale and the money paid. The best of it is, Mr. Frederick being already largely interested in the ledge, and having worked the rock for a long time, knows just what he has bought, and would not to-day take twice the amount for his bargain.

MOHAVE COUNTY.—By telegraph, April 24: Late advices from Mohave county say the mines are looking better daily. Many strangers are arriving from California every day. Mineral Park presents a lively appearance. Quick-silver has been discovered in abundance in the valley of Chlorido, and experts pronounce the prospects very flattering.

Colorado.

GEORGETOWN BULLION SHIPMENTS.—Colorado Miner, April 10: The silver reducing company shipped for the week ending April 9th, \$7,735. The Judd and Crosby shipped for the same period, \$5,951.

BURLEIGH TUNNEL.—The Burleigh tunnel is being continuously worked, under the superintendence of Mr. C. G. Ryder. The length of the tunnel is now 1825 feet. The heading is very hard rock, and the average distance made per month is 20 feet. At present the only work being done is that of pushing the tunnel forward, no drifting being done on the lodes crossed by it.

DEMOCRAT MOUNTAIN, CLEAR CREEK COUNTY. There is no let up to the amount of work being done, and the growing productiveness of the rich mines on this mountain. Large amounts of ore are being daily extracted from the Rogers, Polar Star, Queen of the West, A. T. Stewart and other noted mines.

THE DOUGLAS TUNNEL.—Mr. Goetzel has been steadily driving the tunnel, owned by the Douglas silver mining company, into the heart of Douglas mountain, until it has reached a distance of 675 feet. Mr. Lamphire has thoroughly examined the ground into which this tunnel is running, as well as the character of the veins crossed, and believes the property to be one of the most promising in the mountains. The mountain shows no disturbance, the lodes are true fissure veins, and the development in lode No. 1 gives the most encouraging results. Mr. Goetzel deserves great credit for the energy he has displayed in driving this great enterprise, and every one will rejoice that a brilliant success is about to crown his efforts. He has had faith in Douglas mountain, and in tunnels, and has never doubted the result.

BROADWAY TUNNEL.—The work of development in this fine property, which has recently been started up after a long period of inactivity, may now be said to have merged into productive work. Rich ore and considerable of it has recently been struck, and we expect soon to be able to give a report from it.

Utah.

CLIFTON DISTRICT.—Correspondence Salt Lake Tribune, April 21: The Deep Creek Consolidated company have resumed operations, and are repairing their furnaces and putting men to work on their mines.

It is the opinion of every one who has visited this district, that it must ultimately become one of the most important in the Territory. Our great need is cheap transportation. Owing to our great distance from Salt Lake and the railroad, we pay a double tax on supplies and bullion, so that low grade ore will not pay to handle. It is the experience of all miners that the abundance of low grade ore is what makes a camp.

Clifton district is fortunate in having ore of a grade that will pay. Iron and copper abounds, but has been neglected owing to the great expense attending the hauling. The Deep Creek company, in working one of their mines on Gold hill, came on a splendid body of copper, four feet thick, and have shipped

two car loads to Baltimore, as an experiment, the result of which I will be able to inform you of in my next.

This great expense and difficulty of lining furnaces would be obviated if a railroad were here, as we have quarries of fine rock of a quality superior to any known on this coast, and in unlimited quantities.

Iron of a quality admirably adapted for fluxing ores is found here. Saving the comparatively small quantity used at the furnaces of this district, it has not been touched.

General News Items.

A young German, while seated in Portsmouth square, one day last week, took a derring from his pocket and applying the muzzle to his breast, deliberately pulled the trigger. Much to the Teuton's disappointment, the wound resulting did not prove immediately fatal, and he found himself obliged to hear what the public thought of his suicidal attempt and the cause leading thereto, as expressed in a note found in his pocket.

Two employment agents in Virginia were arrested last week for swindling immigrants out of a few dollars, under the pretence of furnishing them employment. The swindlers were adjudged guilty on seven distinct charges, and on the first fined each \$200 and in default of payment imprisoned for 90 days.

A LATE London dispatch states that considerable excitement prevails in Athens over the approaching elections, and that a state of siege is reported as impending. The Government is concentrating 5,000 soldiers in Athens, and it is supposed it intends to raise the army to a war footing.

CHARLES E. PICKETT, of this city, has been released from confinement in the county jail, where he has been since August last, under a sentence for alleged contempt of court. Mr. Justice Crockett was the court for which the philosopher expressed his contempt.

The steamer *Ventura* of G. N. & P. line was lost off Point Sur on the night of April 20th. Over 100 passengers were aboard, but all reached the shore safely. The loss, uninsured, is estimated at \$150,000.

THREE steamboats were burned at New Orleans on the 23d inst., and it is reported that 100 persons lost their lives by drowning while attempting to escape from the flames.

AN Oregon paper tells of a deaf mute who came into its composing room one morning and committed to memory all the boxes of the capital and lower cases, and set 1500 ems during the day.

A CHANCE has been made in the C. P. R. R. time table. Overland trains leave at 8 instead of 7 A. M., as heretofore, and arrive at 5:35, instead of 8:10 P. M.

The tannery of John F. Shultz, at Ora Leva, near Forbestown, in Butte county, was completely destroyed by fire on the night of the 19th inst.

A BANQUET was given to Carl Schurz by a large number of distinguished citizens in New York last Thursday evening. The ex-Senator is about to sail for Europe.

The old foundry building in Sacramento, belonging to the C. P. R. R., was burned last Saturday night.

A CAR attached to a train on the N. P. R. R. was blown from the track near Sancelito last week, and rolled down an embankment.

ATTORNEY General Williams has resigned and Judge Pierrepont, of New York, is reported to have been tendered the office.

It is said that \$100,000 worth of cattle and horses have been killed by buffalo gnats in Tennessee within the last week.

Industrial Items.

THE West Coast manufacturing company has 250 men at work, fifteen hours per day, turning out the furniture for the Palace Hotel, which the contract requires to be finished by the first of July. The order amounts to over half a million dollars.

A COMPANY has been organized in Los Angeles to bore for petroleum on the lands of a Mr. Boushay, near the city. The indications of oil are said to be quite favorable.

The Los Angeles Express expects General Forrest, of Memphis, Tennessee, to reach that place in May with 1,000 immigrants, more or less.

THE Grangers' Business Association of Dixon filed articles of incorporation with the Secretary of the State.

SIXTY men are at work on the new road between Santa Rosa and Napa, and expect to complete it in about thirty days.

GILROY presents, in the estimation of the *Leader*, great advantages for the erection of a tannery.

TRACK laying commenced on the Walla Walla Valley railroad on the 12th instant.

A MANUFACTURING city is what the Amador Ledge would have lone city become.

WAREHOUSES are to be erected and a wharf constructed by the Grangers at Martinez.

THE Petaluma woolen mill is nearly completed.

A new brick yard has been started in Chico.

Hydrographic Surveying.

The following paper was read before the California Academy of Sciences at its last meeting, by T. J. Lowry, of the U. S. Coast Survey:

Hydrographic surveys of bays, lakes, rivers, gulfs and the parts of oceans adjacent to coasts are indispensable requisites to a safe navigation and hence successful international commerce. Being of national importance they are therefore national undertakings—and the Government Coast Surveys and navies of all countries are engaged in determining and mapping the topography of the water basins and channels of the earth.

An accurate survey of waters adjacent to land is based upon a survey of the adjoining lands by means of which the figure of the coast and the positions of a sufficient number of conspicuous and well defined objects near the coast have been ascertained. These objects are the landmarks by observations of which the positions of points on the surface of the water (and hence the soundings) are determined. The relative positions of the landmarks are ascertained with a degree of accuracy proportionate to the character and extent of information to be given by the chart. When perfect accuracy is aimed at, many stations on shore (and especially on island shoals and reefs) are first determined usually by a trigonometrical survey whose accuracy is tested by a base of verification. The stations in the triangulation being selected with reference to the ultimate ends in view (viz., the wants of the hydrographer and navigator), will be so chosen as to include or determine lighthouses, headlands and other remarkable objects—not allowing the triangles, however, to depart too much from the well conditioned forms. In making choice of stations, and thus giving shapes to the triangles it is well to remember that where all the angles are to be observed, the condition most favorable to the accuracy of computation—i. e. where instrumental errors and errors of observation will least affect the determination—is where each triangle is equilateral. But where two angles only are to be observed, the unobserved angle should be a right angle and the observed angles equal to each other and never less than 25 or 30 degrees. Experience proves that in well conditioned triangles the small errors made in the measurement of the angles do not accumulate through each successive step in the operation, but on the whole tend to compensate each other.

Whatever extent of coast may be surveyed, each series of hydrographic operations will be confined to comparatively limited spaces, and the whole will consist of numerous detailed charts correctly linked together and harmonized by means of the triangulation on shore, a description, therefore, of the *modus operandi* in making a hydrographic survey of a single harbor or short sea reach will apply equally to the system adopted in the survey of an extensive line of coast.

Having made a reconnaissance of the region to be surveyed and gathered a general idea of the facilities for, as well as the difficulties of doing the work, the next step is to locate tide gauges and tide observers.

Judging from all information that can be gathered of the prevailing winds, currents, tides, shoals and the configuration of the shore line the hydrographer will fix the number and sites of his tide gauges so as to get data in determining the figure of the surface of the water at any given instant. They should be more numerous the more the surface of the water at any instant deviates from the horizontal form. And the fewer the gauges used the greater the care to be exercised in deciding upon their locations. Placing a gauge within a bar, sand-bank or other impediment to the free action of the water, or within a lagoon which winds fill with water faster than it can escape, is to be especially guarded against. And in comparatively limited basins of water at least two gauges should be established—one at that side of the basin nearest "whence the prevailing winds come" and the other nearest "whither they go." These gauges are not only checks on each other when the wind's action is an insignificant element, but where the wind drives water from one portion of the basin and piles it up in another, they furnish data indispensable for harmonizing soundings taken on those and calmer days.

In such a basin, when but one gauge is used, the proper place for it, theoretically speaking, is the center of the basin. These considerations attended to, each gauge is firmly fixed in a well sheltered spot, so that its zero shall be below low-water at neap, and its top above high-water at spring-tides. By proper circumspection for the site of each gauge, one will generally be found to answer for each station, but where the observations are made from shore two or more may at times become necessary—the observer following the tide from gauge to gauge as it goes out and retreating over the same path as it comes in. The kinds of tide gauges are as various as the circumstances demanding them. The one ordinarily used is of the simplest kind, a straight vertical post divided into feet and tenths, numbered from the bottom upwards; this is found generally to serve its purpose, inasmuch as when it is too windy to read the gauge correctly, it is blowing too much to sound accurately. A vertical tube with small holes at the bottom to admit the water which supports a float, is however, susceptible of closer readings under all circumstances; and for getting off-shore tides, Mitchell's gauge is admirably adapted; while as a self registering

gauge, Saxton's stands without a parallel and leaves nothing to be desired.

The zero of each gauge should be referred by means of a spirit-level, or otherwise, to a bench mark cut distinctly and durably on some permanent object (and the remark made in the book) so that if displaced it can be properly replaced in position.

For the purpose of reducing the soundings it is mainly essential that the tide-gauge, and sounding-boat watches be together; but where the laws of the tides of the locality are also desired, it is best to keep either lunar or mean solar time. A series of observations of the tides on these gauges made simultaneously with the soundings furnish data for reducing each sounding to the reference plane—the mean of the lowest water. This plane is also given by these tidal observations. The frequency of the necessary readings of the gauge varies from every half-hour to every five minutes, according to the rapidity of the rise and fall of the tide.

And now, if there be not on the shore permanent well-defined objects that will serve as signals, such as spires, towers, flagstuffs, light-houses, or tall slender trees fixed by triangulation, then the hydrographer erects the necessary signals; usually tripods boarded up, and painted white if projected on dark background from the sounding boat, or red, (or black) if against the sky or a sandy background.

The tide-gauges and signals being erected, the next step is to determine carefully with a theodolite the relative position of these signals and plot them by the computed sides of the triangles of which they are the vertices. It is, however, not imperative that the actual sizes of the triangles be at first known—but the triangles can be computed and plotted from any assumed base, since the "relative positions of the signals" is the essential desideratum.

Hydrographic surveys all have for their main object the tracing, determining and plotting, on a suitable scale, the contour lines of navigable channels and water-basins. Contouring represents the inequalities of the earth's surface by determining the relative heights of any number of points above or below a line equidistant at every point from the earth's center. This line is what is understood by the term "a level-line"—and is that which is assumed by the surface of the water when at rest. In mapping the contours of parts of the earth not covered with water, after the principal contour lines are drawn on the topographical sheet, intermediate lines may, with the ground before the eye, be sketched in; but such interpolations are obviously impossible when tracing the contour lines of a basin filled with water, as in hydrography, where a series of points in the curves of equal depths are brought out only by lines of levels made with the sounding-line. Now since these lines of equal depths are analogous to contour-lines on land—being contour-lines of the bottom of the water-basin drawn through those points where the reduced soundings are equal—the same rule hence, obtains in hydrography as in topography for the directions of the lines of levels for developing them—viz: the perpendicular and parallel to the strike or dip of the bottom, i. e. one system of sounding-lines coincident with, and another at right angles to the lines of the steepest declivity of the bottom. The lines, run in the general directions of the "curves of equal depths, or horizontal curves, are the main-lines in developing the contours of the bottom, yet the auxiliary lines which should be run perpendicular to these not only check these depths but also furnish additional data for drawing these curves of equal depths. At a crossing of these lines the difference of the soundings should not be more than three per cent., and the limit of error must not exceed five per cent. of the depth.

To form an idea of the general configuration of the bottom of a body of water, we must call in every available aid; as, the topography and geology of the adjacent coast, the effects of currents, tides and prevailing winds, and most of all the revelations of our lead-line, which assist us in judging of the topography of the parts yet unsounded, and hence better fix upon the directions of the lines to be run. The force and directions of winds and currents and qualities of the vessel must of course be considered in laying out directions of sounding lines. And the greater discretion exercised in giving directions to these lines the fewer in number will it require to bring out the bottom's varied features in the length and breadth of their modulation. The number of lines required depends upon the extent of the information to be furnished by the chart.

If, for purposes of general navigation, the soundings on the map will be sufficiently numerous when the horizontal curves (viz.—fathom and half fathom, up to three fathoms and inside of that feet, curves) can be drawn without doubt as to their directions in any case. As to the frequency of the casts, where the bottom is very irregular, are wanted not casts at studiously regular intervals, but every possible sounding.

Whether it is the demands of the navigator or the marine engineer that are being satisfied, along with these contour lines of the bottom are required the materials of which the bottom consists, the level, rise and fall of the water, the directions and speeds of its currents and at times the temperatures and specific gravities of the water. The accuracy of the methods and instruments for executing these surveys also varies with the amount of detailed information required. If the survey be made for the erection of a breakwater instead of purposes of general navigation, then are de-

sired more instruments for observations, more well determined signals, more cast positions determined, more soundings on a line and more lines of soundings, more specimens of bottom and more current observations. In every case, however, the whole ground should be gone over thoroughly to bring out the general features of the bottom and detect each sudden irregularity of depth, which should be traced through its every line of approach, and if it proves to be an isolated knoll or ridge, it may be "rayed off" by planting one or more temporary buoys on it, and to and from them running radii in different directions. However, as these radial lines are often insufficient to bring out its every feature, others may be run at right angles to them. Yet for general purposes of navigation the general features and extent of a reef and the shoalest cast on it are found amply sufficient. As each sounding is taken the surveyor notes its depth and also the time which fixes its position with reference to other points on the line determined by either sextant, theodolite or compass angles on known fixed points.

The degree of precision with which the positions of the sounding boat are fixed determines the accuracy, and hence usefulness, of a hydrographic survey. To fix the position of the sounding boat under every variety of circumstances is therefore the all important problem in practical hydrography, and the methods most universally relied upon by the hydrographer for determining his boat's position is that by the three-point problem.

This problem is wide in its application, accurate in its determinations and most simple in its graphic solutions. The simultaneous observation of the two angles subtended by three signals fix the place of observation under every possible contingency—except when it is on the circle passing through these three signals—i. e., when the three circles of position are coincident. The accuracy of the determination of positions by this problem depends mainly upon the relative positions of the signals and the observer, and the size of the observed angles—being the very best where the signals are equidistant from the observer, and subtending angles of 120 degrees. The three signals in a straight line, is a favorite location with many hydrographers, as it offers but one case of indeterminateness, and that very easily avoided, of being on the straight line passing through them. But in general a most desirable location is where the circle through the three signals is convex towards the observer, and the middle one is the nearest of the signals, for then "a revolver" is impossible. Other things being equal, it is better to "angle on" the more distant objects which subtend good sized angles, say from 45 to 135 degrees, for not only is the parallax of the sextant then less, but an error made in getting an exact coincidence of the images of the signals is then less felt by the angles than if the signals were near or the angles very acute.

And besides what is thus told by the relative positions of the signals, the hydrographer should be able to read the tale which the size of the observed angles tell of a position's fixedness. If the sum of the observed angles equals 180 degrees or more, then the observer is sure he is not on the circle of indeterminateness. But if this sum is less than 180 degrees and equal, or nearly so, to the supplement of the angle subtended at the middle signal of the other two, then the position is not determined. By having these supplements written about the signals, between the proper lines, on the field-sheet, we can by a mental summing of the observed angles tell (without plotting) whether we are too near the circle to get a good determination; and may thus catch other angles that better fix our position.

The three-point problem finds in the three-arm circular protractor an accurate, simple and most expeditious graphic solution, which is most extensively used in plotting positions of the sounding boat. In practice the observed angles are set off on the proper lines of the protractor, and the fiducial edges of its arms caused to traverse the three points representing the signals observed upon, and the center dotted and the position is plotted. If breakers denoting danger be observed at a time when it is impossible to anchor over them or even approach them to fix a buoy to mark their locality, their position may be marked quite accurately by pulling around them and getting cross ranges (or cross magnetic bearings) of prominent objects on shore so disposed as to guide the observer to the spot in more favorable weather, when a perfect calm may leave no trace whereby the danger can be recognized.

A NEW MODE OF MANUFACTURING SCREWS has been introduced at Edinburgh. By this method the screw, instead of being made, as at present, by cutting away the iron of the bolt to leave the thread, is formed by rolling the screw on the bolt blank while hot. It is claimed for this process that a great saving of time and labor is effected. Recent experiments have shown that the tensile strength and the holding power in both hard and soft wood of rolled screws were considerably greater than those of cut ones.

VENTILATION.—The importance of a thorough ventilation in our dwellings may be inferred from the following: If the air of a crowded apartment is conducted through water, so much animal matter is collected in the water as to occasion a speedy putrefactive fermentation, with a disgusting odor.

The Locomotive.

Looking at the locomotive in a national point of view, its value to a nation as a machine connected with the development of its wealth and progress is measured by the cost of carrying a ton of goods and a passenger a mile. The lower this can be made, the greater its benefit, and the more extended the range of its influence and operations. This should be the point of strife between nations: how low can you bring the cost of carrying? Any intelligent person who will examine this matter, with the vast amount of data at his command, will find that, considering the price we pay for labor, metals and fuel, no other country has solved this problem with the same gratifying results.

The vast business of the Pennsylvania Railroad, including the passage of the Allegheny Mountains, for 1874, shows that it moved nearly ten millions of tons of minerals and merchandise at a cost of 0.719 of a cent per ton per mile and carried more than six millions of passengers at a cost of 1.60 cents per passenger per mile. Can any other road in the world out of the United States show such results, or anything near them, after equating the prices paid for labor and metals, to say nothing of the severe climate, the steep grades and the sharp curves of this railway, which cannot be encountered without extra cost.

CONVERSION OF LOCOMOTIVES INTO STATIONARY ENGINES AND BOILERS.—The change of gauge on the Great Western Railway, in England, has necessitated the introduction of new locomotives, adapted to the narrow gauge-line now in use, and the locomotives formerly used have consequently been thrown out of employment. These last named engines have been purchased by Mr. Barton, of London, who is converting them into stationary engines and boilers which are likely to be of great service for wind-mill, pumping, and other similar purposes. The boilers are well adapted for stationary purposes, and present several other obvious advantages over the old Cornish type. They evaporate considerably more water per pound of fuel on account of the large heating surface; they have large copper fire boxes; quality of fuel is not so important, as an artificial draft can be created by steam jet in chimney, and can be worked at 120 lbs. pressure, and up to 400 H. P., smaller sizes can be supplied. The engines can be secured on cast iron bedplate if required, are easily moved and occupy but little space. The expense of setting is avoided, as no brickwork or brick chimney is necessary. No doubt also the cost of the converted locomotives is moderate, and as they are at once compact, and massive, and built in a style very superior to that of ordinary stationary engines, it may be of service to our readers, even in this country, to call attention to the above facts.

MASSACHUSETTS MINES.—The Boston Advertiser, which devotes a column and a half to divers and sundry "loaves," "claims" and companies in connection with the Essex mining region, says: "Every item that finds its way from the latest known mining section of New England into the moving stream of news, points to an immigration to the regions near Newburyport during the coming spring and summer as odd and great in proportion as that which inspired Bret Harte's lecture. Yet even at this early period in the undeveloped history of the Newburyport mines, there are many indications of the swindles that will be, of the money that will be lost through speculation in worthless land or by the sudden death of bogus stock companies, and of the chicanery and deception, the levers by which adventurers move their measures. It certainly does not seem as if there could be any possible doubt but what underlying the land for many miles in and around Newburyport are mineral deposits, rich in silver, lead and gold. Outcroppings and undoubtedly genuine specimens of galena, rich in a percentage of silver, have been found in many different places throughout that section that would indicate veins of different length and direction—a sort of titles to the chapters of Essex mining—that are inevitably to follow.

SHEET METAL STATUARY.—The manufacture of sheet metal statuary for ornamental and architectural purposes is quite novel, but fast becoming an important branch of industry. Sheet zinc is the material employed, and it is wonderful to notice the skill displayed in this line, and the perfection to which such work has been carried. The new court-house at Jackson, Mich., has recently been ornamented with a full length figure of Justice, seven feet high, made from sheet zinc, which weighs only 100 pounds. The figure is pronounced by experts as very superior, and was the work of the Kittridge Cornice and Ornament Company, of Philadelphia. This company propose to make a specialty of sheet metal statuary.

SIMPLE TEST FOR LUBRICATING OILS.—The following simple method for testing the products of hydrocarbons or mineral oils in lubricating mediums will be found both convenient and useful for every engineer or mechanic: Fill a bottle with the oil in question, moistening the cork and inside of the neck of the bottle, and then twisting the cork about its longer axis. The best lubricating oils produce no sound, but the more the oil is adulterated with hydrocarbons and products of dry distillation, the louder the noise produced. An oil that gives a loud cry is most unfitted for a lubricator.

USEFUL INFORMATION.

The White Streak in Silk—An Interesting Discovery.

For a number of years the silk manufacturers of this country have been troubled by the appearance of what is commonly called a "white streak" in dyed silk. This name describes the appearance about as well as any other term we can apply, and has been adopted for lack of any more positive information respecting it. It makes its appearance principally on black silk after it has been wound on the spools ready for use on the sewing machines. It is not, however, confined to black machine twist, but is visible in many of the other dark colors.

It has the appearance of a slight roughness or fuzz on the side of the thread as it lies on the spool. It is invariably white and easily recognized, especially when it occurs in the black silk. The combined talents of the silk manufacturers and dyers in this country have been employed during the last few years to discover some method of overcoming the white streak, either by varying the process of manufacture or by covering it in the dye. As yet all efforts have failed to be completely successful. Various theories have been proposed to account for its appearance; much time and money have been spent in the study of the question, without arriving at any certain knowledge concerning it.

Some manufacturers believe that it is due to carelessness during the process of dyeing; that the silk is not thoroughly washed from the soap suds in which it is boiled, leaving particles of soap adhering to the silk. Others stoutly affirm that it is due to the dead wood which the silk takes on as it passes over the wooden rollers of a machine known as the stretcher.

The Nonotuck silk company's present theory is that the streak is due in some way to the process of adulteration to which the silk is subjected as it is wound on to the reel from the cocoon. They think it possible that the cocoons when wound may be soaked in warm water to which a quantity of rice starch has been added, thus making a kind of rice water or thin paste, which the silk takes up as it is wound, thus adding a cheap weighting material to the silk.

That this theory does not account for the appearance of the streak is evident, since some of our brands of silk, we are confident, are perfectly free from any adulteration, but yet the streak occurs abundantly in them. A careful examination with the microscope and chemical reagents, for the purpose of obtaining some definite idea of its nature, soon settled the fact that it is a vegetable substance of some kind; but exactly of what nature, I was unable at once to determine. This slight clue enabled our dyer to apply a dye that would partly cover it. This new process of dyeing, however, was attended with many objections. It was more expensive, while it took a much longer time to dye the silk. Our greatest objection to this method of dyeing was that it increased the weight of the silk with the dye stuff, thus injuring its quality and affecting its strength. We could ill afford to sacrifice the strength of the silk for the sake of covering the streak, so we sought to avoid the difficulty by using another brand of silk. I finally became convinced by careful examination that it was of the nature of a parasite, or a fungus growth on the raw silk. All of my researches tended to confirm this theory.

I have lately submitted samples of the streak, which were found both in the raw silk and in dyed silk, to Professors Verrill, Eaton and Johnson, of Yale College, New Haven, who all confirmed the theory of its being a fungus growth on the silk. An eminent naturalist of Boston, whom I consulted on the subject, also confirms the theory, and thinks that we may find that this growth is connected with the disease with which the silk worms of Europe have been troubled for so long a time.—C. A. Burt, Oneida Circular.

Interesting Experiments With Flowers.

The *Journal d'Horticulture de France* contains some interesting particulars on the artificial coloring of natural flowers. Those that have a violet hue will gradually change color and turn to green under the influence of the smoke of a cigar. This change is owing to the ammonia contained in tobacco. Starting from this circumstance the Italian professor, L. Gabba, has made a series of experiments on a variety of plants with that alkali in its natural state. His apparatus is a very simple one, merely consisting of a plate into which he pours liquid ammonia, covering it afterwards with a reversed glass funnel. The flower to be tested is inserted into the tube. In this way he has seen violet, blue, and purple turn to bright green; intense carmine red (of the pink) become black; white turn yellow, &c. The most extraordinary results were afforded by variegated flowers. When the latter, immediately after this exposure, are dipped into pure water, they will retain their new colors for several hours, after which they simply return to their former state. Another curious discovery of Professor Gabba's is that the flowers of aster, or starwort, that are violet and have no smell, acquire a delightful fragrance and turn red under the influence of ammonia. We know that the Japanese, by means of injections which they keep secret, can color or whiten flowers and obtain wonderful variegation. The Chinese

have also secrets of their own, among which is one for reducing large trees to a dwarf size. The Garden of Acclimatization has at this moment an orange tree, a hundred years old, and imported from China, no bigger than a rose tree; its fruit scarcely attains the size of a cherry.

[The above experiments may be easily repeated by any person curious in each thing. The effect of a black pink or a green violet in a bouquet would certainly be very curious if nothing more.—Ems. Press.]

COLOR OF THE CHAMELEON.—An English paper gives some interesting facts relative to the cause of change of color in the chameleon, which have been gathered from remarks made on this subject by M. Paul Bert, at a late meeting of the Société de Biologie de Paris. This animal, whose natural color is dark green, has the power of changing to pale green, and very pale yellow, this change of color being entirely due to the nervous system. The explanation of this phenomenon is thus given: "Under the skin, and communicating with it, are vessels filled with pigment, coursing through little canals which intersect, cross, and interlace each other in all directions at the back of the epidermis itself. This pigment is afterwards drawn back into the vesicles by the volition of the animal, and the chameleon then takes on a pale tint produced by a pale yellow tissue, visible by its transparency." It has been discovered that the color of the animal is affected by light, and that if disturbed at night the side on which a light is thrown becomes pale, the other side remaining unchanged. So far, no explanation of this curious fact has been suggested, and it offers a field for research and observation which may lead to very important results.

JELLY FROM OLD BOOTS.—The reader may stare, but science smiles supreme, and asserts very emphatically that a toothsome delicacy can be made from a dilapidated foot covering. Some time ago, says the *Scientific American*, Dr. Van der Weyde, regaled some friends not merely with boot jelly, but with shirt coffee; and the repast was pronounced by all partakers excellent. The doctor tells us that he made the jelly by first cleaning the boot and subsequently boiling it with soda under a pressure of about two atmospheres. The tannic acid in the leather combined with salt, made tannate of soda and the gelatine rose to the top, whence it was removed and dried. From this last, with suitable flavoring material, the jelly was readily concocted. The shirt coffee, incidentally mentioned above, was sweetened with cuff and collar sugar, both coffee and sugar being produced in the same way. The linen (after, of course, washing,) was treated with nitric acid, which acting on the lignite contained in the fibre, produced glucose, or grape sugar. This, roasted, made an excellent imitation coffee, which an addition of unroasted glucose readily sweetened.

GOOD HEALTH.

Worth Knowing, if True.

Among the many sanitary virtues which have been ascribed to the eucalyptus or Australian gum tree, we have now the assertion that it is especially valuable for rheumatism, a disease which has heretofore baffled medical science. Instances are given in proof of the assertion, and among others the two following by the *Petaluma Argus*. It appears a gentleman named John Quinlan had tried most of the approved remedies to mitigate the pain of this affliction, without avail. He visited the West India islands and many other regions for relief, but did not obtain it. Coming to Petaluma, one of our hotel keepers, with whom Mr. Quinlan was acquainted, noticed among his guests a man who had his arms and legs bound up with leaves. Upon questioning the party he learned that he was afflicted with rheumatism, and that he had bound the diseased parts with the leaves of the eucalyptus tree, from which he had experienced great relief and apparently almost a permanent cure in a few days. This intelligence was communicated to Mr. Quinlan, who immediately tried the experiment, with the most gratifying results. He procured a quantity of rank green eucalyptus leaves and beating each one slightly, bound them upon the parts in which he felt the most pain. The effect was marvellous; the pain ceased in a short time, and in a little while the long suffering patient felt like a new man. He continued to apply the leaves and to wear them while walking about the streets, and at the end of two weeks felt entirely well. He says no amount of money would purchase from him the power of applying this remedy, should he be attacked again.

The *Call*, of this city, a few days after publishing the above, gave its readers the following additional confirmation: Since our article of Tuesday, attesting to the virtues of eucalyptus leaves in the cure of rheumatism several persons have since called at our office—among the number a clergyman—to corroborate the statement. They report that they have seen the leaves applied to the affected parts of several sufferers from this painful disease, in each of which the relief afforded was almost immediate, with the prospect of being permanent.

This remedy has the merit of being inexpensive. Persons afflicted with the rheumatism may give it a trial. If it will do for others what Mr. Quinlan says it has done for him, a discovery is made for which tens of thousands of suffering people will feel thankful.

Pathological—What we Breathe.

Very suggestive experiments have been made by Mr. Blackly, in connection with his researches upon the "hay fever," with a view of determining the extent to which pollen of various plants is diffused throughout the atmosphere. His first series of inquiries was instituted in a meadow at the average breathing level of four feet nine inches from the ground, beginning in April and continuing until the end of July. A slip of glass was exposed horizontally, coated with a thin layer of non-drying liquid. The results were tabulated daily, and the highest number of pollen grains obtained on a square centimeter in twenty-four hours was 880, June 28. Sudden diminutions in the quantity of pollen—when these occurred in the ascending scale, between May 28 and June 28—were invariably due to a fall of rain, or to this and a fall in the temperature. Mr. Blackly also examined the amount of pollen to be found in the highest strata of the atmosphere. This was done by means of a kite, which, by being attached to other kites, sometimes attained an elevation of 1,000 feet. The pollen was found to be much more largely present at the upper levels than at the "breathing level." Taking the average of the quantities where pollen was present at both levels, he found that while the average of the ordinary level was 21 only, for each experiment, that for the higher levels was 472.33, or more than nineteen times as much. After making due allowance for the difference in the velocity of the air at various altitudes there still remains a great preponderance unaccounted for in the amount of pollen in the upper strata.

Mr. Blackly remarks that his experiments also afforded abundant proof of the presence of fungoid spores in the air in large quantities. In one experiment, which lasted four hours, and in which the number of pollen grains collected at an altitude of 1,000 feet was 1,200, the spores of a cryptogam (probably *Ustilago segetum*) were so numerous that he could not count them. At a rough estimate they could not be less than thirty to forty thousand to the square inch. A fact like this makes the ubiquity of fungoid organisms a thing easy to comprehend.

Delicate People.

There is a constant sympathy expressed by robust people for those of slight physical constitutions. We think the sympathy ought to turn in the opposite direction. It is the delicate people who escape the most fearful disorders, and in three cases out of four live the longest. Those of gigantic stature are almost always reckless of health.

They say, "Nothing hurts me," and so they stand in drafts, and go into the night air to cool off, and eat crabs at midnight, and doff their flannels in April, and get their feet wet. But delicate people are shy of peril. They know that disease has been fishing for them for twenty years, and they keep away from the hook. No trout can be caught if he sees the shadow of the sportsman on the hook. These people whom everybody expects to die, live on most tenaciously. We know of a young lady who evidently married a wealthy man of eighty-five years on the ground that he was very delicate, and with reference to her one-third. But the aged invalid is so careful of his health, and the young wife so careless of hers, that it is now uncertain whether she will inherit his storehouses, or he will inherit her wedding rings. Health and longevity depend more upon caution and intelligent management of one's self than upon original physical outfit.—*Exchange*.

HYGIENIC BOOT SOLES.—Is there any method of making the bottoms of boots so moisture will not pass through them? This is a practical question—several methods have been tried. One is to have a cork layer between the inner and outer sole; but this thickens the boot bottom too much. Another is to cover the bottom of the boot with rubber; but the rubber soles are apt to come off, as they have to be cemented on. Still another way is to have a rubber sole with a leather margin pegged on, and this we think has proved more or less satisfactory; but it is difficult to introduce it. What is needed is that common leather should be so prepared as to be impervious to water. It can be done—who of our hygienists will do it?

A HEAVY DOSE OF MERCURY.—A few days ago, says the *Gilroy Advocate*, of April 3, Mrs. Anna Babb's little boy drank a pound of quicksilver. The child is less than three years old, and even in California is considered rather young to indulge in so strong a beverage. He found the mercury bottle in some rubbish in an old trunk, while playing, and drank the whole, leaving but a few drops. The physician was sent for, who administered some light remedy. The child gave no other indication of having taken the mercury than drowsiness. The metal did not all leave the stomach for ten days, but he was about all the time, and is now bright as ever.

A DOG WITH THE MEASLES.—A house dog in Upton, Mass., had the measles simultaneously with the children of the family, from whom he caught the disease. He was carefully doctored, and was getting along finely, when one day he slipped out of doors and played in a snow bank. This indiscretion was fatal. He took cold and died.

DOMESTIC ECONOMY.

Cooking For Invalids.

Following are some excellent hints, taken from *Arthur's Magazine*, in reference to cooking for invalids:

Let all the kitchen utensils used in the preparation of invalids' cookery be delicately and scrupulously clean; if this is not the case a disagreeable flavor may be imparted to the preparation, which flavor may disgust and prevent the patient from partaking of the refreshment when brought to him or her.

For invalids, never make a large quantity of one thing, as they seldom require much at a time, and it is desirable that variety be provided them.

Always have something in readiness; a little beef tea, nicely made and nicely skimmed, a few spoonfuls of jelly, etc., that it may be administered as soon almost as the invalid wishes for it. If obliged to wait a long time, the patient loses the desire to eat, and often turns against the food when brought to him or her.

In sending dishes or preparations up to invalids, let everything look as tempting as possible. Have a clean tray cloth laid smoothly over the tray; let the spoons, tumblers, caps and saucers, etc., be very clean and bright. Grael served in a tumbler is more appetizing than when served in a basin or cup and saucer.

If the patient be allowed to eat vegetables, never send them up under-cooked, or half raw; and let a small quantity only be temptingly arranged on a dish. This rule will apply to every preparation, as an invalid is much more likely to enjoy his food if small delicate pieces are served to him.

A mutton chop, nicely cut, trimmed and broiled to a turn, is a dish to be recommended for invalids; but it must not be served with all the fat at the end, nor must it be too thickly cut. Let it be cooked over a fire free from smoke, and sent up with the gravy in it, between two very hot plates. Nothing is more disagreeable to an invalid than smoked food.

To Weave Hair.

A writer in *The Household* gives some very plain directions how to weave hair: Take a smooth board one and a half feet long and six or eight inches wide. Near one end drive three shingle nails in a row, the nails being half an inch apart and the row running parallel with the end of the board. At the other end, opposite the middle nail, drive one nail; wax three pieces of linen thread, tie them together at one end, and about a quarter of an inch from this knot tie another. Now slip it over the nail that stands alone, then tie one to each of the three nails, drawing the thread considerably tight.

Take the board on your lap, with the three nails toward the right hand. Next take a bunch of hair, both the ends evened, the size of a knitting needle, wet that end and put it under the thread nearest you, over the middle thread and under the last, then bring it back on the left side, reversing the order. Now push it close up against the knot. Proceed in this way until the strip is of the required length. After it is dry it can be pushed together more closely. Twist is superior to linen for durability.

GOON PIE CRUST.—Many persons have difficulty in making pie crust, often finding it heavy and dark. A lady writer in the *Vermont Journal* gives directions how to avoid this: To one quart of flour thoroughly mix one small teaspoonful cream tartar, one teaspoon of lard, (less will do,) lightly rubbed in the flour, one teaspoon salt, half teaspoon soda dissolved in very cold water. Mix lightly with a knife, pouring in a little of the water at a time. Do not wet all the flour, and do not knead it. If you want the top crust to resemble puff pie crust, roll out some of your dough and spread on lard, sprinkle on flour, then roll up. Now, do not do as I used to, cut off a piece and turn the edges up and roll out. I have learned a better way. Roll with your rolling pin a piece large enough for your top crust, just as it lies rolled up on your board. Wet the bottom crust around the edge with cold water before putting on the top crust. Do not pinch the edges of the top crust down. Cut or prick, to let the air out while cooking. Bake in a quick oven and you will have a nice looking pie.

DRESSER MUTTON.—To have it as it should be, the dish must be lined with mashed potatoes, the mutton nicely minced and properly seasoned, placed in the dish, a little stock added, and then covered over with mashed potatoes roughed with a fork, and placed before the fire till the little dish assumes the appearance of a nicely-browned baked hedgehog. The hotter served, the better relished, provided it has only been allowed to simmer and not to boil.

DOUGHNUTS.—Boil one quart of new milk and melt in it half a pound of butter. Beat three eggs with two pounds sugar, and add the boiling milk, stirring all the time. When nearly cold stir in a teaspoon of yeast, a teaspoon of salt, and flour to make stiff batter. When quite light knead in flour to make a soft dough. Let it rise again till very light, roll, cut in strips, and fry in hot lard.

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The Interruption of Railroad Travel.

If this journal was dependent upon its Eastern exchange list for the matter to fill its columns the editor would be compelled in this issue to apologize for want of "original" matter. The interruption to railroad travel caused by the washing away of many miles of the track of the Union Pacific road not only kept back the mails but detained several thousand passengers and a large quantity of freight. The trouble occurred east of Green river. The road-bed at this point is but an elevation of the loose soil of the alkali desert, which, as it became saturated with the heavy rains and freshets from the mountains, turned to mud, and, as it were, melted away.

The vanguard of the detained travelers arrived here on Sunday, the 25th inst., and they have been pouring in ever since. There are, we understand, over 2,000 westward bound freight cars lying upon the side tracks east of Green river. Those started from Omaha last will be the first to come through, so that our merchants will be put to some inconvenience on account of the detention of expected goods.

The company is making strenuous efforts to get the track in shape again, and it is probable that the late ten days' embargo may be productive of good in causing them to put the road in better and more durable condition.

California Fire Clay.

The constant and increasing rich discoveries that are being made in California are not by any means confined to the richer minerals. Gold and silver seem to be the most sought after, as they are both precious metals and their glitter exerts upon every human mind a powerful attraction. But it should be borne in mind by those engaged in mining, that in prosecuting their researches it is very possible the mine may contain other substances of value. In Cerro Gordo mining district, Inyo county, which is exceedingly rich in argilliferous galea ores, there exist immense beds of fire clay, said to be as good as any ever discovered in this country, the product of which has been used in the Cupola furnaces in that district for several years, proving itself equal to the best English fire clay.

The existence of good fire clay in the immediate neighborhood of rich mines like those of Cerro Gordo district, is of special importance to the miner. It is also of great importance to our iron workers, and manufacturers of all kinds who use furnaces. It is pleasant to know that fire brick and clay can be made of California material and so many dollars kept at home. The prosperity of a State as well as an individual is reckoned by what is saved, and any article of commerce or consumption that can be supplied at home is another leak stopped.

This State has heretofore paid out half a million dollars annually for English fire brick and fire clay. It is to be hoped that the people in Cerro Gordo district will turn their attention to the manufacture of fire brick, and as it exists there in inexhaustible quantities, the clay will be found almost, if not quite as great a source of wealth as their silver. The demand for this article is not at all limited, but as manufactures multiply and mines are developed, the demand increases. Fire brick are worth \$40 per thousand and fire clay \$20 per ton. This important mineral wealth should not be permitted to lie dormant any longer. The Golden Gate plaster mill in this city recently ground up ten tons of this Cerro Gordo clay, and Selby's reduction works have also used about 20 tons of California fire clay.

(Copyrighted.)

Short Lectures on Patents.

No. 2.—By JNO. L. BOONE, of Dewey & Co's MINING AND SCIENTIFIC PRESS Patent Agency.

In my former article I pointed out the general rules that govern patents for the protection of both the inventor and the public. I will now consider

What May be Patented.

As a rule, anything that is new and useful can be patented. No matter how small and insignificant the invention may at first appear, so long as it can be shown that it possesses the elements of novelty and utility, it can be made the subject of a patent. Many of our most valuable patents cover inventions which appear at first sight to be too insignificant to patent.

Many small ideas have been given to the public by inventors, because they thought them too simple to warrant the issue of a patent covering them, which afterwards came into such general use that their possession under a patent would have been a fortune. Such an invention was the turning of the stamp and stamp stem in quartz batteries, in order to cause the face of the stamp to wear evenly. This invention can be found in use to-day in almost every quartz mill in existence; yet it was never patented.

If Howe had concluded that the idea of placing the eye of the needle near the point was too simple to patent, he never would have accumulated the vast fortune he did, and perhaps we would not have the sewing machine to-day in its present complete form. As a rule the simplest inventions are the most valuable. It requires less capital to place them before the public, and the returns to the inventor are more speedy, hence they are more profitable than more complicated inventions.

It frequently happens that an imperfect or useless machine can be made of great value by the addition of a simple improvement. To own the patent for the improvement in such a case is equivalent to owning the patent for the entire machine.

When an inventor has discovered that he can do anything in a better manner than it was done before, or produce a better result, or can obviate previous difficulties by means new and not used before for the same or an analogous purpose, he need not stop to ask whether the device is too simple to patent. Such cases can always be patented.

Attaining Perfection.

Few inventions are perfected by one inventor single-handed, but they generally pass through many hands before any degree of perfection is attained. That is, one man invents the principle and gives it form and existence, while many men are required to complete it and give it the best form and adaptation. But a small proportion of the patents issued from our Patent Office cover original principles—they are chiefly improvements, and as such

they are none the less valuable, none the less useful to the world, as the one is necessary to the other in order to benefit mankind.

The First Models

Of all our great inventions, the steam engine, the sewing machine, the electric telegraph, and numerous others—were but the crude embodiments of the ideas which they represent, and the credit of bringing them to their present state of perfection must be awarded to improvers; and many of the points that enter into their construction are extremely simple, but none the less valuable in the working economy of the machines. Without them the machines could not successfully or economically be operated, hence the patents covering them are valuable and profitable.

When a person contemplates

Applying for a Patent,

His first step is to construct a model. The law requires that this model be made inside of twelve inches in size each way. Model making is usually very difficult work. It requires special tools and close workmanship. Few inventors are mechanical enough to construct their own models, especially if their inventions are complicated. They therefore have to entrust their secrets to a model maker, or to persons who are competent to construct models. Some model makers are dishonest and attempt to take advantage of the inventor, but I believe such cases are exceedingly rare. Inventors should be careful to have good witnesses to their invention, or secure a caveat before they entrust them to model makers, so that in case of trouble they can prove priority.

Commissioner Fisher, however, stated in a decision regarding the conflicting claims of an inventor and a model maker, that "the office always looked suspiciously upon the claims of model makers where they conflicted with the claims of another party, especially when the model maker had been engaged to construct a model for the other party." If the inventor has plenty of witnesses to his invention he need have no fears of its being wrongfully taken away from him permanently.

Keeping Inventions Secret.

It is a great error of some inventors to suppose that when they have made an invention it is policy to keep it absolutely secret from all the world for fear that some one will attempt to claim it ahead of them. In European countries where patents are issued to first applicants, and where first applicants are understood to be first inventors, such a course would not only be wise, but necessary, but in the United States where the rights of the actual inventor are so strongly guarded, and where proof of priority will even procure a second patent, it is necessary that an inventor should exhibit his invention to at least a few of his friends in order to be able to establish priority in case of trouble. Where an inventor attempts to keep his invention a secret from every one, the great danger is that some person might by stealth, or by other means, obtain a knowledge of the secret and apply for a patent in advance of him. When this is the case it will be readily seen that there is no hope for the secret keeper: he has no witnesses or witnesses to call upon to establish his priority, he is powerless, and the patent thief is absolutely safe. But if he had taken a number of his friends into his confidence, or if he had publicly and openly exhibited his invention, so that all the world, for that matter, might know who it belonged to and who the inventor was, it would be a bold man indeed who would attempt to claim it in the face of such testimony. I am speaking now of inventions which have been perfected and represented either by a working model or a machine, so that the inventor knows what he desires to claim. It is not so, however, where the inventor has merely conceived an idea which he proposes to work into practical form. In this case the law provides him protection while he is experimenting upon his theory by allowing him to

File a Caveat

In the patent office, and thus prevent a patent from being issued to another person while he is experimenting, without his being duly notified and allowed to file his claim and demand an interference. It would be well in such a case even after the caveat is filed, for the inventor not to explain his idea or theory too freely, as such a course might

Stimulate Competition

And create unnecessary trouble, but when the invention is perfected, the sooner the inventor exhibits it to reliable witnesses the better it is for him, and usually, as above stated, the more witnesses the better.

[These lectures, with additional information for inventors and patentees, will be issued in book form by the publishers of this journal.]

MINING LAWS AND FORMS.—The proprietors of this journal have just published in pamphlet form, the United States Mining Laws and Regulations thereunder, together with the forms required under the Act of May 10th, 1872, in relation to locations, etc. These forms are official, having been adopted by the land office. The necessity has been felt of a compilation in a cheap form of the laws of the United States relating to mining, such as this pamphlet furnishes. All the information most needful to the miner will be found in its pages, and it is placed at a price—50 cents—which makes it accessible to all. Those desiring copies can address Dewey & Co., Publishers MINING AND SCIENTIFIC PRESS, 224 Sansome street, San Francisco.

Information for Miners.

We conclude this week a very long and detailed article on hydraulic mining, which has been running in the PRESS since Nov. 28th, 1874. The article is the most exhaustive one on the subject ever written, and the author, Mr. Waldeyer, has had such an extended practical experience in the matter, that what he has written is interesting not only to the general reader, but to the practical miner. He has described all the operations connected with hydraulic mining in detail, and the article is noticeably free from any theories on any subject, being confined principally to a description of the proper methods and apparatus for working, and succinct statements of facts connected with the subject.

All the engravings with which this article was illustrated were made by our own engravers, and we trust that they have been satisfactory. The subject is such an important one that we have given it considerable space, knowing that it would be appreciated by many of our readers. The value of a single article of this class is worth more to a miner than a year's subscription to the PRESS, and we shall endeavor, as we have done, to obtain matter of a similar character, from practical men, for the benefit of our readers. We will shortly commence the publication of an article of interest to quartz miners, giving hints on the Washoe process, by J. M. Adams, M. E., of Silver City, Idaho. It does not profess to be a complete and systematic description of the Washoe process. It contains no detailed descriptions of machinery, no discussions of chemical reactions, and but few explanations of fundamental principles. It is addressed to those who are supposed to understand these things already, and therefore to be able to appreciate the value of suggestions drawn from practice.

If our mining friends would send us occasionally word of any little improvements or new things they may come across, which are useful to them, they might also be useful to others. We are always glad to publish any practical suggestions that may come before us, and urge our readers to spare an hour or so occasionally for the benefit of fellow-workers. A knowledge of elegant diction is not necessary. Put your ideas down in any shape they come to you, and we will fix them up for publication. Miners and mechanics are too apt to think that they cannot write and keep what they know to themselves. Cicero, in his letter to his son Marcus, in *De Officiis*, says that the person who gives a light from his torch to a traveler in darkness loses none of that light himself, while at the same time he makes glad the heart of him who was before in the dark. This is as true now as it was when Cicero first wrote it, but the principle is too often lost sight of. Information can be imparted without detriment to any one, which will be beneficial to many. We hope our hint will be taken, and that some of our readers will assist us in our endeavor to make the PRESS as interesting and valuable as possible.

Mariposa Estate.

A full force of laborers and miners has been put at work on the new tunnel, near the Fulton mine, on the celebrated Mariposa estate. This tunnel is expected to develop many veins through which it will pass in its course the Pine tree vein. Workmen have already removed the rails and ties from the railroad on Devil's gulch, and graded the bed so as to make a good wagon road to the river, a way long felt. Mariposa county, although it possesses many quartz veins outside of the Mariposa grant, has of late years failed to attract the attention of quartz miners to the extent the merits of its ledges would deserve. Among the prominent mines not within the boundaries of the grant are the Ferguson, (owned in England), the Washington, Maxwell Creek and Hite's Cove. The only prominent mines in the county which have run with regularity of late have been the Hite's Cove and the Washington.

The new company which is operating the Mariposa property is doing little except running the tunnel mentioned above, which enters at the Merced river, near the Cphir mills. It follows the course of the Pine tree vein, but keeps outside of the vein in the date or country rock, which can be more cheaply excavated. Several encouraging discoveries have been made on the surface in various parts of the grant. It is to be hoped that no further interruption of this work will occur until the tunnel reaches the lode, so that cross-cutting can be done as soon as possible.

In the Dayton mine, on the Comstock, the water in the shaft, instead of rising to the drain tunnel as expected, yet lacks over 90 feet of reaching that point, showing that the strength of the great reservoir is virtually exhausted.

It is reported that the grave of Vasquez has been opened, and the head taken from the body and carried off.

(Continued from Page 281.)

discharged, being received in a car, shate, or other conveyor, according to the construction of the mill.

The door in the back of the flue furnishes a ready means for sampling and examining the condition of the ore in its progressive stages, and in some cases the salt is not added to the ore until subsequent to desulphurizing, in which case this flue door is conveniently used.

Other Uses of the Cylinder.
The cylinder has been found to give excellent results in roasting the compound auriferous pyrite ores to be treated by the Plattner process, in which case a small quantity of charcoal is subsequently introduced to the charge, so as to facilitate the decomposition of the resultant sulphate of copper. This form of cylinder is undoubtedly well calculated for the manufacture of soda from cryolite, roasting cement, plaster of Paris, ores of zinc, lead, copper, etc. In a word, it is admirably adapted to most roasting and reverberating furnace operations.

Cost, Weight and Capacity.
The cost of a cylinder, including its supporting and rotating machinery, iron work for fire box, bolts for foundation, and all royalties on patents, is about \$2,000. The total weight of the foregoing parts is 16,000 pounds; the placing of the foundation and erection of brick work, for fire box, cylinder linings and dust chambers, will vary greatly according to local circumstances. The capacity of a cylinder in twenty-four hours is, as reported by Mr. Chas. E. Sherman and endorsed by B. O. Cutter, eight to ten tons, the chloridizing being up to twenty-six per cent. These statements are based upon their experience at the Caribou mill, Colorado. A. D. Breed, Esq., proprietor of the same mill, gives the actual total cost of roasting and chloridizing as \$5.50 per ton. This low cost renders it feasible to work with profit very low grade ores. This furnace has been examined and favorably spoken of by Prof. R. W. Raymond, United States mining commissioner; Clarence King, in charge of Geological Survey of Fortieth parallel; Guido Kustel, Barlingame, Superintendent Tennessee mill, Silver City, N. M.; A. Walters, Superintendent United States mint, Boise City, Idaho; H. Stoetling, Territorial assayer of Colorado; J. M. Locke, C. E.; Prof. Dawley, Chas. E. Sherman; B. O. Cutter and A. D. Breed, all of the Caribou mill, Colorado. The manufacturers claim for the furnace the following advantages: first—a most thorough and uniform accomplishment of its work; second—complete control of its action irrespective of the character of the material acted upon; third—a high per centage of chlorinations, and therefore, of yield, with ores of the precious metals; fourth—low cost; fifth—little wear and tear and ease of repairing; sixth—skilled labor is not a requisite in its management; seventh—the size of the apparatus permits it to be readily adapted to the size of a mill by simple adaptation.

Perfecting Arrangements for the Tenth Industrial Exhibition.

In the Press of April 17th we gave some particulars of the additions now making to the Mechanics' Pavilion and the extra inducements offered by the Society in the way of premiums, etc., for the tenth exhibition, which opens on the 17th of August, next. A meeting of the Board of Managers was held at their room in the Mechanics' Institute building, on Tuesday evening, the 27th ult. Vice-President B. B. Conhall presided, and most of the managers were present. The Executive Committee reported that the painting of the Pavilion has been completed to their satisfaction, and in accordance with the contract. Also that the smoke-stack and all out-door appurtenances of engines and boilers are being painted and put in order. The Horticultural Garden Committee reported that a large number of plants and trees have been purchased and placed in the garden, and are doing finely. The importance of a thorough and practical test of the powers of the different engines and machinery that will be exhibited has been fully considered by the Board, and they have decided to adopt the plan used by the Royal Agricultural Society of England, which is the most perfect and correct of any yet invented. The proper apparatus and machinery will be made here immediately, the estimated expense being \$1,500. Plans and detail drawings, of the same have been received from the office of the Engineer, London, by Mr. Jas. Spiers, Chairman of the Committee. The Secretary, J. H. Culver, reported that large number of applications for space have been received, and an exhibit of almost every product and manufacture of the Pacific coast, as well as the raw materials, is already assured. An invitation was extended to the Photographic Society of the Pacific to use the art gallery of the Pavilion for the National Convention of photographers to be held here in July next. The floor of the old horticultural garden will be relaid, and the main shaft extended two hundred feet. The additional area for machinery will be 50x210 feet, giving 10,500 square feet more than the former Fair did.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Mining and Scientific Press American and Foreign Patent Agency, the following are worthy of mention:

STEAM GENERATOR, WATER HEATER AND STEAM MOTOR COMBINED.—Sebra R. Mathewson, Gilroy, Santa Clara county, Cal. This invention is intended to provide a general utility apparatus for farmers and dairymen. It consists of a steam generator, water heater and motive power combined in one machine, and is provided with conveniences to adapt it to the various uses to which it is to be applied. A case or shell is made of boiler iron or suitable material. In the lower part of the shell is an annular chamber surrounding the furnace or fireplace, and extending as high as the fireplace. The boiler used is annular in shape, and has an outside shell surrounding the outside and top and extending down in the tubular space inside of it almost to the bottom, so as to provide a space between boiler and shell. The heat and products of combustion from the fireplace, in order to pass out through the stack or chimney at one side of the shell, is compelled to pass up through the space between the boiler and its shell, outside of the boiler, then

across the top of the boiler, and down its inside until it enters the tubular space inside of the boiler. Thence it passes around the motor before it reaches the smoke stack. On top of the case is placed a rotary engine surrounded by a case so as to leave a space around it. This space communicates with the space above the boiler upon one side and with the space between

the boiler and outside shell upon the opposite side, so that the heat, after passing around the boiler, will also pass around the engine and thence to the smoke stack. The apparatus is arranged so that the steam may be cut off before it enters the engine and turned through a branch pipe, or the exhaust may be directed through branch pipes and conveyed to any desired point. A draw pipe, with cock, leads from the annular water chamber through the shell, so that hot water can be drawn from the chamber when desired. The inventor claims that the arrangement of the machine is such that he greatly economizes fuel by entirely surrounding the boiler with the flue space so that the heat from the furnace will pass entirely around it and then around the engine before escaping, thus enabling the apparatus to be worked economically. The end of the smoke stack is covered with a double netting, the inner netting being very coarse while the outer one is fine, so that any sparks which pass through the inner or coarse netting will lodge between the two, thus avoiding danger from sparks. This will be a specially useful dairy power apparatus, and is mainly arranged for that purpose.

UNIVERSAL GAUGE QUILTER AND CORDER.—George Vincent, Stockton, California. This is an attachment for sewing machines which the inventor calls a universal gauge quilter and

Hydraulic Mining in California.

No. 23.

Being then forced to acknowledge that a broad and shallow stream facilitates the catching of gold, we must ask why are all our sluice-boxes not constructed on the principle of under-currents, wide and shallow? The answer is that the heavy and large material (boulders and pieces of hard clay or cement), needs a deep current of water to carry it along.

If, therefore, a separation of the finer gravel from these boulders, etc., were effected, no reasonable obstacle would remain to the application of that principle in gold-washing which has been sanctioned by the practice of thousands of years, and which our modern time, with all its advances in science, cannot improve, but only imitate.

The practicability of such an application in gold washing, even for the large hydraulic operations, may be illustrated by the subjoined sketch, which, though not executed with regard to proportions, represents with sufficient clearness a section of main flumes or sluices, running on a grade of six inches per twelve feet, and tapped every 250 feet for its whole length.

The distance between tap I and tap II would, therefore, be 250 feet, and between tap I and tap III 500 feet. The platforms have only a grade of four inches per twelve feet, and the gain in height by this lessened grade would be for a distance of 250 feet about 3 1/2 feet, which gain is spent in a drop at tap II, where a larger platform receives the strained gravels of taps I and II. Where the gravel and water drop off is inserted a deep, strong box, well charged with quicksilver. To the bottom of this box an iron pipe is led, which discharges a stream of water under a regulated hydrostatic pressure and in adjustable quantities.

In this way the quicksilver would be kept always in motion, and the gravel itself would be subjected to an excellent crushing process. (See sketch, pipe .1.) Pipes 2 and 3 inject streams of pure water under the grating to keep the box clear, and to supply also more water to wash the gravel over the widened platforms.

This process may be repeated for the whole length of the sluice-boxes. The size of the gravel may be reduced by repeated straining, as described above.

The undeniable advantages of this mode of working can be stated in a few words:

First. All the fine gravel and sand, in which most of the fine or rusty gold is carried off, will be submitted to a continuous washing over under-current platforms, without ever being returned to the main sluices. The reduced grade on these platforms is equalized by an addition of pure water, which will permit an easier settling of the gold than a swift and muddy stream.

Secondly. Repeated drops, connected with a strong hydraulic jet, will do a great deal for the scouring of rusty gold and the general breaking up of the washed material.

Thirdly. A reduction of the gravel to the smallest size can be easily attained by repeated straining as mentioned before, so that the largest pebble would only equal a pea in size.

To prevent this fine-gravel wash from "baking" requires only a very simple arrangement. A frame-work resembling a common harrow can be placed on the top of the platform, the teeth downward, and touch with their points the riffles of the platform. This arrangement would secure the breaking of the stream at a hundred or more points, and could be removed and replaced at a moment's warning. (See engraving.)

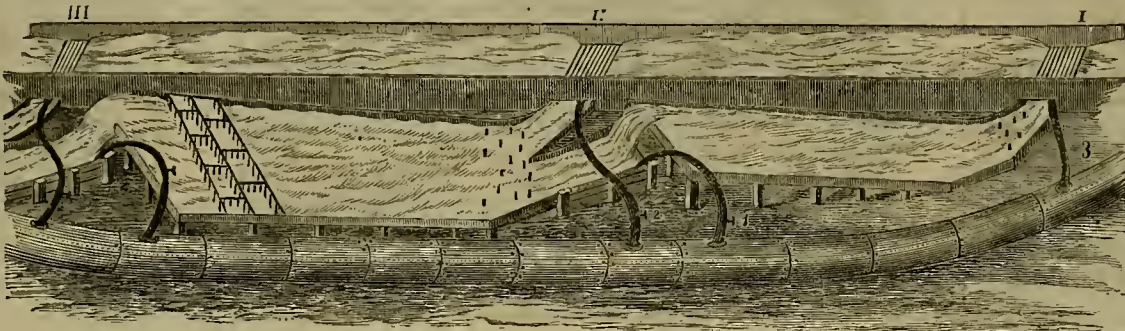
Where motive power can be procured as easily as on large sluice-boxes running a large and rapid stream of water, this barrow might be put in slow motion by an undershot-wheel, the frame of the harrow running on rollers upon the sides of the platform.

This sort of machinery is the simplest in construction, and could be used, perhaps, with great beneficial effect, and without that wear and tear which any more complicated machinery would suffer by the treatment of such an enormous quantity of material as continually passes over the long line of platforms.

The writer submits the foregoing suggestions, trusting not only to gain the favorable judgment, but also to arouse the inventive energy of those to whom we owe already the present advanced condition of the art of hydraulic mining.

Condensed from an article by Charles Waldeyer, in the last Annual Report of the U. S. Commissioner of Mining Statistics.

In the Globe consolidated mine on the Comstock the steady, strong flow of water from the main west drift on the 400-foot level has stopped all work in that portion of the mine at present. When the ledge was cut by the south cross drift the burst of water was so great that it was with difficulty that the workmen escaped with their tools. The water immediately filled the drift and station, and raised twelve feet above the station in the shaft, at which point it still remains.



Sluice-washing of the future. I, II, III, taps; 1, 2, 3, auxiliary jets.

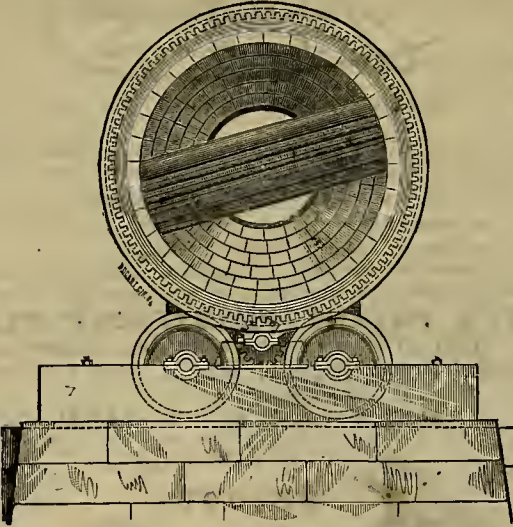


Fig 3. Transverse Section of Bruckner Revolving Furnace.

the boiler and outside shell upon the opposite side, so that the heat, after passing around the boiler, will also pass around the engine and thence to the smoke stack. The apparatus is arranged so that the steam may be cut off before it enters the engine and turned through a branch pipe, or the exhaust may be directed through branch pipes and conveyed to any desired point. A draw pipe, with cock, leads from the annular water chamber through the shell, so that hot water can be drawn from the chamber when desired. The inventor claims that the arrangement of the machine is such that he greatly economizes fuel by entirely surrounding the boiler with the flue space so that the heat from the furnace will pass entirely around it and then around the engine before escaping, thus enabling the apparatus to be worked economically. The end of the smoke stack is covered with a double netting, the inner netting being very coarse while the outer one is fine, so that any sparks which pass through the inner or coarse netting will lodge between the two, thus avoiding danger from sparks. This will be a specially useful dairy power apparatus, and is mainly arranged for that purpose.

metal plate. On the outside of each of the gable ends and just below the tops of the sides is secured a wooden strip which extends entirely across the ends of the case. The case cover is constructed similar to the roof of a building, with two sloping sides and a horizontal top strip secured together by wooden braces or gables. The cover fits down over the truncated gables of the box case and the braces or gables of the cover are placed far enough from the ends of the cover to fit down inside of the box gables and allow the horizontal top strip to rest on the metal plate outside of them. The sloping sides of the cover and these form a roof for the case. A lock can be used, if desired, to secure the cover to the sides of the case. When this cover is removed the entire top of the case is open, so that the bottle or demijohn can be removed without trouble. The outside strips serve as handles or gripping pieces for the hand when moving the case about. By this means Mr. Newman provides a cheap and very convenient case for bottles, which has the advantage of allowing the bottle to be easily removed when desired.

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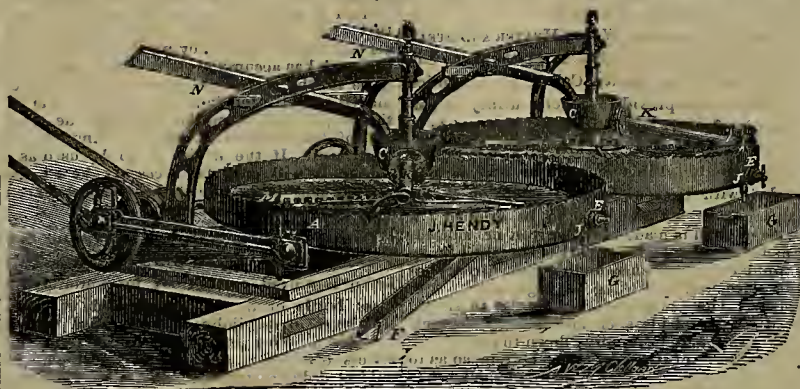
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345	Bullion	52¢@55
315	Best & Belcher	52¢@54
315	Crown Point Con.	74¢@76
465	Belcher	116¢@55
10	Bacon	3¢
390	Crown Point	36¢@38
160	California	51¢@51
325	Chollar Potosi	66¢@68
345	California	64¢@64½
325	Confidence	50¢@51
140	Con Virginia	45¢@47
325	Danew	3¢@3
335	Dayton	30¢@31
325	Gould & Curry	19¢
300	Hale	1¢
160	Hale & Norcross	41¢@41
70	Imperial	8¢@9
325	Julia	131¢@131
320	Kentuck	16¢
120	Kentuck	16¢
100	Knickerocker	44¢@44
100	Lady Bryan	65¢@65
1050	Mexican	30¢@30
390	New York	23¢@23
2180	Ophir	112¢@112
300	Orepan	68¢@67½
250	Occidental	11¢
140	Phil Sheridan	11¢
1005	Rock Island	57¢@57
100	Sage Nevada	11¢
10	Savage	11¢
350	Sinclair	7¢@7
350	Silver Hill	11¢
100	Texas	5¢@5
50	Utah	5¢@5
350	Woodville	11¢@11
60	Yellow Jacket	83¢
1310	Best & Belcher	535¢
390	Bullion	55¢@55
390	Crown Point Con.	74¢@74
1310	Ch. Hill	54¢@54
390	Crown Point	36¢
390	Confidence	50¢@50
390	California	52¢@52
175	Con Virginia	44¢@44
100	Daney	5¢@5
100	Dayton	54¢@54
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335	Gould & Curry	18¢@18
40	Globe	1¢
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1880	Belmont	114¢@114
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140	American Flag	22¢@22
1900	Andes	44¢@44
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50	Comstock	25¢
200	O.P. Mine	11¢@11

170 Eureka Con.....29@29½
50 Eureka G V.....

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50	Eureka G. V.	1	1	300	Mansfield	1	1
10	Golden Chariot.	6 1/2	6 1/2	334	Mides.	1	1
300	Koseuth.	1	1	370	North Platte	1	1
880	K. K. Con.	1 1/2	1 1/2	100	Niagara.	1	1
155	Leopard.	11	11 1/2	680	North Carson.	2	2
30	Lewishan.	1 1/2	1 1/2	415	New York.	2 1/2	2 1/2
300	Meadow V.	1	1	300	Omaha.	1	1
150	M Belmont.	7	7	320	O. G. Hill.	1 1/2	1 1/2
115	Mansfield.	5	5 3/4	130	Pioche.	1	1
25	Nahogany.	10	10	1210	Poorman.	8 1/2	8 1/2
100	N. Carson.	1	1	370	Pacific Island.	1 1/2	1 1/2
50	N. Caruso.	30	30	500	Prospect.	1 1/2	1 1/2
370	Gr. Gold Hill.	2 1/2	2 1/2	230	Ray & Ely.	5 1/2	5 1/2
800	Pioneer.	1	1 1/4	100	Rye Patch.	1	1
100	Pacific.	1	1	370	S. Island.	1 1/2	1 1/2
445	Raymond & Ely.	5 1/2	5 1/2	1180	S. Chariot.	1 1/2	1 1/2
370	St. Patrick.	2 1/2	2 1/2	240	Silver Hill.	1	1
370	Sagehen Chariot.	1	1	150	Sanitar.	1	1
300	Whetool.	5	5 1/2	200	Teller.	1	1
100	Wash & Creole.	1	1	330	War Eagle.	1	1
60	War Eagle.	1	1	1100	Woodville.	3 1/2	3 1/2

imore Consolidated for
ican Flat. The Baltim

timore Consolidated for each share of American Flat. The Baltimore Consolidated company has also declared a stock dividend of one share of the Maryland mining company for each share of the Baltimore Consolidated stock. The Idaho stocks seem to be gaining in favor. Poorman and Golden Chariot largely while War Eagle and South Chariot are firm. The reported strikes in Golden Chariot brought it up a little, and the division of the stock also assisted it to some extent. The Idaho mines have been in the background so long that the

favorable reports of the
congratulating Raymond C.

favorable reports of the local papers are encouraging. Raymond & Ely holds its own very well, which is good for Ely district stocks, and that mine leads them all and encourages the owners of the other mines. On the Comstock everything seems to be going on as usual. New hoisting and pumping works are going up in all directions, and legitimate mining seems to be in the ascendant.

LIMESTONE SPRING, S. C.

Golden Medical Discovery, Purgative Pellets and Dr. Sage's Catarrh Remedy, they having cured me of Catarrh of nine years' standing, which was so bad that I disfigured my nose, and, while curing it, your medicine also cured me of both hemorrhoids and piles.

times also cured me of Asthma in its worst and most aggravated form. Before using your medicines I had become reduced in flesh from one hundred and fifty-five to one hundred and fifteen pounds, and I now weigh one hundred and sixty-two pounds, and am in better

health then I have enjoyed for twenty years.

The above is but a fair sample of hundreds of letters which are received by Dr. Pierce, and in the face of

such evidence who can longer doubt that the Doctor's medicines cure the worst cases of Chronic Catarrh.

Wm. Forsyth Bynum & Son, druggists, of Live Oak
Fla., write, Sept. 16th. 1874, as follows: "Dr. B. V.
France, Buffalo, N. Y. Has Golden Medical Pills

PIERCE, Buffalo, N. Y.—Your Golden Medical Discovery and Purgative Pellets sell very largely and give complete satisfaction, as numbers of our customers

end friends testify with pleasure. Your Favorite Prescription is indeed the great Favorite with the ladies and numbers can say with joy that it has saved them

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Thousands of women bless the day on which Dr
Pierce's Favorite Prescription was first made known

to them. A single hottle often gives delictets and suffering women more relief than mouths of treatment from their family physician. In all those derange-

ments causing back-ache, dragging down sensations, nervous and general debility, it is a sovereign remedy. Its soothing and healing properties are well known.

its soothing and healing properties render it of the utmost value to ladies suffering from internal fever, congestion, inflammation or ulceration, and its strength

ening effects tend to correct displacements of internal parts, the result of weakness of natural supports. It is sold by all druggists.

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JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary
24v17-qy

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Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

PATENTED NOVEMBER 25th, 1873.

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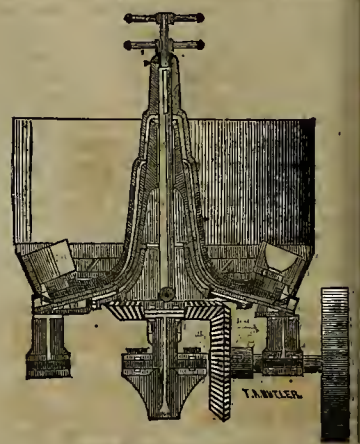
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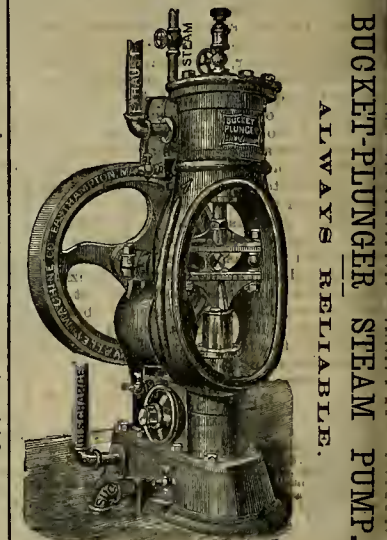
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(Manufactured by the same parties.)

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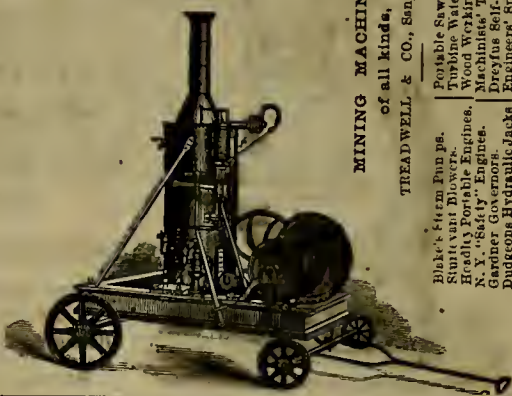
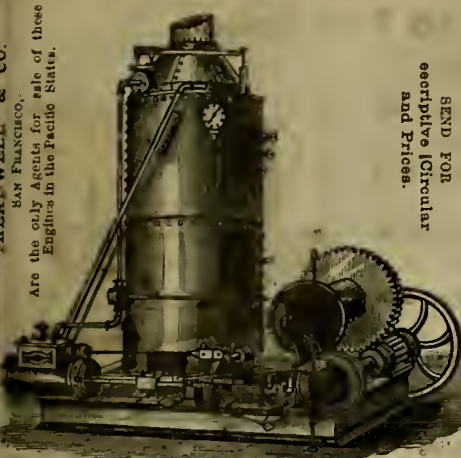
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Patented January 26, 1875.

For description see MINING AND SCIENTIFIC PRESS, March 5, 1875.

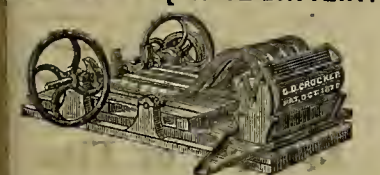
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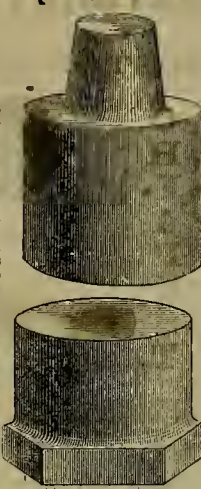
[PATENTED MAY 25TH, 1874.]

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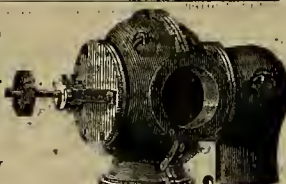
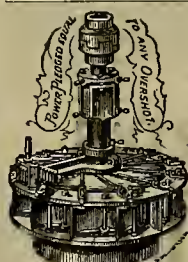
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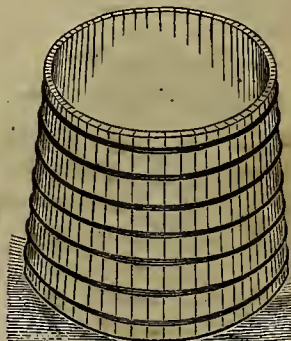
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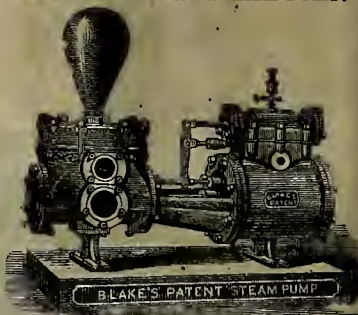
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Perin's French Band Saw
Blades,

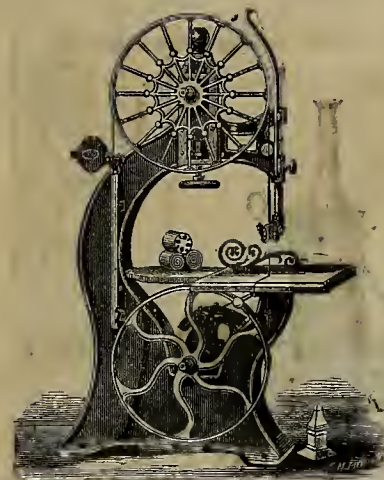
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BLAKE'S PATENT STEAM PUMP.



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(From 1 to 10 Horse Power.)

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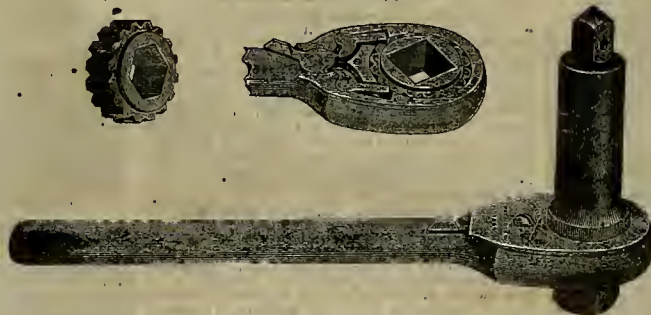
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SAN FRANCISCO, SATURDAY, MAY 8, 1875.

VOLUME XXX
Number 19.

An Improved Cut-off Valve.

The importance and necessity of a release of the steam pressure on the back of the common slide valve; the unreliability of cut-off at different points of the stroke, as well as its defect in distributing the steam equally in the backward motion of the piston compared with the forward motion of the same; the failure of a constant lead opening for forward, backward and mid-gear of the link motion, have been a subject of constant consideration among engineers. For many years numerous inventions have been brought before the public to overcome these imperfections, amongst which were the link motions of Stevenson, Gooch, Allan and Meyer, some of which have one and some have two slide valves, the upper one serving to control the expansion of steam. Mr. John C. H. Stut, of this city, has recently patented through the agency connected with this office an improvement on rotary reversing and cut-off valves, which he claims overcomes all the imperfections of the old link motion with very few moving parts and no complicated machinery, it being possible to turn all out with the lathe.

In the accompanying engravings, showing this valve, Fig. 1 is a horizontal section taken through *xx* Fig. 2. Fig. 3 is a vertical section taken through *yy* Fig. 1. Fig. 4 is a side view of the valve. Fig. 5 shows the operation of the valve. *A* is the steam cylinder, in which the piston is moved alternately from end to end. *BB* are ports which lead from the end of the cylinder to the cylindrical valve-chamber, *C*. In this case the cylinder is placed vertically, while the valve-chamber lies horizontally and the ports open into the chamber, one on the upper side and the other just opposite upon the lower side, in the form of elongated slots, which stand at a small angle transversely with the axis of the chamber, so that, if continued directly around, they would form spirals. This angle of the ports is plainly shown at Fig. 5, which represents the inside of the valve-chamber, unrolled, as it were, upon a flat surface.

This valve is also cylindrical, and is fitted so as to be steam tight within the chamber, as is fully described further on. The valve has two sets of openings, one exhaust, *D*, and one steam-port, *E*, lying in the same plane and opposite sides of the valves, while the other set of ports, *FG*, for reversing the engine, lie in a plane parallel with the first, the exhaust port, *F*, for the reverse motion, lying beside steam port *E*, of the forward motion, and steam port *G* of the reverse by the side of the exhaust port, *D*, of the forward motion, so that, by moving the valve endwise in its chamber, either set of ports can be made to open into the ports, *B*, and their width of opening can also be regulated. One end of the valve, *H*, is considerably smaller than the other part, as shown at *I*, and serves as an inlet pipe for steam. This pipe connects with the steam ports, the one not in use being at times closed, because it is always in contact with the inner face of the valve chamber, while the other alternately comes opposite the upper and lower steam port, *B*. The exhaust ports act in the same manner, and are connected with a passage through the interior of the portion, *J*, of the valve, which is hollow and open at its outer end, to allow steam to escape in that direction.

In order to allow of this end movement of the valve and still maintain the pipe, *I*, steam tight, it is accurately fitted to slide outside or within the conducting steam pipe, the joint being stuffed, so that the end motion can be effected without leakage.

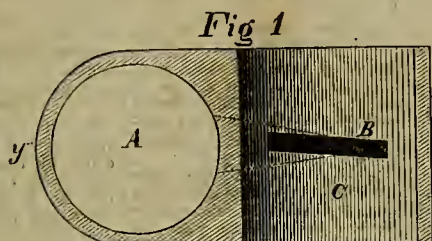
The operation of this valve will be as follows:

The valve being set by means of any suitable lever-connection, so that one set of ports are in a line with the ports *BB*, of the chamber, steam is admitted and the engine moves. Any positive connections, as gearing, may be made between the engine-shaft and valve so that the latter shall move accurately and in conjunction with the piston. The steam ports, *E* and *G*, of the valve are in the present case two inches in length, while the ports, *B*, of the chamber are two and thirteen-sixteenths inches long.

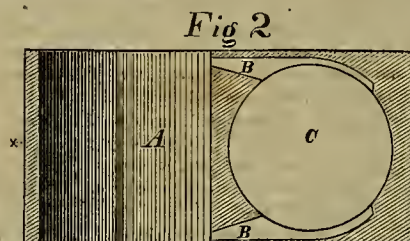
By this construction this valve remains fully open while it is passing over this thirteenth-sixteenths difference in the length of the ports, which is of great advantage, as it gives the steam an opportunity to exert its full pressure,

the valve in its chamber so that when rotated it will uncover only a portion of the steam port, although the exhaust port is made enough wider to present sufficient clearance not to choke.

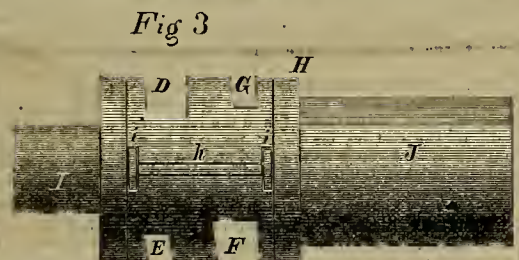
The ports, *B*, being, as before described, placed spirally around the chamber and one side, *c*, of the steam port, *E* or *G*, in the valve being also made to stand at an angle, as shown, it will be seen that where the variable cut-off is to be used the opening will be the largest when the ports, *E* and *B*, first meet, and the inclination of each will be such that, as the port *E*, passes over the port *B*, the opening will be gradually narrowed down, and may be entirely closed at any point in the stroke, the point of closing depending upon the distance which the



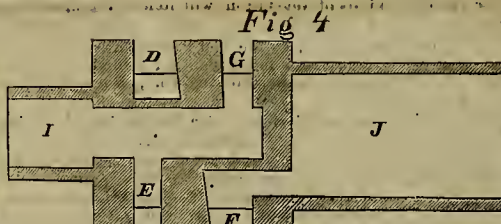
Horizontal Section.



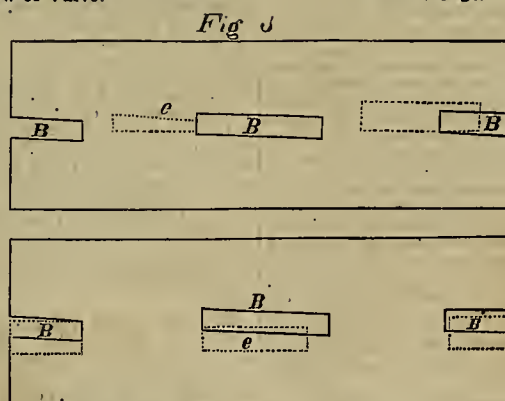
Vertical Section.



Side View of Valve.



Longitudinal Section.



Operation of Valves.

STUT'S ROTARY REVERSING AND OUT-OFF VALVE.

and the size of the port is not so quickly reduced after its full opening.

The exhaust ports are equal in length to the bridge between the ports *BB*, of the chamber, (one-eighth less than the length of the ports, *B*), so that, as soon as it is entirely closed to one of the ports, it will be instantly opened to the other, and there will be no back pressure.

To reverse the engine, it will be necessary to slide the valve along in its chamber until the two ports, *F* and *G*, are brought to rotate in a line with the ports, *B*.

It will be seen from the length of the ports, *E* and *G*, that they will cut off the steam from the ports, *B*, some time before the piston reaches the end of its stroke, and this constitutes a constant cut-off, which is determined by the length of these ports. The distance between the outlet ports is equal to the length of the bridge, measured on the circumference of the valve.

The variable cut-off is regulated by moving

the valve has been moved endwise in the chamber. By this construction the inventor is enabled to adjust the amount of cut-off to the greatest nicety.

In order to keep this valve perfectly tight, the moving face is constructed in two semi-cylindrical segments, which form each half of the circumference of the valve. Their meeting edges are packed by means of a longitudinal strip, *h*, and two transverse strips, *i*, at the end of this longitudinal strip. The segments lie upon the interior portion of the cylindrical valve, and the ports correspond with the opening to the interior of the part, *I*. Suitable devices are employed to pack the meeting edges of these openings. Those desiring further information concerning this valve may address the inventor, John C. H. Stut, No. 182 Stevenson street, San Francisco.

THE NEW Belcher air shaft, which is completed to the 1000-foot level, is greatly benefiting the entire mine, by drawing off the hot air and cooling the lower levels.

Making Casks by Machinery.

At the California wine cooperage and mill company, 30 and 36 Spenser street, they are engaged on a contract for seventy-five or eighty large oval wine casks, capable of containing 3,000 gallons each, for S. Lachman & Co., Market street. These casks are all made of well seasoned Eastern oak and are very heavily hooped. At this cooperage a large portion of the work usually done by hand is done by machinery, making a saving of time and labor, and turning out truer work. In getting out their staves, the proprietors of these works, M. Fulda & Sons, first dress the staves into the required thickness. They are then steamed and bent to the proper curve or bilge; afterwards being placed on a saw and "listed" or edged up to the level desired. They are then jointed to different curves for different sized casks. After being jointed they are set up and heated over a fire to get them in proper shape. They are then ended off, concaved and grooved ready for the head. The heading is also steamed and bent to give extra strength to large casks.

The holes for the dowel pins in the heads are bored by machinery. After the different pieces of the head are driven together in the dowels, the heads are sawed into the proper size suitable to the groove or 'croze' of the cask. The heads are then put in the casks, planed off, and the hoops placed in proper position. All this except the finishing work is done by machinery. In tank building the work is almost entirely done by machinery, such as planing, jointing, crozing, sawing, boring heads, etc., leaving nothing

to be done but set the tank up.

At these works twenty-two men are employed in a general cooperage and mill business. In the mill department they do general jobbing, planing, sawing, etc. They are putting in more machinery, so as to carry on a more extensive mill business. The establishment occupies two full water lots. In making redwood water tanks they have apparatus and conveniences for taking out the color and taste of the redwood, where only cold liquids are to be used. Hot liquids will continue to draw out the color from this wood. They are about to commence work on a very large oak wine cask capable of holding 15,000 gallons. It will be oval, thirteen feet by sixteen, with staves twelve feet long. This is for S. Lachman's cellar on Market street, now the largest on this coast if not the largest in the United States. When the seventy-five new 3,000 gallon casks with the big 15,000 gallon one are put in with the great number already there, this wine cellar will be one of the sights for tourists to inspect.

IN THE Ophir mine the prospecting on the 1700-foot level now being done is principally for the purpose of determining the exact location of the foot-wall of the ledge. The erection of the foundations for the new incline machinery is making steady progress.

IN THE Hale and Norcross mine the north drift on the 2100-foot level has connected with the south drift on the same level from the Savage, affording a fine circulation of pure air, and greatly facilitating operations on the lower levels.

IN THE Yellow Jacket mine the water has been drained from the 1840-foot level, and work resumed at all points in that portion of the mine. The prospecting operations on the 1740-foot level are still pressed vigorously ahead.

PANAMINT is to have a Stetefeldt furnace.

CORRESPONDENCE.

Tunnel Work at French Corral.

ENTRERS PRESS.—In a recent tour through Nevada county your correspondent had occasion to stop for a few days at the mining town of French Corral. In strolling around through the cavernous openings and over the precipitous banks in the hills—that tell so plainly of the work of the "Little Giant"—his attention was attracted by a column of blue smoke passing up into the atmosphere from behind the abrupt bluffs of the Yuba. Turning his steps thither he soon stood upon the verge of the narrow canon through which the gold-burdened waters of the Yuba go rumbling onward toward the plains below. Peering downward through the tops of oak and fir trees, a glimpse is had of a low roofed building, by the side of which is an immense heap of newly emboweled granites with car track running from the dump toward the base of the hill, and then quickly disappearing. Reasoning in his mind what these things might indicate, and reflecting on the direction he had come, your correspondent was led to believe that he was standing directly over a heavy charge of giant powder that was being used in the excavation of a tunnel; and, although the towering hill seemed planted firmly on its base, a look of serious melancholy flitted on his countenance as if he had thoughts of home and friends. However, these thoughts were vain, for, upon following down the winding trail he was met at the foot of the hill by the genial face of the foreman of the works, Mr. C. S. Davis, who soon dissuaded his mind. After partaking of a bountiful repast, and when an hour had been pleasantly whiled away in social chat, we donned the miner's garb, and with a taper each marched slowly into the hill-side.

At the entrance we remarked the exceeding hardness of the rock, and in the whole length of the tunnel (some 1300 feet) saw scarce a seam or crevice. The dimensions of the excavation are 8x8 feet, and when we consider the solidity and flinty hardness of the walls, and its powerful adhesiveness, it was almost a source of wonderment to behold what was being accomplished in so short a time. But when we had reached the terminus of the tunnel, and stood facing the solid stone wall, apparently impenetrable, we would certainly have desponded of their making further progress, had we not noticed, standing quietly though defiantly beside us, what appeared to be a little mountain howitzer—harmless except when mounted upon a mule's back. This implement of warfare, however, proved to be not an enemy, but a friend to man—a rock drill. Having at other times seen various drills of similar construction, we were not disposed to give this any particular attention; but, learning from Mr. Davis that this was the only machine of its kind in operation on this coast, we were glad to give it more than a casual notice, and learn wherein it differed from other excellent machines that have been successfully used in California and Nevada.

It is called the Ingersoll rock drill, and is manufactured by the Ingersoll rock drill company, in New York city. The essential difference between this and other well known drills, as observed by your correspondent, was that this machine is self-feeding, while others require an extra attendant for this purpose. This is claimed as a decided advantage, for the reason that there can be no irregularity in feeding, and, as a natural sequence, no cramping of the drill occurs, besides the economy of dispensing with one attendant. Other points of superiority claimed by the company and attested by Mr. Davis (who knows by actual test what the machine is) are: its simplicity, portability, and power to do a great per cent. of work. When in operation it is almost free from the jar or vibration that is so destructive to machinery of like character.

In this tunnel—which, as I have said, penetrates a solid body of the hardest granite—the progress made is worth of remark, when we consider the size of the drill points used, and the fragile appearance of the little monster that does the work—the average progress made with two three-quarter inch drills being four feet to each eight hour shift, the pressure gauge of the compressor indicating a pressure not exceeding sixty pounds, and ranging the greater part of the time from forty-five to fifty-five pounds.

A word concerning the purpose of this tunnel might be of interest to your readers. As most Californians are aware French Corral was in early days an exceedingly lively mining camp, having a population numbering up into the thousands. The mining claims being chiefly placer or gravel were operated mostly by individual owners of small capital. This being before the days of wealthy mining corporations and extensive water ditches, mining was conducted in so primitive a mode that the bed rock (upon which the richness of the claim lies) was seldom reached on account of the absence of a natural outlet with sufficient fall to carry the

washings through the sluices. Hence, when the hill-tops had been washed down to the general level of the surrounding country, the claims were in some instances abandoned, while those that were still held remained for the most part unworked.

The greater part of this mining ground is now owned by the Milton mining and water company, this company also controlling a water privilege with extensive ditches, supplying all the mining claims at this and various other points with water for mining purposes. The work of tunneling the hill is projected and carried on by them, for the purpose of getting sufficient fall to work their claims to the bed-rock. It will, when completed, be some 3,000 feet in length, having a grade of eight inches to fourteen feet running measure.

This will give the mining interest of French Corral a new impetus, as there is abundance of good pay dirt to keep the hydraulic pipes at work for several years to come.

The company are now washing quite extensively, giving employment to quite a number of men in this, as well as keeping a full force at work at both ends of their tunnel. Mr. V. G. Bell is superintendent and N. C. Miller, secretary, both of whom are residents of the place and have their office there. I will endeavor to give you notes of progress, etc., from other places in the county that I visited. L.

Irrigation.

How our Plains may be Irrigated without the Aid of State Credit.

Of all the works demanded from the hands of men who will live hereafter in the State of California, there are none more important than the irrigation of the great valleys of the Sacramento and San Joaquin.

With a soil and climate suitable to the support of millions, and a productive capacity, under favorable circumstances, equal to all other portions of the State, a few thousand inhabitants now are scarcely able to obtain a livelihood, although a very large part of these valleys are under cultivation.

If the withholding of sufficient rain and the coursing of rivers every ten or fifteen miles means anything, it means that the energy of men shall cause these rivers to flow as rivulets over these plains.

It is assumed that all men know of the beauty, fertility and constancy of an irrigated country, and it is not necessary to state that orchards, forests, and an abundance of all kinds of vegetation will follow the spreading of water over the plains. This abundant vegetation, by the well known laws of nature, will cause a more plentiful rainfall, and thus benefit the neighboring land, which cannot be irrigated.

The Control of the Water Sources to rest with the Land-Owners.

There is nothing in political economy more wise, clear and unquestionable than that the State, or the owners of the land using the water, should own and control the water supply.

No body of people should ever be placed in a position subject to the will and caprice of a corporation in connection with anything so essential to their well-being as water. To subject them to this condition is only to entail a system of bondage or serfdom on them and their posterity. Unfortunately for California, many have occupied the legislative halls who could not see the importance of conserving the waters of the State to fertilize the lands. Others, of a worse character, have been bribed to legislate these lands into speculators' hands.

Perhaps there are no duties belonging to the Granger organization greater than the wresting of the waters of the State from the control of men who desire that farmers should pay them tribute forever. Even and exact justice will be done these men by condemning and confiscating their claims, and the paying to them the actual amount they have paid out and the value of their property at this time; no prospective value to be considered. This amount to be paid by the State, county or irrigating district.

Corporations not Needed to Supply Water.

Many persons believe that these plains will not be irrigated unless the work be done through a corporation or association of capitalists, and that it is therefore a necessity to surrender to them the control of the water supply. This alternative should not be accepted, because of public policy and the greater benefit which will ensue to land-holders by the owning and controlling of the water.

It is true that a large part of the land of these valleys is owned by speculators who bought with a view to selling at a profit, and they will therefore favor the project which gives them the most profit with the least expenditure. This condition of things we cannot alter, and must accept; nevertheless, the future demands that works of irrigation be established, even though large land-holders become enriched, for we must have comfortable homes for the millions who seek to live in California.

The question how to frame a law of association so that the ownership of the water and the land may go together, should be considered by every politician in the State, and no candidate for legislative office should be considered competent until he presents to his

constituents the draft of a law covering land and water ownership.

How District Association Reclaims Overflowed Land.

We have found that by association lands may be reclaimed from overflow, why, by the application of similar laws, may not lands be irrigated?

To the question, why has not reclamation been more successful, the answer is, California engineers have tried to exclude water from lands by building levees of turf and spongy soil upon land which floats on a bed of mud and water. The most insane engineer in existence will still retain sense enough to tell you that the first rule of leveeing is to ditch through the turf, and then get solid earth from the bottom of the river by dredging machines, or earth containing no vegetation from the nearest practicable place, and to base the levee upon the hard pan or solid earth beneath; for levees, as buildings, require unyielding foundations.

The law of 1868 sets forth that the owners of a majority of the land in any district may associate and then elect trustees. These trustees may employ engineers to make plans and estimate the cost of the work necessary to reclamation. Upon these plans and estimates the Board of Supervisors, if they approve them, direct three commissioners to jointly view the land, and assess upon each and every acre to be reclaimed or benefited thereby, a tax proportionate to the whole expense, and to the benefits which will result from such work; said tax to be collected and paid into the county treasury, and shall be paid out for works of reclamation, upon the order of the Board of Trustees, when approved by the Board of Supervisors. This tax is enforced by the District Attorney of the county in a manner similar to the enforcement of the collection of State and county taxes. With a few amendments the reclamation laws are sufficient to reclaim the lands and keep the control and ownership of the levees within the hands of the owners of the land.

Some of the Legislation Necessary to the Formation of Irrigating Districts.

Two incomplete and inefficient acts were passed upon irrigation at the last session of the Legislature. These acts may be so altered and amended as to render irrigation by association entirely practicable. The legislation needed should cover the following points:

1st. The Surveyor-General of the State should lay off the land of the State with reference to irrigation, and set forth the proper water supply to each district and the place and manner of taking it.

2d. The owners of a majority of land susceptible of irrigation should be enabled to form a district.

3d. Trustees should be elected by the owners of the majority of the land in the district.

4th. Trustees shall apply to the Surveyor-General of the State to designate the water supply proper to the district, and the land outside of the district necessary for canals or other work. As soon as the land and water is thus designated, the trustees shall immediately take possession of the same and hold them as property of the district.

The trustees shall employ an engineer to make plans, surveys and estimates of the works necessary to irrigation.

5th. The Attorney General of the State shall immediately seize, condemn, and appropriate such water and land as the Surveyor General shall designate as necessary to the district, when the owners of such water sources or land shall establish in court the amount they have actually expended in works connected with such water supply or land, and the actual value at the time of seizure, without reference to any future or prospective value. Then the trustees of the district, approved by the Board of Supervisors, may order the amount paid out of funds belonging to the district. But no prospective damages to the owners of water or land shall be allowed by the courts or paid by order of the trustees. The appropriation of the water and land should be immediate and irrevocable; the litigation for damages may take place afterwards.

6th. To furnish the money necessary to works of irrigation, there should be commissioners appointed by the Board of Supervisors, or, when in two or more counties, by the joint action of the Supervisors of the counties; these commissioners to assess upon each and every acre a tax proportionate to the whole expense as estimated by the engineers employed by the trustees, and to the benefits, either directly or indirectly, which will result from such works.

7th. These assessments to be collected by the District Attorney of the county in which the land lies, or by some State officer appointed for the purpose, and the amount collected to be immediately paid into the county treasury and there subject to the order of the trustees when appointed by the Supervisors. But no order to be paid except for work actually done or in compliance with the judgment and orders of a court. Warrants drawn by the trustees to draw interest at 10 per cent. per annum until paid.

8th. Assessment to the full amount necessary should be made by the commissioners upon the estimates formed by the engineers employed by the trustees of the district; but the trustees shall call in only installments of this tax large enough to cover the works which must be completed within six months from date of call. All assessments to be a lien upon the land and work its forfeiture unless paid.

9th. All contracts to be let to the lowest

bidder for cash, and all contracts to be let in small sections, after due advertisement. Thus giving the poor man an opportunity of paying his assessment by his own labor.

10th. The district thus formed shall own the water forever, and no land not included in the district, and which has not paid for the works of irrigation at the time the works are constructed, shall have the use of this water, except on such terms as the officers of the district may dictate; for the land owner who will not assist in the enterprise should have none of its privileges.

State Credit as an Assistant.

As the irrigation of these plains is of great importance to the State, it would be well to consider whether the loan of the credit of the State would be proper. If it is proper, then the owners of the land should pay interest in advance, so that the State shall lose nothing by delay; and the failure to pay interest should work an immediate forfeiture of the land in every case. No loan of State credit unless based upon the certain and absolute forfeiture of the land, upon the failure to pay the interest or any part of the principal on the day designated; and for this purpose the owners of each tract should obligate themselves by land when forming the district, or before availing themselves of State credit.

In order to avoid hasty or improper disposition of State bonds, they should be sold by the officers of the State and not be sold for less price than the market value of other State securities. This and the letting of all work to the lowest bids for cash may tend to insure an honest action on the part of trustees.

State Ownership of Canals.

If the State should actually own and build canals for irrigation, canal rings, as in New York, may be formed. And if it is proper to construct them in one place, why not in fifty places? The owners of gravel and placer claims will not understand why the land speculator should have State bonds to assist him, when other great interests of the State require assistance. The title land owner will equally demand assistance, and thus, when the State begins to issue bonds, who can tell the stopping place?

State Aid Not Necessary.

Few farmers on these plains count their acres by less than hundreds, and speculators count by thousands. If they form districts and prove to the world that they intend to irrigate, their lands will rapidly advance in value, and thus before they have to pay their first assessment they can sell one-half their land for enough to pay for irrigating the other half. Now, as one acre irrigated is worth ten not irrigated, it seems a fair proposition that they should, if necessary, sell a portion to improve the other. State aid, except to assist in the formation of districts and the condemning to their use the waters of the rivers, should not be extended to the owners of the land.

The entangling alliance of State with land sharks will be fruitful of no public good. As almost all have more land than they can properly work after irrigation, let them sell a part to enhance the value of the remainder.

An Appeal to the Legal Fraternity.

Let it be understood by all who read this article that it is written for the purpose of urging men of legislative capacity to frame an effective law upon a most difficult subject, as the above is but a crude and unfinished sketch.

How to wrest from the water grabbers the waters of the State will puzzle many able men and the legislator who can frame an act to do so should be well appreciated by his fellow men. It may save much trouble in the Legislature, and enable our law makers to approach the subject with more intelligence if some of the legal minds of the State would publish in the journals of the day the outline or draft of a law applicable to the case, for no hasty legislation can properly encompass the great questions involved.

DR. M. W. RYAN.

CHEERY CREEK.—A correspondent of the White Pine News writes: The Star mine still remains a luminary of the first magnitude. We understand that the Superintendent, M. Keeney, has contracted with the San Jose company at Egan for the use of ten stamps for the ensuing month to run on Star ore; this is in consequence of the five-stamp mill, which has constantly been at work on ore from the mine, not being able to keep the dumps clear. With the milling facilities thus employed the will be able to reduce 15 or 20 tons of ore daily producing in billion over \$100 per ton, aggregating \$1,500 to \$2,000 per day. This ore produced from a mine only partially opened and which will eventually quadruple the amount. In the last four months this camp has shipped about \$85,000 in bullion, produced from 900 tons of ore. The Exchange will commence milling ore next month. The appearance of the mine warrants the prediction that, once started, this company will run its mill indefinitely and profitably, adding largely to our bullion products. The Chan is bonded to parties who own other valuable property here. It is thought that work will soon be resumed under the new management and that it will prove to be what it once promised—the convey of the district.

The new Belcher air shaft is about timber and finished down to the 1000-foot level, is greatly benefiting the circulation of air the lower levels. The mills are kept steadily running on ore from the mine, and everything looks prosperous for the future.

MECHANICAL PROGRESS.

Testing Iron and Steel.

With the exception of these experiments made some two years ago by Col. Eads in connection with the construction of the St. Louis bridge—such experiments were noted in these columns at the time—very little has been done in the direction of testing the tensile strength of large masses of iron or steel. The method of testing heretofore employed has been the adoption, as a standard of unit, the results given by the extreme proofs of specimens having a section of about one square inch, from which the strength of large masses is obtained by theoretical formulae—qualified by the introduction, as a factor of safety, of four-fifths of the result, which is thrown away for possible errors, lack of homogeneity, poor workmanship, etc. Practice has found it necessary that this great margin should be allowed when dealing with large masses. Col. Eads' experiments so fully verified the necessity for such allowance. That so great a discrepancy between the calculated and actual results as four-fifths could be found necessary, has led many engineers to the conclusion that a new theory is necessary for the estimation of the strength of iron. It is held by such that a series of careful testing experiments with large masses of various diameters should be instituted, in order to detect the unknown cause of the remarkable variations noticed between the theoretical estimates and actual results.

The experiments of Col. Eads have led to a new discussion of this matter, and have developed some unexpected results with regard to this comparative tensile strength of iron and steel, when presented in large masses. A universal was the confidence in steel over iron, that in the inception of his great bridge enterprise it was decided that only the minor parts of the bridge should be constructed of iron, while steel should be the material for the more important parts. Being one of those who had contracted a strong doubt with regard to the reliability of experiments with small masses, resolved, in order to insure undoubted success in his great life monument, to subject every portion of the structure to practical tests. This ended an enormous hydraulic testing apparatus was constructed.

The first heavy pieces subjected to this test were a large number of massive iron shafts, which stood up well to the theoretical test. But most unexpected failure was experienced in testing the steel shafts, from which so much better results were expected. Some of them gave way under strains which iron shafts of similar dimensions had endured. A much larger discrepancy was found to exist between the large and small masses of steel than between similar masses of iron. So great was this discrepancy that the steel shafts were at once condemned and iron substituted wherever heavy masses were required.

This showing may well call in question the propriety of using steel in large masses where ultimate strength is brought into play, notwithstanding its acknowledged superiority for such uses in small masses.

We believe these are the first and only testing experiments which have been made with steel under such conditions. A practical comparison was made with the two metals some years ago on board the steamer *Red Jacket*, in which two shafts of equal size were placed, one of iron and the other steel. The steel shaft lasted off within a week, while the iron was in service up to the present time.

What the nature of this difficulty with steel in large masses may be, is quite unknown, but the facts are notorious. Krupp has for this reason abandoned his solid forged steel cannon. The matter is very naturally exciting much enquiry and speculation, and cannot fail to add materially to the interest which will be taken by engineers everywhere in the result of the Government experiments which are about to be undertaken in accordance with an act of Congress passed just at the close of the last session, full reference to which will be found elsewhere on this page under the head of "Test of American Iron and Steel."

PRESERVING CAST-IRON FROM RUST.—Girders, angle irons, and other similar large masses of iron are often placed in exposed positions, where damp, air, steam, and acid vapors have access. If the iron be put up in a rough, it very speedily rusts, and under working conditions the corrosion soon reaches a dangerous point. Contractors generally care to supply such irons painted in three coats of minium, which, if honestly done, would to a certain extent protect the metal; but, as a rule, only one thin coat is applied, and the slightest abrasion exposes the iron. A new and peculiar mode of treating iron is the following: the metal is heated until, if touched with oil or fat, it fizzes, and then is plunged into a vat of mixed oil and grease. This mode of treating cast iron is therefore far superior to any "painting," as the oleaginous matter actually penetrates the pores, and prevents oxidation for a very long time, while it does prevent painting, if desirable, afterward.

Test of American Iron and Steel.

The Sandy Civil Appropriation bill, passed among the last acts of the late Congress, contained an appropriation of \$75,000 for tests of iron and steel, to be made by a Board of Engineers, who are to serve without pay, with the exception of the Secretary. The members of this Board have recently been appointed by the Secretary of War, as follows: Colonel T. T. S. Laidley, Ordnance Department, U. S. A., resident; Professor R. H. Thurston, Secretary; Commander L. A. Beardslee, U. S. N.; General Q. A. Gilmors, Engineer Department, U. S. A.; Chief Engineer David Smith, U. S. N.; W. L. L. Smith, C. E.; A. L. Holley, C. E. A testing machine is to be built, and set up at the Watertown arsenal, where the experiments are to be conducted. The Board will receive instructions from, and report to the Chief of the Ordnance Department of the Army.

The members of this Board are all well known engineers, several of whom have already distinguished themselves by their investigations of the properties of materials used in construction. It would be difficult to over-estimate the value of their future experiments, if carefully conducted. To mention a single instance, it may be stated that the English formula deduced from Gordon's experiments is almost the only authority available to our engineers for computing the resistance of materials to compressive strains. Very few of our engineers could afford to make such experiments as they desired; and when such investigations were conducted by companies, the results were not usually available for general use. It seems probable, therefore, that the appropriation, made by Congress for these experiments, will be productive of more good than many other items for which ten times the amount was allotted.

ABSENCE OF OXYGEN FROM ARTESIAN WATER.—M. Gerardin, in a paper read to the Paris Academy of Sciences descriptive of the artesian wells of Grenelle, finds there is no oxygen present in the water from the lower sandstone of this locality, nor from the Rilly gravel beneath the clay and at contact with the chalk (the water was obtained out of contact with air from various depths by means of a syphon invented by the author), nor from the Soissonais gravel. Neither was this gas discovered in the water from the artesian well at Gonesse. M. Gerardin concludes that water obtained from subterranean depths does not contain oxygen if kept from contact with the atmosphere. This precaution is essential, for in contact with the air it dissolves several cubic centimetres of oxygen. The author has often found in the interior of the ascension tubes long whitish opaline filamentary algae. These algae present the curious property that they remain whitish in solar light as long as the water is deprived of oxygen, but they become green the instant the water is the least aerated. Their sensibility to the action of oxygen is most delicate. The action of the algae serves to confirm the chemical test with hyposulphite of soda.

It might be interesting to have these experiments repeated on the water from California artesian wells. It is well known that aerated water readily parts with its oxygen when thrown into the atmosphere in the form of a fine spray, as has been evinced in recent experiments of renewing the oxygen of the atmosphere in diving bells by this means alone—direct connection between the atmosphere and the bells being entirely cut off for hours without any inconvenience to the occupants. Probably the filtering of the water of artesian wells through the large extents of earth and gravel through which it generally passes before reaching its subterranean reservoirs produces the same results as the spray.

A NEW HEATING FURNACE.—A new invention has recently been made by Messrs. C. Reese, master mason, and Thomas Johns, superintendent of the mill of the iron and steel company, at Ironton, Ohio. The improvement is practically a double furnace, having a grate at both ends, with the fire in the center, passing down between the two doors under the body of the furnace into the chimney on the other side. The inventors claim that this furnace will do one-half more work, for the reason that the heater can be charging at one door whilst drawing at the other; and that it will save largely in iron from the fact that the cold air passes directly to the fire before reaching the iron; that it will save greatly in coal, there not being so large a surface to be heated as in the ordinary furnaces; and further, that it costs less to build and less labor to work it, doing away with the labor of pulling the fine piles to the bridge for sufficient heat, the last pile charged being the first ready to draw out. The furnace is said to be well suited to rail, bar, plate, guide and hoop mills. It is believed by practical iron workers that this furnace will prove to be an important addition to the productive capacity of rolling mills. There will be one of them put in the mill of the above mentioned company as soon as possible.

IRON IN THE CENTENNIAL BUILDINGS.—The quantity of iron to be used in the construction of the Centennial buildings will aggregate about six thousand tons, of which more than five-sixths will be wrought.

The Pullman palace car company are making, at their shops in Detroit, eleven palace cars to go to England and nine to go to Italy.

NEW MODE OF TREATING BELTS.—A correspondent of the *Scientific American* writes as follows: I have for the last 25 years, on every Saturday evening, turned the inner side of my engine belt outside, let the engine run slow, and washed the belt well with warm water and soda, applied with cotton waste. Next, I take a piece of sheet metal and scrape well the belt, next wash with clean warm water, and dry off. I collect the waste oil from this shafting and apply to the belt as much of it as possible. This washing must be done as quickly as possible so as not to dissolve the glued parts. I let the belt stand on the pulleys till Monday, then give another scraping and turn the belt as before. I keep the pulleys very clean. I have long been surprised at this economy I have effected with very little trouble. I have not bought a new belt for the last ten years. There is an engine next me, 14x36 inches (mine is 12x36). I have nearly double the shafting and belts, and my neighbor cannot run with less than 38 lbs. of steam when all the belts are on the loose pulleys. Mine will run at full speed with 5 lbs.

These suggestions, adds our correspondent, will be appreciated by our readers. One must begin with a first class belt, made in the best manner, and use considerable judgment, in following the practice of our correspondent.

SCIENTIFIC PROGRESS.

Effect of Temperature upon the St. Louis Bridge.

The effect of changes of temperature upon iron structures is most palpably demonstrated in the case of the bridge recently constructed over the Mississippi, at St. Louis. The arches of this bridge have spans of about 500 feet, and careful observations of the changes in the height of these arches have been made daily during the months which have elapsed since the bridge was completed up to January. These observations show a variation between the figures of July 20th and January 9th last—which two days were the warmest and coldest of the year—of 8.5 inches. The difference in temperature between the two days was 107 degrees. This is an effect less than was anticipated, the small effect being due to the fact that the iron work is painted white for the very purpose of lessening the same.

It has also been noticed that this change is not always coincident with the showing of the thermometer, the result being varied at the same temperature, by reason of the greater or less amount of moisture in the atmosphere.

The effects of change of temperature are, at the present day, says the *Railway World*, taken into account in all engineering calculations. They determine the distance between the ends of the metals on a railroad track; necessitate the use of rollers at the end of bridge trusses when the variation in their length, produced by rise or fall of temperature, is perceptible; require the use of expansion joints in long iron gutters and the hot air pipes of a blast furnace, and have driven civil engineers at times almost to their wit's end for "compensating" contrivances.

During the erection of Southwark bridge across the Thames, at London, the structure was almost ruined for want of observing this natural law, the expansion of the cast iron of the arches under the sun's rays producing a strain upon the piers which had not entered into the engineer's calculations.

Since that time bridges have been more carefully framed with respect to thermal influences. The engineer's endeavor is to have the expansion or contraction of one part counteract the corresponding change in another part, so as to increase the stability of the whole.

PARASITES ON FLIES.—A correspondent of the *Scientific American* says that while recently examining the tongues of the house fly with a microscope he discovered upon several species of worm. On some he found two worms, on others none at all. The worms were found about the spiral glands; they were transparent in appearance—head and tail being exactly alike. They were very active in their motions. The correspondent is desirous to know from other microscopists if these worms have been noticed before, and would be pleased to receive any information concerning them.

Have any of our San Francisco microscopists noticed them? If they have we should be pleased to hear from them. If they have not they might perhaps find the house fly an interesting subject for observation, who will verify, or otherwise, both the above and the observations minutely detailed in the issue of the *Scientific Press* of April 27th with regard to this insect.

THE ANDES GRADUALLY SINKING.—The highest points of the Andes are thought to be sinking. In 1745, when measured by La Condamine, Quito was found to be 9596 feet above the sea. In 1803 Humboldt made it 9570 feet, in 1831 Boussingault 9567 feet, in 1867 Orton 9520, and in 1870 Reiss and Stübel 9356 feet. If the earliest and latest measurements were exact Quito has sunk 240 feet in 125 years.

SINGULAR FACT IN REGARD TO DRIFTING ICE.—Lieut. Weyprecht, of the late Austrian polar expedition, made this remarkable discovery that the ice never drifted straight in the direction of the wind, but that it always deviated to the right, when looking from the center of the compass. With N. E. wind it drifts due W. instead of S. W.; with S. W. wind it drifts due E. instead of N. E.; in the same manner it drifts to the north with S. E. wind, and to the south with N. W. wind. There was no exception to this rule, which cannot be explained by currents, nor by the influence of the coasts, as with these causes there would be opposite results with opposite winds. Another interesting phenomenon was the struggle between the cold northern winds and the warmer southern ones in January, just before the beginning of the lasting and severe cold; the warm S. and S. W. winds always brought great masses of snow and produced a rise in the temperatures amounting to 76-95 degrees Fah. within a few hours.

The influence of extremely low temperatures upon the human body has often been exaggerated. There are tales of difficulty in breathing, etc., that are caused by them. Lieutenant Weyprecht and his party did not notice anything of the kind; and although many of them had been born in southern climes, they all bore the cold very easily indeed; there were sailors among them who never wore fur. The cold only gets unbearable when wind is united to it.

RELATIONS BETWEEN MAGNETISM AND THE AURORA.—It appears from the scientific report of the Austro-Hungarian North Polar expedition of 1872-4 that magnetic disturbances are closely connected with the aurora. While in temperate zones they are the exception, they form the rule in arctic regions; at least the instruments are almost in constant action. This is the case for the inclination, declination, and intensity needles. The magnetic disturbances in the district visited were of extraordinary frequency and magnitude. They were closely connected with the aurora borealis, the disturbances being the greater, the quicker and the more convulsive the motion of the rays of the aurora, and the more intense the prismatic colors. Quiet and regular arcs, without motion of light or radiation, exercised almost no influence upon the needles. With all disturbances the declination needle moved toward the east, and the horizontal intensity decreased, while the inclination increased. Movements in an opposite sense, which were very rare, can only be looked upon as movements of reaction. The ways and manner of the magnetic disturbances are highly interesting. While all other natural phenomena become apparent to our senses, be it to the eye, ear, or touch, this colossal natural force only shows itself by these scientific observations, and has something mysterious and fascinating on account of its effects and phenomena being generally quite hidden from our direct perception.

ORIGIN AND PHILOSOPHY OF LIMESTONE CAVES.—Caves in limestone have usually had their origin in fissures, through which water flows, or at one time flowed, at first slowly percolating through them, and then, as they gradually became larger and larger the volume of water likewise increased, until the fissure became converted into a true underground river or water course; even in cases where no water flows through them at the present day it can plainly be seen that such was the case once.

They are eaten out of the limestone by the solvent power which water charged with carbonic acid possesses. Ordinary water free from carbonic acid would be quite incapable of dissolving out the limestone, but all natural waters contain more or less of that gas, derived by the rain from the atmosphere and from the decaying vegetable matter which it meets with in its passage through the soil. All limestone caves usually retain more or less completely their original form of fissures, expanded, perhaps, in parts, into vast caves and chambers of immense proportions, but again contracting a little further on into a mere crack or tunnel. Comparatively large rivers are received by such caves, which then continue their course underground, in some cases suddenly appearing to the light of day again, but in others making their way beneath the surface right out to sea. Certain of the South Australian creeks are thus discharged.

PHOSPHOROUS AND PUTREFACTION.—The presence of phosphorus or some one of its compounds has been observed to be one necessary condition for the development of putrefaction. The more phosphorous the more rapid the putrefaction. The bad odor is supposed to be owing to the escape of phosphoretted hydrogen, and to the same compound is attributed the luminosity of putrescent matter under some circumstances. On passing the gases evolved from putrefying matter through argentic nitrate, no phosphorous compound of silver was found, although the gases were completely deodorized by passage through the silver solution.

SCIENCE AND INDUSTRY.—An interesting example of the industries and important results which have sprung recently from the scientific treatment of substances long overlooked or unnoticed, is that afforded by the silky vegetable down which clothe the seeds of many trees. These are now largely employed in some parts of the country for stuffing beds, quilts—in the place of eider down—also ladies' skirts, and for other purposes.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

GOVER MINE.—Amador Ledger, May 1: This mine is fast being developed into a valuable mining property. A 10-stamp mill, driven by water from the Purinton ditch, is now in active operation, and crushing good grade ore. The ledge in the 700-ft level averages from eight to ten ft in thickness, and the ore of high grade, bearing free gold, and well charged with gold bearing sulphurets. Drifts have been run north and south from the main shaft, and the ore found to increase in quantity and quality in all the levels. Between 1000 and 2000 pounds of sulphurets are saved from each day's crushing, and which yields at the rate of \$200 per ton. The Gover is not only looking remarkably well, but may be classed with the valuable mines of the county, and this result has been brought about under the excellent management of Mr. John Treglaon, a careful and experienced miner. The mill is under the supervision of J. R. Treglaon, a practical millman. Hendy's concentrators are used and give entire satisfaction. Hooper's steam pump is attached for freeing the mine of water. The Gover company are likewise owners of the Fremont mine in the same neighborhood, and we learn will in a short time commence sinking a shaft thereon, with the intent of proving the mine as rapidly as possible.

BUTTE.

LAVA BED MINING.—Oroville Mercury, April 30: Mining at the Lava Beds has started up with more than increased alacrity. The long dry winter has left the claims free from water, so that they can be worked without much trouble. George Dyer is at work for the Hilton company, with every prospect of success, though it will take some time yet to get ready to take out pay dirt. On Monday last we saw Mr. Bigelow at work putting up a steam engine on the claim of Ah Hap & Co. It was what is known as a Hooker water lifter. There is little doubt that all land now vacant will soon be settled for. A great call will be made for poles, wood and building lumber during the coming summer. With the increase in the work carried on there will be a corresponding increase in trade in town. Money, even now, is plenty.

CHROME.—M. Robinson, of Nimeshew, in this county, came to town a few days ago, having some very black rock which he wished to have tested. Mr. Oallow, our county clerk, sent it to San Francisco to an eminent assayer. It turns out to be chrome iron and runs as high as 60 per cent. pure metal. There is an abundance of the ore in sight, and it is very easily gotten out. The mine is twelve miles from Chico, on a down-hill road all the way. Two claims have been taken up. The ledge is from 10 to 20 feet wide.

THE NEW MILL.—At last the new quartz mill at Forbestown is finished, and has been running just five days on trial, and turned out \$500, or just \$100 per day, with blanket washings and sulphurets to hear from yet. The machinery is all new and works, as all new machinery does, with some considerable friction; still, we think this a pretty good showing for a beginning. The ledge is twenty feet in width and prospects \$30 to the ton. The rock is easily got out, and is only 200 feet from the mill and all the way down hill. The shaft is only down some 30 feet. The mill is now running night and day and is working as well as the owners could wish. The cost of taking out the rock and crushing it, of quicksilver and every expense, does not reach one-fourth the receipts.

CALAVERAS.

GWIN MINE.—Calaveras Chronicle, May 1: News from the Gwin mine continues wholly favorable. The 1000-ft level is run a distance of two hundred feet from the shaft, all the way in fair milling ore. Stopping is going briskly forward in both the 900 and 1000-ft levels. The batteries—forty-four stamps—are kept at work without cessation, and the yield of the mine is increasing from month to month.

RICH QUARTZ.—Rock of extraordinary richness is being taken from the well known Haskins and Hadley mine at West Point. The last crushing of quartz taken from the mine paid nearly \$200 per ton, and we are informed that the rock now being taken out will yield considerably in excess of that amount. The work of taking out rock is going steadily forward, and another crushing will be in readiness for the mill in a short time. The shaft on the ledge has reached a depth of about one hundred and forty ft.

FAVORABLE PROSPECTS.—Charles Rickman, proprietor of one of the quartz lead lately discovered at Mosquito gulch, is confident of developing a good mine. He has sunk a shaft about twenty-five ft deep on the ledge, taking out first-class ore from the top down. The lead is from fourteen inches to two ft wide and all the rock will pay well for crushing. Rickman is pushing work along as fast as his limited appliances will permit.

ASBESTOS.—A man named Hipkins has lately discovered a vein of asbestos in this county near Gibson's ranch, on the road from Angels to Milton. We have not learned the extent of the deposit, nor whether any considerable amount of work has yet been done upon it.

WEST POINT DISTRICT.—Last Monday the

new hoisting works of the Josephins were completed, and sinking the main shaft some thirty ft in depth was resumed. The new working shaft on the "Chesuo" is going down rapidly. A too heavy flow of water has interrupted sinking at the Modoc. Nothing new at the Anderson Flat mine. Stopping good ore at the Lone Star. The old Doyle mine is being re-opened by M. Carey, who is erecting steam hoisting works. The mine ranks No. 1 for high grade ore and uniform net results. Rich galeua ore has been struck in the north level of the Ramcat. A shaft is being sunk on the new discovery by Henry & Son. The ore will average one ft in width and mill about \$45 per ton. Champion, stopping. Ore richer than previous. This rich body of ore has lengthened from ten or twelve ft to thirty-five ft at a depth of 140 ft.

INYO.

PANAMINT ITEMS.—THE STETEFELDT FURNACE. Panamint News, April 27: Seator Stewart and party arrived in San Francisco on Sunday evening, and early on Monday morning they sent for Prof. Stetefeldt. He soon arrived at the company's office, and within two hours the contract for the furnace for the twenty-stamp mill was closed. Capt. Bell went immediately to work shipping the machinery, and the greater part of it is now on the way via the Allen's Camp route. The probabilities are strong that a furnace will also be put in the lower mill and its capacity increased.

JESSIE MAX.—Are progressing rapidly, owing to the softness of the ground. The shaft is down sixty feet and is in ore of a high grade. The width of the lead at the bottom of the shaft is not known, as no cross-cut has been run as yet to ascertain its extent. The tunnel is in eighty feet, and the last few feet is entirely in quartz carrying considerable chlorides, worth probably \$40 or \$50 per ton. This, however, is an unexpected find, as the ledge for which the tunnel is being run is yet some seventy or eighty feet distant.

DON JUAN.—They are timbering and stopping out ore for shipment to San Francisco. The first shipment of twenty-five sacks of ore by this company was made on the 23d inst., and they have ten or twelve tons more ready to ship as soon as out-going trains can be had.

EMMA.—The Emma joins the Sunrise on the northeast, being east of the Twilight. The ledge has been stripped for about eighty feet. The mine is looking extremely well, some two hundred tons of ore being in sight, which is of the free milling character.

WYOMING.—In the lower tunnel, which was being run to tap the main ledge, the vein was struck in running one hundred and fifty feet, striking it at a depth of about three hundred feet. They are now in a fine body of high grade ore, but the extent of the vein has not yet been determined.

LEE DISTRICT.—Captain J. B. Frink gives us further information concerning Lee district, which was organized a few weeks ago. This district is twenty-five miles from Panamint and fifteen from Cerro Gordo, on a direct line between the two places. There are about twenty locations made in all, in a space of about half a mile square, all by San Bernardino men, comprising two companies. The first company is composed of J. R. Frank, B. L. Lee and Henry Clark, men who have been prospecting between this point and the Colorado river for a number of years, and are the discoverers of this district. The other company consists of fourteen persons, among whom are General Dodge of San Francisco, Rose, of Los Angeles, and Watson and Walsh. These mines are exceedingly rich and crop out from 2500 to 4000 feet in length. They are situated upon a high mesa, about 5000 feet above the level of the sea, wood and water are abundant and about six miles from the mines, a good level road leading thereto.

KERN.

ANTIMONY.—Bakersfield Southern Californian, April 29: The Temple antimony mine, in San Emidio canon, is being opened, and furnaces are soon to be erected to reduce the ore to a condition for shipment to England for further refinement. Mr. Quinn, an old prospector, who has spent several years in the San Emidio mountains, hunting for mines, has consolidated his interests with the Temple company, and is still looking for more ground. An advantage to this mine of antimony—which is represented to be the purest discovered in this country—is the finding of a well defined lead of borax in the vicinity. This bed of borax is located high up in the mountains, and presents a fine bank, the extent of which is yet unknown. It is of the fine, velvety, snowball character of borax.

MARIPOSA.

THE TUNNEL AT BENTON MILLS.—Mariposa Gazette, May 1: The "high ore," commenced about two years ago, and upon which operations were for several months suspended, has been recommenced, with some improvements in the machinery. The tunnel is now in about 700 ft, and everything works smoothly. Mr. Horn, the former superintendent of the job, still runs the machine. The Burleigh drill walks into the solid ledge at a rate astonishing to an old miner, or any other man whose practical knowledge of drilling is confined to the old sledge and hand drill process. The question of striking good pay ore is only one of time. Everybody familiar with the Josephine and Pine Tree mines knows that the gold is there.

NEVADA.

OMAHA MINE.—Grass Valley Union, April 30:

Very fine rock continues to come out of the lower level of the Omaha mine. The ledge is 2½ ft in thickness, and scarcely any of the quartz taken out but shows free gold and fine sulphurets. Some fifty loads of rock have been put upon the dump within the past week, and experienced judges of quartz say it is the best looking pile of rock, taking it all through, that they have ever seen. Yesterday we saw a handsome piece of rock from the lower level, (240 feet), which showed free gold in the hard quartz, gold in the sulphurets, and had plenty of galeua. The Omaha company have it in consideration, owing to their excellent prospects, to erect steam hoisting works as well as a mill upon the mine.

BUCKHAM MINE.—This mine is located southwest of Grass Valley, near Bear river. The location was made years ago and the ledge has been worked with good success. The rock had to be hauled to Grass Valley in order to have it tested, and it has been worked through two or three different mills, in different lots. The ore has paid all the way from \$15 to \$29 per ton by mill process, and without estimating the sulphurets. The average of all the ore worked has been something over \$20 a ton. The ledge averages over 2 ft in thickness, and has been tested to a depth of 97 ft. A letter from J. G. Worthington, received yesterday from the Buckham mine, states that the rock is improving rapidly in the shaft, showing free gold (a thing that has seldom been seen in the rock which has been worked) and plenty of sulphurets. The mine only needs a mill on it to prove a success. This thing of hauling quartz from ten to fifteen miles is not economy. The owners are men without capital, and they would like to arrange for a mill. They can show the certified figures for the yield of the rock, and from the best and most careful millmen in this district.

New York Hill keeps sending out those rich specimens and piling up good pay rock on the dump. People here are beginning to talk about its being the richest mine in Grass Valley district, and when the works now near completion get to running, it will be apt to turn out net results which will substantiate this claim. New York Hill is "petering out" well.

MEADOW LAKE MINES.—Truckee Republican, April 28: We are able to state on authority that operations in this once well known mining district will be commenced on an extensive scale, just as soon as the snow is melted off so as to enable the parties who expect to operate them to get in their machinery and supplies. There exists no doubt of the richness of the ore found here, and the difficulty of working it at the former excitement, which was the only obstacle to making this district one of the richest in the State, has been removed. Two processes have been discovered which render the reduction of these rebellious ores no longer doubtful, and both of them are cheap and readily adapted to the work. One of them works the rocks up to the fire assay. Since the first of January upwards of fifty locations have been made, and many other parties are anxiously awaiting an opportunity to go in and make others.

The Culverson mining company has levied an assessment in order to prosecute the work of developing the mines immediately. The U. S. Grant company is now ready to begin work. Others that are not as yet incorporated are making active preparations to open their claims. A party of men left Truckee last night for this district, to look after some very rich claims. The party consisted of Frank Paulson, G. W. George Smith, Lee Butt, Wm. Hsler, David Hart, Robert Swin and others. They are all very sanguine of success. Some will remain to look after their interests and commence operations. There seems to be but little doubt that the past fame of this district will be eclipsed by the new fame it will soon gain, and we confidently hope to see this district one of the most important tributaries of this place, as supplies will probably be taken from here.

PLACER.

CLEAN-UP.—Placer Argus, May 1: The Indiana Hill canal, mill and mining company, located at Gold Run, cleaned up \$6,300 a few days ago from a three weeks' run. In the last three clean-ups, of six weeks running altogether, \$9,500 has been paid in dividends to the stockholders of the company.

CHROME.—Placer Herald, May 1: An extensive deposit of chrome iron has been discovered about five miles north of Auburn, on the old Grass Valley road, and is now being opened by a Mr. Martin. The ore, so far as tested, is said to be of a good quality, and is worth, say at San Francisco, in its crude state, about \$15 per ton.

PLUMAS.

THE NORTH FORK COUNTRY.—Plumas National, May 1: From Surveyor Keddie, who arrived in town from the North Fork on Friday, we learn that times are lively and that the season promises to be a brisk one. The Carriho hydraulic company have recently purchased the Fug & Ohl claims, which are located about one and a half miles above Carriho. The price paid was \$7,000, in coin. The ground prospects splendidly—in many places from fifteen to fifty cents to the pan. This will be the first claim opened by the new company. The operations of the Carriho company will commence as soon as the necessary supplies arrive from below. The Ditch hill pipe is working splendidly, and a good head of water has been running for about five weeks without a burst. There is every reason to think that

it will now stand the pressure. The mine at Barker hill is paying richly. After five days' run with one pipe they took up two lengths of poles at the head of the flums and got \$800 in fine gold—not a piece weighing over fifty cents. The ground-slice is from fifty to two hundred and fifty ft in length, and as many coarse pieces have been picked up in it, one weighing \$26.50, the probability is that the ground is very rich. The company propose to pump water by steam power to the top of Oummiag's hill, catch it in a reservoir, and use it for piping that ground. The water has to be raised from the ditch line 206 ft, and the pump at Ohio Valley will be used for the purpose. This ground is known to be immensely rich. They will commence work on this operation immediately, as Mr. Keddie has already made the necessary surveys. Messrs. Reed, Merwin, Bonte and Jacobs have recently been inspecting the Ditch hill operations, and were highly pleased with the prospects.

GREENVILLE NOTES.—Our dispatches from Greenville are up to April 30: The work on the Indian Valley mine, under the superintendence of Mr. O. Drake, is progressing rapidly and well. The fine rock struck just before the big cave took place is looking even better as developments continue. Everything promises well and the mill will be started next week. Mr. Purdy, the Superintendent of the Crescent mill's property, has arrived. He talks of starting up work again. The Hudson mine, with ample funds, will soon be started up by Mr. E. Leets. He proposes also to rebuild the Dixie mill. The Baker mine is looking splendidly. They are now getting good pay rock in the Union company's mine.

SANTA CRUZ.

BI-CARBONATE OF LIME.—Santa Cruz Sentinel, May 1: It has been known for some time that a valuable deposit of bi-carbonate of lime existed within Santa Cruz, on the western boundary of the town. Recently, Calvin Brown, engineer of the navy yard at Vallejo, visited this county in search of material to manufacture Roman cement, and found that abundance existed in our midst, in the vicinity of the grind-mill now leased by Messrs. Bennett & Hinds. He had once secured four acres of the land, quite sufficient for his present demands. The deposit is almost inexhaustible, underlying the lands of Mrs. Majors, Messrs. Pray, Towne, Doderer, Boston, Heath, Hitzelberger, Wright, Heacock, Kirby and others along the plateau from Kirby's tannery to the rocky cliffs adjacent to Mrs. Majors' residence, with a width nearly the same distance. The deposit crops out near the tannery, and at places is probably from twenty to fifty ft deep. Its value is beyond present computation, as no other similar deposit has yet been discovered in the United States. The manufacture of Roman or Portland cement will at once be commenced, and it is said that the old mill (Majors') will be used to grind the material after baking and mixing the ingredients. To make a good cement, a blue clay from the salt marshes near Benitoia will have to be procured and added to the carbonates of lime, and baked at a white heat in the proper kilns, and then to flour fineness, and put in close paper-lined barrels for market. The Croton aqueduct, the Delaware breakwater, and many other important public works throughout the country, were built with similar cement. The Sheppey stone of England from which Parker's cement is obtained, is more nearly like the stone discovered in Santa Cruz. It is not properly a stone, but an artificial (seemingly) hydraulic lime, composed of a mixture of clay and chalk which abounds along the coast, but only in this particular place has it the necessary amount in equal parts for the purposes of cement.

SIERRA.

PILING.—Mountain Messenger, May 1: The Green Mountain is still piling, nights.

A mining excitement prevails at Howland Flat, and claims are being rapidly taken up.

The Bald Mountain claim gets richer as the go into the mountain.

The Woodchuck ravine boys have all gone out to commence their spring's work.

The Swallow company, at Monte Cristo, is troubled with bad air.

"HOMESTAKE."—The Homestake quartz company, situated above Rock creek, has some thirty or forty ft of tunnel yet to run through hard bedrock before reaching their ledge. This is the ledge from which Johnson took \$3,000 with a hand mortar. If everything is satisfactory when the ledge is reached, the company will immediately erect a mill. The ledge is large, but is very rich.

The Oro company have put two shifts' work in their mine, to put it in better order for taking out quartz.

DISCOVERY.—"Slug Canon George" has discovered a quartz ledge in Slug canon that prospects well.

The trouble about water between the Bald Mountain and the South Fork companies has been settled.

STARTED.—The Keystone mill, which has been lying idle for several months, has again been started.

We are informed that work is to be commenced soon in the deep gravel mines and the ridge below Gibsonsville.

The Union company have found quite an extensive bed of pay gravel in the back of their claim at Gibsonsville.

NEW MILL.—The Independence quicksilver mining company are considering the propriety of putting in 20 new stamps. The mine said to be paying finely.

The Oak Ranch company will run their

ahead. Where they raised their shaft the rock was pitching and the gravel of the me quality as at Monte Cristo.

ONOMA.

Coal.—Petaluma *Argus*, April 30: Discovers indicating the existence of valuable deposits of coal have recently been made by E. Rathburn and L. E. Brooke, of this city, on a ledge of Thomas Hopper, about two miles west of his residence. The work of prospecting a mine will be commenced soon. Two or three other parties are prospecting for coal in Onoma mountain.

MINING.—Russian River *Flag*, April 1: The Sotoyome mine has two shifts working in one tunnel, and on last Friday struck large matter containing cinnabar, 96 feet from mouth of tunnel.

Just now the quicksilver business is very all in this county. The Excelsior has extended work; the Geyser furnace has stopped work, in order to increase its condensing capacity, and many claim-owners in the various mining districts have discharged their hands. Quicksilver at 60 cents a pound is not very inspiring.

Tax. Mt. Jackson has struck another fine vein of ore. The quality is the best we have ever seen from that mine.

Capt. C. A. Eastman informs us that the Anderson Jew mine (Sansal canon) is looking better than ever before. He has made arrangements for crushing six tons of ore at the Calistoga mill. The ore is to be shipped this week. Besides, he is bagging some more rock, to be shipped to San Francisco.

Tak Calistoga silver mine cleaned up \$9,540, a day's run, week before last.

COLUMBIA.

COLUMBIA.—*Union Democrat*, May 1: Last week at a depth of eight hundred feet in the south end of this mine, a fine vein of rich quartz was found. It is reported to be as rich as the ore which gave prominence to the mine the day of its great prosperity. The south end has never been worked, and should this result find proof to be as represented, it may be asked for the "Sonsby" to take rank again with the large paying mines of the State.

MAKES & DABROW QUARTZ MINING COMPANY.—*Union Independent*, May 1: The Fisher No. 6, which is the new hoisting shaft, is now at some sixty feet, which is equal to 130 ft below Nos. 3 and 4. A small shipment of ore was made on Monday last, which yielded, mill process, nearly \$300 per ton. This new shaft has cut in its vertical course the very rich feeders, all tending to the main vein, which dips into the hill at an angle of 27 degrees. When the depth of 100 feet shall have been obtained, a drift to the ledge will be made and a level connecting with Nos. 2, 3 and 4, and an upraise made to the two latter, of only 200 feet, and which will be the first drift or level ever run in the mine. The ore (some 480 tons on the dumps) having all been taken from the several prospecting shafts north and south in merely sinking an incline—following the ledge. Having prospected the mine fairly, the more expensive work of a full hoisting or working shaft has recently commenced, with an increased force, and improving the continuity of the ledge to the extreme north.

Nevada.

ASHOE DISTRICT.

CONS. VIRGINIA.—*Gold Hill News*, April 29: Daily yield, 500 tons of ore, keeping the mills running up to their full working capacity. The ore breasts and stopes on the 1500, 1400 and 1300-ft levels are all looking well and yielding the usual amount of rich ore. The joint cross-cut on the 1400-ft level is still driven vigorously ahead in the ore vein, the quartz ore being of fine favorable character. The east cross-cut on the 1200-ft level, at the edge of the ore vein, and is showing some streaks and spots of excellent ore.

CALIFORNIA.—The enlargement of the main drift on the 1500-ft level for a large air shaft to connect with the Ophir mine and to secure the thorough ventilation of the level, is making steady and favorable progress. Cross-cut No. 3 on the 1500-ft level is still driven forward through the ore vein, the face in low ledge ore. The face of cross-cut Nos. 4 and 5 on this level are still in good ore, as is also that the north and south drift running in the ore vein to connect cross-cuts Nos. 3 and 4. The joint cross-cut on both the 1300 and 1400-ft levels are energetically carried forward, that on the 1400-ft level being in the ore vein, and the other being just on the point of entering it. Making the winze from the 1400 to connect with the 1500-ft level is making good progress. The bottom still in ore.

OPHIR.—The ore stopes on the 1465-ft level continue to look well. The face of both the east and west cross-drifts from the northeast drift, at the bottom of the north winze, on the 10-ft level, are still in a fine character of ore. **BULLION.**—The east cross-cut from the north drift, on the 1700-ft level of the Imperial mine, the ledge day before yesterday, which shows the fine ore prospects, and although nothing can be fully determined in a mine until the developments are completed, there seems hardly doubt any more but that the Bullion is going to develop into a paying mine.

SAVANNAH POINT.—Daily yield, 500 tons of ore. The ore breasts are all looking well and promise a good yield for a long time yet to come. Prospecting the ledge at the 1600-ft level has developed nothing new during the week. Driving main east drift on the 1700-ft level is making good progress.

CALEDONIA.—The new shaft is now down and thoroughly timbered to the depth of 115 feet. The erection of the new air compressor is about completed. As soon as the compressor is ready to run, a six inch pump will be attached for the purpose of extracting and keeping down the water in the shaft.

BEZUCHKA.—The water is being rapidly extracted from the main incline, although nearly 100 ft in depth yet remains in the shaft to hoist to the surface. Nothing can be done in the drifts on the 1500-ft level until this water is drained. The bottoms of both the middle and north winzes are still in ore. The ore breasts are all looking well on the 1400-ft level, and are yielding fully as good if not a little better quality of ore than for some time past. Daily yield, 500 tons.

SIERRA NEVADA.—The main east drift at the 700-ft level, now being run for the purpose of prospecting the ore vein at that point, is making rapid headway, the face still in a mixture of clay, quartz and porphyry.

NORTH SAN FRANCISCO.—This is a new mine, located on the north end of the Comstock lode, a short distance north of the Geiger Grade toll house, and nearly on a north and south line with the Utah, Sierra Nevada and Ophir claims. The location is a fine one, the ledge cropping out at two different points on the surface. A fine three-compartment working shaft has been commenced, which is now down 30 ft, finely timbered throughout.

ROCK ISLAND.—The main west drift at the 450-ft station is in 40 ft in fine working ground. It is expected that this drift will reach the ore vein in a distance of 130 ft from the shaft, as the ledge has a strong eastward inclination toward the shaft. The prospects for finding ore when once the ledge is reached are certainly very favorable.

SENATORS.—During the past week the south-east drift on the 400-ft level on the hanging well of the ledge, proving the ore vein to be 20 ft in width, and the quartz of a fine quality, spots of which give assays of gold and silver.

CROSSLAND POTTER.—Daily yield, 40 tons of ore, from the old upper workings. The average assay value of this ore is about \$30 per ton.

SOUTH CALIFORNIA.—During the week a couple of fine looking feeders of quartz have put in an appearance at the bottom of the shaft, one of which widens rapidly, and may develop into something valuable. Water does not interfere.

UTAH.—Putting in the heavy stone foundations for the new and powerful hoisting and pumping machinery is making steady and rapid progress. The new machinery is arriving by the car-load almost daily.

NIAGARA.—Sinking the new shaft is making rapid progress. The ore vein has every appearance of widening out, and the ore at the bottom of the shaft is of a fine character.

LANSY BAYAN.—The recent damage to the pumping machinery has been fully repaired and the water lowered 60 ft. The air connection between the up-raise from the 180-ft level and the winze from the level above is completed. Sinking the winze below the 180-ft level is making steady headway, the bottom still in ore.

BALTIMORE AND AMERICAN FLAT.—The new pumping and hoisting machinery is all working with the utmost smoothness and perfection; the shaft is being drained of water and work resumed at all points on the 850 and 750-ft levels. Cross-cuts have been started too on both the levels to cut the ledge, and the prospects for good ore developments in these mines are growing more favorable every day.

PHIL. SHERIDAN.—More seams of quartz and black clay are coming in, and the indications are very promising for a good ore development before long. There is evidently a valuable ledge ahead.

NORTH CONSOLIDATED VIRGINIA.—The shaft is down 180 ft, the bottom still in ledge material of a fine, favorable character. Assays, ranging from \$5 to \$13 per ton, are frequently obtained, giving great confidence in the future developments, when a greater depth is reached.

MOORE & MOGAN.—The cross-outs in the surface workings continue to show ore which experts pronounce to be of the same character and texture as that found in the great bonanza itself.

TAOY CONSOLIDATED.—The new steam hoisting machinery is now in full and successful operation, and sinking the shaft deeper is being actively prosecuted.

WELLS-FAROO.—Three shifts of hands, working night and day, are putting the shaft down lively. The drift at the 150-ft level is in 40 ft.

SUTRO TUNNEL.—The cave mentioned in last week's report is about 100 ft west of shaft No. 2. Being loose and sliding in from above, it is found to be a very difficult job to drift through the caved debris. But it is being done, however.

PIONEER CONSOLIDATED.—Shaft down over 100 ft, and the work being pushed lively night and day, with three shifts of hands. Sinking in ledge matter. Steam hoisting works will soon be needed.

DANDANELLIS.—The machinery of the old hoisting works of the mine is being fixed up and made ready for action as fast as possible.

DANEY.—Cross-cutting the ledge on the 400-ft level will be resumed in a very few days.

NEVADA.—The cross-cut of the lower level is now passing into a softer and more favorable character of matter, and shows indications of approaching the main ore vein or chimney.

GLOVE CONSOLIDATED.—The pumping machinery has been put in the most perfect condition, and the extraction of the water from

the 400-ft level was commenced this morning.

JUSTICE.—The developments of the south mine and at the 400-ft level go on as usual with excellent prospects in sight, but no new and important feature to make note of.

JULIA.—Sinking the main shaft is making splendid headway, the new "Burleigh" drills working with the utmost perfection. Much better progress can now be made than at any time in the past, everything in and about the mine being in the most perfect working condition.

ORIGINAL GOLD HILL.—Air pipes have been run through to the extreme end of the north drift, allowing of good ventilation and working to better advantage. The ore body developed in the south drift shows splendidly, and the new ore dump will be completed to-morrow or next day, ready for ore extraction and milling whenever the company shall desire.

SOUTH COMSTOCK.—Shaft down 165 ft to-day. The bottom of the shaft is in ledge matter, quartz and clay predominating.

WHITE PINE DISTRICT.

ELKO MINE.—*White Pine News*, May 1: This has always been considered a good mine, and has encouraged the owners by its yield of good ore, but recent developments places it among the best mines of the district. At a depth of 136 feet they have struck the ledge, which is six feet in width, and yielding carbonate ores which assay way up into the hundreds. It is the intention of the owners to take out a large quantity of ore and ship to Eureka for reduction. This is one of the hundreds of similar mines in White Pine district lying idle for the want of a furnace to work the ores. A few more strikes like this will be sufficient comment on the prejudice that exists against the mines of this district. That this prejudice will be swept away, and that soon, hardly admits of a doubt, for no such fortunes as are here for some one to reap, are going to be passed by for any great length of time.

Montana.

THE BLACK LEADS.—*Correspondence New Northwest*, April 16: The big strike before reported caused a great excitement here, and the days of 1864-5 are being lived over again. Old time prejudices, though grown firm and strong, melted in the crucible of excitement like wax before the flame and left the man so divested a willing victim to—quartz. Men were visible in every direction with stakes in arms looking for croppings to pounce upon, and it is now immaterial whether they are green, black, or blue, for one is as likely to be good as another. But this result of all this re-locating will be very beneficial to this district and to all directly or indirectly interested in the prosperity of the camp, as all the fragmentary property heretofore mostly owned by outside "boiled shirt" non-residents has reverted back to men who will develop for a legitimate claim of 1500 linear feet in a body. A new era is now dawning on Summit valley mining district and its vast resources will be more surely and speedily developed and the way thus prepared for ever timed capital to invest. The Travona shaft is now 28 feet deep and the vein has been steadily widened. About 1½ tons of ore have been sacked daily for shipment. On the Parrott lead the different parties still continue stoping out good ore. Messrs. John Downs & Co. are now down 90 feet and are preparing to erect a whim to dispose of the considerable body of water coming into the mine, which is difficult to hoist by manual labor.

THE PIONEER COMPANY. Pioneer, expect to start up in a few days now. Having had a 600-inch ditch for several years, and last year purchased the 400-inch Keystone ditch, they will have plenty of water this season.

Oregon.

RESOURCES OF EASTERN OREGON.—*Oregonian*, April 20: Our readers have become familiar with the Virtue mine near Baker City, which has been sending out its golden bricks for a long time. The Virtue mill had a small beginning, and can make no pretensions to equality with the great mills of Nevada, owned by San Francisco capitalists; but it has successfully opened one or more valuable mines, and is extending its operations constantly.

Then, there is the Rye valley mines, which have already been demonstrated rich in both gold and silver. There is a mill at Rye valley.

At Conner creek, also, is another splendid mine of gold quartz, the richness of which is already established by milling the rock.

At Ronen gulch near Baker City, the McClelland brothers are working a gold bearing "pocket ledge" in which the "pockets" are numerous and very rich. The specimens shown us from this ledge has \$24 in gold in it, by specific gravity test, and in aggregate weight equivalent to \$32.

Over in Grant county, Mr. Cabell is working a ledge of gold and silver, which in California would be the basis of more "big bonanza" excitement than a little. This rock assays \$592 gold and \$1,987.50 silver to the ton. The machinery with which this truly magnificent mine is worked is a little mill of inferior capacity.

Several other ledges known to be rich in the precious metals and partially opened, are waiting for some one to take hold of them.

And besides the precious metals, rich mines of copper and cinnabar were discovered years ago in Grant county, which would prove sources of immense wealth if they were well opened. There is no reason why Eastern Oregon may not in time become as famous as any other mining region in the world.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last, Dr. H. W. Harkness in the chair. The time of the meeting was principally occupied with the reading of a carefully prepared paper by Charles W. Brooks on "The Origin of the Chinese Races," the object of the writer being to prove that the first Mongolians came from some part of this continent, probably Peru. This paper was one which showed unusual research and study, and is of great general interest. Mr. Brooks has had an opportunity for following up this question, superior to most people. In his extensive travels with the Japanese Embassy, he had with him some of the ablest Japanese historians, men of profound learning, who had made the history of Eastern nations the study of a lifetime. He availed himself of their knowledge on the ancient languages while he was at the Vatican library and that of the British museum, to obtain translations of the old papyrus and hieroglyphs which had any bearing on the question, and has really developed some interesting facts.

The argument may be succinctly stated as follows: Central Asia has hitherto had the credit of being the cradle of mankind. Scientists say that America is older, geographically, than any part of the earth's surface. Therefore in natural process of evolution, the aboriginal man must have appeared on this hemisphere, in the vicinity of the first rocky elevation. The Chinese people are unlike any other people on the continent of Asia. They are hemmed in by mountains and the great wall along their northern and western frontier. They have had no communication with other Asiatic peoples from time immemorial. According to this tradition, their first progenitors landed on the southern coast of China. In looking for the place where they might naturally have been brought by favoring winds and currents, our attention is turned to Peru. The records of that country show an immense antiquity. Their civilization was extremely ancient, and the remnants of an almond-eyed race resembling the Mongolian are found in the Peruvian mountains and also about the headwaters of the Amazon. An armed vessel or an invader might have gone in sixty days from Peru to the southern coast of China. Chinese records show that 3,588 years before Christ, Fo Ki, a stranger king, introduced the recondite knowledge possessed by the Peruvians to the Chinese. The lower roots of the Peruvian idiom are connected with the 216 radicals of the Chinese language. These writings occur all through Asia, and as far west as the Pyramids.

The suggestions of these facts and the many inferences to be drawn from them were elaborated with much detail. It was shown that while Peru had at one time 11,000,000 of inhabitants, her industries had died out and her population disappeared, China had gone on increasing her population indefinitely, and achieved a high degree of civilization. The paper was listened to with interest and applauded at the close.

It was announced that a class in archaeology was being formed at the Academy, so that all who wish to join can do so. It will be under the charge of Mr. W. N. Lockington.

The President stated that at the next meeting of the Academy Prof. Guerin would read a paper on the "Sewerage System of San Francisco."

The meetings, hereafter, will be held at eight o'clock, P. M., as announced by the Secretary.

General News Items.

AMONG the late ventures in California journalism is the Santa Cruz *Local Item*, published by H. Coffin, late of the *Gilroy Advertiser*. Mr. Coffin seems determined to give his patrons a live paper, and from the initial number, which has come under our notice, he bids fair to succeed.

A MAN named John Reynolds, who, until quite recently, was employed as waiter at the Cosmopolitan Hotel, committed suicide last Saturday at the West End House, by asphyxiating himself with gas.

DISPATCHES from various points in the Pennsylvania coal regions report that the strike is still in force, with disturbances at several places.

ANOTHER letter in the Beecher business. This time it is one from Mrs. Tilton to Judge Neilson. What its contents are is just now roasting the brains of the reporters to ascertain.

It has been ordered that a postoffice be established at Allen's Camp, Kern county, California, Henry Clay Coley, Postmaster.

A TRAIN of twenty-three cars loaded with oysters reached San Francisco from the East Tuesday. They will be transplanted in the bay.

The original aspect of the Civil Rights bill has been declared unconstitutional by a North Carolina judge.

The new Palace Hotel at Napa was formally opened last Friday evening.

A WHALE was seen in San Diego bay the other day.

The Pope is ill again.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Thirteenth Lecture delivered before the University of California College of Agriculture, on Friday, February 5th, by PROF. C. E. BESSEY.

Our Timber Trees.

To the student, as well as to the practical man, the timber producing trees of this Pacific slope furnish a topic of great interest. A well grown tree is a grand object, interesting to every one, from the dreamer who only asks of it that it throw its shade over him, to the lumberman who asks it to yield him the boards, planks, joists and shingles so snugly packed away within its shaggy bark; doubly interesting to the lover of nature, who studies its forms and dwells upon its beauty as if it were an animate thing, who loves it as a fellow creature, and who mourns as for a friend when some ruthless hand fells it. Wonderful machines trees are, pumping up day after day tons of water, which they allow to steam through the millions of breathing pores in their leaves; sending their roots down into the darkness of the earth among the rocks and roots, and bringing up from thence the materials with which they build tall shafts which out-top all other living things. They are nature's masterpieces. Go and stand beside the gigantic *Sequoias* of the Calaveras or Mariposa groves, the *Araucarias* of Norfolk island, or the monstrous gum trees of Australia, and you are with the largest living things on earth.

What thing of life can claim even half the antiquity of some of the trees now growing? Our largest redwoods were seedlings one thousand years ago. Run back if you can over all the changes our English speaking race has seen during the time these redwoods were growing.

Thirty one centuries ago the Big Trees of California burst their seed coats and began their long reaching toward the skies, began adding cell to cell for the construction of spires which should withstand the storms of more than three thousand years. Thirty-one hundred years ago,

Twelve Centuries Before Christ,

When the names of which old Homer sung were still fresh in the memories of men. Our people, our civilization, and our religion have risen since these giant trees began existence.

But what shall we say for the great dragon tree which until within a few years was standing upon the island of Tenerife? Careful estimates placed its age at considerably more than five thousand years. When Moses wrote his account of the world, this dragon tree had been for more than a thousand years braving the storms which swept down upon it from the ocean; when our *Sequoias* were tiny sprouting plants, it had already seen more than twenty centuries; when Rome was in her glory, this ancient tree had passed the meridian of its life. This one living thing spanned with its life the known world; its youth was in the pre-historic past, its old age extended to our present.

Interesting as these inquiries are, I wish, to-night, to call your attention to another view of the matter. Trees, if usable, represent dollars and cents, but if unfit for use, their commercial value is nothing. Now the uses which give value are many; without attempting to enumerate all, they are such as the following: they may furnish food, medicines, timber, gums, balsams, perfumes, spices, dyes, ornaments, etc. But few trees are so poor as not to furnish one or more of these. With us the great demand is that our trees furnish timber. The question of the lecture then, shall be,

What Trees Furnish us with Timber?

A convenient division of timber trees is into "soft wood" and "hard wood" varieties; and under these names timber men and lumber dealers buy and sell the woods found in the market. To the soft wood division belong all the pines, redwoods, firs, spruces, cedars, arched and other cone-bearing trees, as well as the poplars, cottonwoods, lindens, white-wood and a few others. In the hard wood divisions are found the oaks, beeches, chestnuts, hickories, walnuts, elms, ashes, laurels, cherries, maples, locusts and many others.

Among the soft wooded trees the pines stand as of the greatest importance. There are many species which are abundantly distributed throughout the northern half of the globe, and in every country one or more species seem especially adapted to meet the wants of civilized man.

The Scotch pine, *Pinus sylvestris*, called also the Scotch fir, is a tree found in Europe and Northern Asia. It is a fine tree, growing best in the mountainous districts, where it attains the height of upwards of eighty feet, with a diameter of from four to five feet. Its lumber is known in England under the names of red and yellow deal, and is largely used for many purposes.

The white pine, *Pinus strobus*, called also Weymouth pine, is a native of the Northern

United States. In Maine, Vermont, New Hampshire, New York, Michigan, Wisconsin and Minnesota, vast acres were formerly covered by this pine. It is a tall, slender tree, often in this dense forests attaining a height of two hundred feet, with a diameter of but four to five feet. Its wood is for the Northern States what the Scotch pine is for the countries of Europe. It is white, easily worked, reasonably strong and durable, not given to warping or checking, and besides, it takes paint well, all of which qualities at once commend it to the builder and manufacturer.

Its Uses are Almost Numberless.

Yellow pine, *Pinus australis*, is found growing in the Southern Atlantic States, especially in Georgia and Florida, where it forms extensive forests. This is the pine of the South, replacing the white pine of the North. It is not as large a tree as its Northern relative, attaining an average height of less than one hundred feet. Its wood is yellowish in color, dense, heavy and gummy. When dry it becomes very hard, and is then quite difficult to work. Although used in the South for almost all kinds of work, it is especially fitted for use as flooring, and for this purpose it is largely brought to the Northern markets. It is even used somewhat in California for this purpose; a large cargo was landed a short time ago for the Palace Hotel, in the city.

The sugar pine, *Pinus Lambertiana*, of California, may be said to be the Western representative of the foregoing trees. It is botanically a very near relative of the white pine of the East, which it resembles very closely in everything excepting size, being a giant as compared with its Eastern congener. Place two boards side by side, the one from the white pine, the other from the sugar pine, and it would be a most difficult thing to tell which was which. If California had no other conifers, sugar pine would be used for as many purposes as the white pine, but you are so fortunate as to have three or four others having different qualities, so that the use of sugar pine is somewhat restricted. On account of its lightness, firmness, strength, ease of working, freedom from warping, and readiness to take paint, it is largely used for doors, sashes and blinds.

The redwood tree, *Sequoia sempervirens*, is the great lumber producing tree of California. It is not a pine, but is more nearly a cypress, having canes and leaves much more nearly resembling the latter than the former. It is peculiar to this coast, and even here it appears restricted to certain favorable localities. Dr. Gray considers the redwoods (including the giant trees, which are near relatives), as the remnants, so to speak, of

A Former Gigantic Race of Trees,

Which extended throughout the northern hemisphere, climatic and other changes having destroyed them long ago in all countries but California. Beyond the Sierras here and there we find the fossil remains of gigantic trees; and we can trace them away Eastward, even into Northern Asia. Here alone in favored California has the climate remained stable enough to permit their continuance to the present. But even here there has been some change; for now the redwoods are somewhat restricted to certain districts, while we know from fossil and other remains that they once covered portions of the State where now none are to be found. On the tops of the Coast Range mountains are roots and pieces of stumps of ancient redwood forests. They represent a dying race, which specially favoring conditions have given a little longer lease on life.

The Douglas spruce, *Abies Douglasii*, is a native of the Rocky Mountains, Sierra and California regions. A beautiful tree, it was long ago taken to Europe as an ornamental tree for the parks and gardens. Here it is chiefly interesting on account of its timber, which is much sought after by railroad men. Its durability when in the ground makes it very valuable for ties and posts, for which it is much used. It is also brought into the market as boards and planks under the name of spruce lumber.

Oregon pine and Oregon fir are names applied to a very valuable timber brought to our market from Oregon and Northern California. The name pine is not properly applicable to this tree, as it belongs to the botanical genus, *Abies*, the spruces and firs. The wood is firm, light, very strong, elastic and durable. It is used for many purposes, the most important of which is ship building. Ships have been made of this timber throughout, and upon trial have been found as strong as if made from the oaks and other hard woods.

"Soft Wood Ships."

As they are called on account of the lightness of their materials, sink less into the water under a given weight of cargo, than do those made of the heavier woods.

Masts and spars of this timber after bending under heavy winds for days or weeks, as soon as released from the strain straighten up again as before.

There are many other soft wood trees of this region which are now somewhat used, and which no doubt could be utilized if we knew more as to their strength, durability and other qualities. Among these are several pines, yellow pine, *P. ponderosa*; nut pine, *P. sabiniana*; Monterey pine, *P. insignis*. Several additional ones belong to the genus *Abies*—the spruces and firs might be added to the list—as also the giant arbutus of Oregon, *Thuja*; the western larch, *Larix*; western red cedar, *Juniperus*; California white cedar, *Libocedrus*; and some others. Of other soft wood trees than the cou-

isfers, California has none worth mentioning, and with the exception of the tulip tree, *Liriodendron*, of the Eastern United States, none of them are greatly to be desired. With so many valuable soft woods at her command, California has but little need of more, and yet it cannot be denied that

No Tree on this Coast

Furnishes a timber which can exactly replace the wood of the tulip tree, the whitewood or yellow poplar of the Atlantic States.

Among the hard wood trees the oaks occupy the same relative position as do the pines among the soft wooded ones.

British oak, *Quercus sessiliflora* and *Q. pedunculata*, is known wherever British ships have gone. This tough, heavy, durable wood has always been a favorite with British ship builders, and the superiority of the British navy, no doubt, is largely due to the fact that these oaks have always been easily obtained. So important have they been considered, that long ago great plantations of them were made and carefully guarded. Hundreds of the British vessels now floating were made from the oaks which grew from the acorns which

Careful, Thoughtful Hands Planted,

Perhaps two centuries ago.

The live oak, *Quercus vivens*, of the Southern Atlantic States, is for American shipping what British oak is for England. Unfortunately for us, as a native it grows somewhat south of the points where the most of our ships are built, and so it has never been used as much as it might have been, had it been a native of the whole country. California cannot as yet boast of an oak equal to either of the foregoing, possibly because we hardly yet know anything about the native species.

Our common evergreen oak, *Quercus agrifolia*, so common in and about Oakland, thus far has been considered useless as a timber tree. Possibly by proper preparation it may yet be turned to some use.

Tan-bark oak, *Quercus densiflora*, growing in Central California, is now coming into use for the manufacture of wagon and agricultural implements. Under proper preparation it becomes hard, tough and durable.

Canon oak, *Quercus chrysolepis*, found in the ravines and canons of the mountain ranges, is tough and durable, and is said to be of value in ship building. It has, however, been but little used.

The walnut of Europe, *Juglans regia*, is a tree of considerable value in the countries where it grows. In the United States, westward to the Missouri river, it is replaced by the black walnut, *Juglans nigra*, a tree of a thick, heavy growth, producing a valuable dark colored wood, much used for furniture and inside work in houses. Its near relation, the butternut or white walnut, *J. cinerea*, is a smaller tree, producing a lighter colored wood, valuable for the same purposes as the former.

In California a species nearly allied to the black walnut is found rather sparingly. Its wood is valuable, and is used to some extent as a substitute for the former species. It would be well to

Plant Freely,

Not only of the native species, but also of the European, which makes a rapid growth here, and of the black walnut, which, though not a rapid grower, can be made to do well.

The hickory is one of the finest of the trees of the Northern United States. In its bearing it is not very unlike the pines; its straight stem is surmounted by a more or less conical top, often at a very great height from the ground. Its wood is white, hard, heavy and tough, and when properly protected quite durable. As it is subject to the attacks of certain

Wood Eating Insects,

It is not much used in large or heavy pieces, its greatest value being found when employed in sticks or pieces but little more than an inch in diameter. For axles and spokes of wagons and carriages, for handles for tools, and for the smaller parts of agricultural implements it is valuable. California has no native hickory, hence it is found to be quite difficult to grow it here. Possibly in the foot hills it might be grown. It is an experiment worth trying, to make a plantation of hickories in some of the eastern counties, for the State has no wood whatever which can exactly replace it.

The elms are found in great abundance throughout most of the States east of the great plains. Some of the species are quite valuable, though the liability to warp is a serious objection. Europe has a fine elm, the Eastern States have two valuable ones, but California has none. Some of the elms are found to grow quite well in some localities in this State, and no doubt could be grown in sufficient quantities to meet all the demands for elm lumber.

The Ash.

Here again we find, first a species in Europe, which is replaced in the Eastern States by the American white ash, a tall, majestic tree, producing a white, light, tough and durable timber. On account of these desirable qualities it is largely used in the manufacture of agricultural implements. For very many purposes it is preferable to hickory; as it is not so heavy while it is very nearly as strong, and possesses, besides, the additional advantage that it is made free from the work of the powdering insects. In Western California and in Oregon a small sized ash occurs in sufficient abundance to be used in manufacturing somewhat.

The Maples, of which there are many species, are divided into two groups—the hard maples, and the soft maples, referring to the character of the wood. The hard maple, or as it is also

known as the sugar maple, of the Eastern States, occurs as far west as the Missouri river. In favorable localities it becomes a large tree, one hundred feet in height, with a diameter of from two to three or more feet. When dry its wood is hard, and capable of receiving a high polish. The soft maples, of which there are several Eastern species, have a much softer and less durable wood. It is, when kept dry, valuable for furniture, and is largely used for that purpose. In Northern California and Oregon a maple occurs which may be considered as the western representative of the soft maple of the East. It is used considerably.

There are three timber trees peculiar to California which are well worth mentioning; they are the

California Laurel, the Madrona and the Manzanita.

The California laurel (*Oreodaphne Californica*) is peculiar to this slope of the continent. Its wood is valuable, and no doubt when we have learned more fully how to use it, it will be of more value still. The Madrona furnishes a hard, heavy, light colored wood, which is, or can be made to be quite valuable. The Manzanita grows usually as a shrub from which it is difficult to get large pieces of timber. Occasionally, however, it is of sufficient size so that good blocks several feet long and from four to six inches thick may be secured. This wood is very beautiful, much resembling mahogany, but being much heavier and harder. It can be made into many small articles of use and ornament and no doubt by proper care and culture it might be grown into a much larger tree.

Among the important woods of this coast not belonging to California, are those recently brought into use from Mexico. The most important one is what is known as *Prima vera* or white mahogany, a white wood resembling in many of its characters the hickory of the East. It is used extensively in the manufacture of fine furniture, and also for street cars, as well as for many other purposes. Summing up the whole matter we find that California is better supplied with coniferous soft woods than perhaps any other country on the globe, having no less than twelve which are more or less valuable. It has, however, but few soft woods aside from the conifers which are of any value. It is decidedly wanting in valuable hard wood trees.

In order that the native woods of this coast may be of greatest use there is great need of

Thorough and Exhaustive Tests,

As to their strength, their durability and their working qualities. There is no doubt in my mind but that when they are known we shall find that many of the trees which we now pass by as valueless are in reality very useful. I am glad to be able to announce that such tests as those of which I have spoken will be made this year at the university. Only a few days ago the arrangements were completed for beginning the work. In this work I trust you are all interested, and I further trust that you will give it a hearty support as a worthy work of a great and growing university.

I have thus thrown hastily together a few of the facts connected with this subject in order to call your attention to the sources of our timber supply—the kinds of woods we have, those we lack, and the need of a further development, so to speak, of our own woods.

Trusting that the matter presented has not been altogether devoid of interest, that it may receive further thought from you, that you may help to develop this portion of California's resources, thereby adding to its wealth and its material prosperity, thanking you for your attention and patience, I bid you good night.

COAL IN NEVADA.—Learned experts declared that there was no coal in Nevada, but they are now shown to be wrong, for coal is found at various points in the State, and in due time good producing mines of it will be developed, and made available as the cheap fuel of the future. It is found at Crystal Peak, near the western border of the State, also away out in the eastern section. Nearer home, we have the Virginia and the Black Diamond companies actively developing their mines the other side of Carson river, in El Dorado canon and a little beyond. Both produce a very respectable article of coal, which burns well and is made practical use of both in stoves and in the production of steam. We noticed a few days since, in Virginia, a huge lump of the coal from the Virginia coal company's mine, in El Dorado canon. It was brought in a few days ago as a specimen by a gentleman who picked it from the dump while passing, and put it in his buggy. This coal is of the laminated brown lignite variety, strongly bituminous, and burning to clean white ashes. There appears to be plenty of it and each underlying stratum shows improvement. Where it can be cheaply transported by means of a railroad, and furnished in quantity, that coal will be found to be a valuable commodity in the way of cheap fuel. Thus, however, the opinions of experts are set at naught, and coal is found to exist in Nevada as well as California.—Gold Hill News.

In the Julia mine on the Comstock, Burleigh drills of the latest improved pattern are being placed in the shaft, and a six inch air pipe connected with the new powerful compressor with which to drive them. Everything will be in readiness to give these drills a trial to-morrow. It is confidently expected that the progress of sinking will be doubled when the drills are once in good running order.

USEFUL INFORMATION.

Recipes for the Shop.

PAINT FOR BURIED WOOD.—The simplest, and perhaps best, paint to prevent buried wood from decaying is made of boiled linseed oil, into which charcoal is stirred until the whole is of proper consistence. Apply with an ordinary paint brush.

COPPER ALLOY THAT WILL ADHERE TO GLASS.—The following alloy of copper will attach itself firmly to surfaces of metal, glass or porcelain: 20 to 30 parts finely blended copper (made by reduction of oxide of copper with hydrogen or precipitation from solution of its sulphate with zinc) are made into a paste with oil of vitriol. To this add 70 parts mercury and triturate well; then wash out the acid with boiling water and allow the compound to cool. In ten or twelve hours it becomes sufficiently hard to receive a brilliant polish and to scratch the surface of tin or gold. When heated it becomes plastic, but does not contract on cooling.

POLISHING COPPER OR BRASS.—Owing to the irregularities of surface, it often happens that considerable difficulty is encountered in putting a polish on articles of brass or copper. If, however, they be immersed in a bath composed of aqua fortis 1 part, spirits of salt 6 parts, and water 2 parts, for a few minutes if small, or 20 or 30 if large, they will become covered with a kind of black mud, which, on removal by rinsing, displays a beautiful lustrous under surface. Should the luster be deemed insufficient, the immersion may be repeated, care always being taken to rinse thoroughly. All articles cleaned in this way should be dried in a hot dry sawdust.

Filing.

This seems an easy matter to the uninitiated. A simple thing to run a file over a piece of metal. This is far from being the case; for a skillful workman will, in a given time, cut away a far greater quantity of metal with a file than one who is unskillful, for he makes every tooth cut into the work, instead of rubbing over it. To do this, he must adapt the pressure and velocity of motion of the file to the coarseness of the teeth, and the hardness, brittleness, and toughness of the material he is working upon.

To file flat requires much practice; that is, to avoid rounding the edges of a narrow piece of work. Many apprentices find this a most difficult thing to do; in fact there are some who never succeed in filing, smoothing, and polishing without rounding the edges of their work.

The power of filing squarely and well is one of the merits of a good watchmaker.

In filing flat surfaces, it is quite an advantage to use a cork to rest the work upon when the form of it will admit of so doing—place the cork in the vise—use the file with one hand, the pressure on the file being communicated by the forefinger. It is mainly to aid the workman in filing flat that the rounded or bellied form is given to files.

The Art of Drawing.

The art of drawing, by which we imitate everything that is beautiful, and transfer to paper or canvas the creations of our imagination, is not only pleasing as an accomplishment, but is also of practical utility in every branch of study. All cannot expect to attain to equal excellence; there is no one who does not possess some little taste, which, with proper cultivation, will develop itself in some degree of artistic beauty. As in music, so in drawing, to become a master of the art requires long labor and constant application; and still it is within the reach of all to acquire such a knowledge, and such an experience, as to produce pleasing effects and cultivate our tastes for the beautiful in art and nature. If we put our mind and hand to the work we may feel sure of the most gratifying results; and each successive difficulty overcome, and every new idea gained, will add knowledge, experience and encouragement.

The proper materials for drawing are either black lead pencils, or black lead fixed in a port-crayon, charcoal, red, black or white chalk, pastels or crayons, pens or hair pencils, and Indian ink. Black is as proper in the beginning to practice after the plainer lines, etc., as any other material, and the stroke it makes, being smooth, will please the young beginner better than what is effected by crayons.

PERFORMANCE OF SMALL ENGINES.—A correspondent of the *Scientific American* has been trying to arrive at a practical test of the value of the nominal horse power of small steam engines. He communicates the result as follows: "Some time ago I tried an experiment with a two horse power engine, in order to ascertain how it compared with the power of a horse. The latter, working in a treadmill attached to a 22 inch circular saw, was two hours in sawing a cord of pine wood, making four cuts and five sticks. The engine attached to the same saw performed the same amount of work in just forty-five minutes; the cylinder was 3½ inches in diameter by 6 inches stroke. Steam pressure was 35 to 40 lbs., and the revolutions of the engine about 300 a minute. The power was transmitted through a 4 inch belt running from a 19 inch balance wheel on the engine, directly to the pulley on the saw. The horse could stand the work only part of the day at a time; but the engine was good for every hour in the day and every day in the week.

Shrinking of Seasoned Timber.

The shrinking of timber works a greater detriment to the wheelwright than to the work of any other artisan, hence no one should be more thoroughly informed with regard to the character of the timber he is called upon to manipulate than the wheelwright. A late number of the *American Builder* contains some hints in this direction, which we give below:

The various kinds of oak, and some other kinds of valuable timber, will shrink more or less every time the surface is dressed off even a small fraction of an inch. Wheelwrights, accustomed to work in oak, are well aware of this fact, and a correct appreciation of it often enables them to turn out work of a superior character, even of ordinary materials, by first blocking out the piece roughly, then allowing the timber to season, and afterwards working the various parts by degrees, as the seasoning process becomes more and more complete. White oak spoke timber, for example, may be allowed to remain in rough state half a score of years, under shelter, without becoming seasoned so thoroughly that the timber will not shrink after the spokes have been dressed out.

Carriage wheels have often been made of the choicest of oak timber after every spoke had been seasoned for several years, and to the great surprise of the wheelwright, every spoke would work in the joints before the vehicle had run three months. The defect in such instances could not be attributed to inferior timber nor to perfunctory workmanship; but simply to this one circumstance—that the parts of the wheels were put together before the timber had ceased to shrink.

To prove that the best quality of oak will shrink after a spoke has been dressed out, let a tenon be made on one end and driven immediately into a mortise; after a few days' exposure in a warm workshop the spoke may be easily withdrawn. The same fact will hold good in the manufacture of woodwork of any kind where oak is employed for tenons. In order to make joints that will never start, the piece on which the tenons are to be made should be dressed over several times, until the shrinking has ceased. Then let the tenons be made. After these have shrunk, while exposed to the drying influence of a warm workshop, the spokes, or other parts, may be driven into their respective places, with the assurance (especially if they are dipped in oil paint previous to driving,) that the timber will shrink no more.

Many kinds of farming implements, in the manufacture of which oak and ash are used, render very unsatisfactory service, simply because the seasoned timber was not allowed to shrink before the tenons were driven into the mortises. In like manner, oak chairs, and other oak furniture, will frequently shrink to such an extent that the pomels, rungs, dowel-pins and banisters will all work loose, if the precaution was have described is not observed.

Rotary Engines.

The rotary engine is a favorite subject of experiment with inventors, which they do not suffer to lapse into obscurity for want of perseverance. At the fair of the American Institute, last fall, there were four or five of these machines, varying in design and detail, but uniform in the theory upon which steam was applied. The simplicity of the rotary engine is an argument advanced in its favor by persons who imagine that it will one day come into general use; yet some of the most complicated engines we have seen are upon this principle. There has long been more than a suspicion in the minds of manufacturers that there must be a good reason for the want of confidence shown toward this form of steam engine, and engineers know that, for a given amount of power, a rotary engine requires a much larger boiler than a reciprocating engine. A careful and systematic trial was made last fall at the fair of all the rotary engines present, and sets at rest the question of economy. The results show that to produce one horse power per hour the best rotary engine required twelve pounds of coal; while the commonest reciprocating engine, with a properly constructed side valve, does not take more than four to six pounds of coal per horse power per hour. Instances are on record where a horse power has been produced with less than two pounds. One test at the fair showed that one engine present took forty-five pounds of coal per horse power per hour.

Despite the unfavorable showing, as above, it should by no means be considered decisive against all possible rotary engine devices. The problem of a practical rotary engine may be a difficult one to solve, but it should not yet be considered an impossible one. The advantages of a direct over a reciprocal motion in the steam engine are enough to serve as a powerful stimulus to invention in this direction. A large recompense is sure to come to the inventor of a thoroughly practical rotary steam engine.

A TUNNEL UNDER THE STRAITS OF GIBRALTAR. A company has recently been formed in Spain, the object of which is to unite Europe and Africa by a tunnel under the Straits of Gibraltar, between Tarifa and Algeiras on the Spanish coast to Ceuta and Tangier on the Morocco shore. The submarine portion will be nine miles in length. The enterprise offers more difficulties than the similar work under the English channel, although the latter will have more than twice the length as the maximum depth of the channel at the point to be traversed is but 163 feet, while that of the straits is 2,621 feet.

GOOD HEALTH.

Using the Same Towel.

Health follows neatness and disease the departure from it. The use of the same towel by many, common in a public place, though more allowable than the use of the same tooth brush, is nevertheless a not much healthier practice. A prominent oculist says that the contagious Egyptian or granular inflammation of the eyes is spreading rapidly throughout this country, and adds, "I have in many, and I may say in the majority of cases been able to trace this disease to the use of the so-called rolling towels. Such towels are generally found in our country hotels and the sleeping apartments of the working classes, and being thus used by nearly every one, are made carriers of one of the most dangerous, and as regards its symptoms, most troublesome diseases of the eye. I therefore would strongly recommend that the use of the rolling towel be abolished, for thereby we will discard one of the great instruments for the spread of such a dangerous disease of the eye, by which thousands of workmen are annually deprived of their means of support."

APoplexy—WHAT PRODUCES IT.—A middle-aged physician once said to the writer: "As I was walking down the street after dinner I felt a shock in the back of my neck, as if some one had struck me; I have not felt well since. I fear I shall die, just as all my ancestors have, of paralysis. What shall I do?" The answer was: "Diminish the tension on the blood vessels, and there need be no fear of tearing them in weak places." Now this expresses in plain terms the exact cause of apoplexy in the majority of instances; and it is one, too, which every one has it in his power to prevent.

A blood vessel of the brain, from causes which will presently be mentioned, has lost some of its elastic strength; food is abundant; digestion is good; blood is made in abundance, but little is worked off by exercise; the tension on every artery and vein is at a maximum rate; the even circuitous flow is temporarily impeded at some point, throwing a dangerous pressure on another; the vessel which has lost its elastic strength gives way, blood is poured out, a clot is formed, which, by its pressure on the brain, produces complete unconsciousness. This is the apoplectic stroke. It will be perceived that there are two leading conditions upon which the production of the stroke depends: a lessened strength in the vessel, and an increased tension on it.—*Popular Science Monthly*.

SIMPLE DYSPPEPSIA REMEDIES.—Dyspepsia arises from a great variety of causes, and different persons are relieved by different remedies, according to the nature of the disease, the constitution of the patient and condition of the stomach. We know of a lady who has derived great benefit from drinking a tumbler of sweet milk—the richer and freer the better—whenver a burning sensation is experienced in the stomach. An elderly gentleman of our acquaintance, who was afflicted for many years with great distress after eating, effected a cure by mixing a tablespoonful of wheat bran in half a tumbler of water, and drinking it half an hour after meals. It is necessary to stir quickly and drink immediately, or the bran will adhere to the glass and become pasty. Coffee and tobacco are often very detrimental to persons troubled with dyspepsia. As a general thing they should be avoided by persons afflicted with dyspepsia; although they may not be especially injurious to some constitutions, when used moderately. Regular eating of nourishing plain food, and the use of some simple remedies like the above, will effect in most cases quicker cures than medicines obtained from the druggist.

MIND AND HEALTH.—The mental condition has far more influence upon the bodily health than is generally supposed. It is no doubt true that ailments of the body cause depressing and morbid conditions of the mind; but it is no less true that sorrowful and disagreeable emotions produce disease in persons who, uninfluenced by them, would be in sound health; or if disease is not produced, the functions are disordered. Not even physicians always consider the importance of this fact. Agreeable emotions set in motion nervous currents, which stimulate blood, brain, and every part of the system into healthful activity; while grief, disappointment of feeling, and brooding over present sorrows or past mistakes, depress all the vital forces. To be physically well one must, in general, be happy. The reverse is not always true; one may be happy and cheerful, and yet be a constant sufferer in body.—*Brooklyn Journal of Education*.

REMEDY FOR NEURALGIA.—A friend of ours who suffered severe pains from neuralgia, hearing of a noted physician in Germany who invariably cured the disease, crossed the ocean and visited Germany for treatment. He was permanently cured after a short sojourn, and the doctor freely gave him the simple remedy used, which was nothing but a poultice and tea made from our common field thistle. The leaves are macerated and used on the part affected as a poultice, while a small quantity of the leaves are boiled down to the proportion of a quart to a pint and a small wine glass of the decoction drunk before each meal. Our friend says he has never known it to fail of relief, while in almost every case it has effected a cure.

DOMESTIC ECONOMY.

Is Alcohol Food?

This is one of the questions of the present day to which the voice of scientific men returns various answers. The prevailing idea seems to be that it is food in a very small degree. The latest authoritative announcements on this subject have been made in a very interesting series of lectures by Dr. Richardson. He comes to the conclusion that alcohol cannot by any ingenuity of excuse for it be classified among the foods of man. It neither supplies matter for construction nor heat. On the contrary, it injures construction and reduces temperature. This conclusion is the result of a long series of experiments, extending over three years, on warm-blooded animals of various kinds, including birds; on the human subject in health and on the same subject under alcoholic disease.

Foods, as supplied to the human system, are of two kinds, tissue-building foods and heat-applying foods. Nitrogenous bodies perform labor of the first kind, tissue-building, and probably are, to a small extent, heat-producers too. Alcohol, however, contains no nitrogen and cannot therefore rank as a tissue-building food. This conclusion will surprise many who have noticed how ale fattens people, but this fattening is the result not of the alcohol but of the sugar or starchy matter which is taken along with it, and it would appear that drinkers of pure spirit, i. e., spirit unmixed with sugar do not fatten upon it.

There is no doubt but that alcohol is used up in the body, that it is assimilated in some manner. Careful and long continued experiments have been made by many scientific men on this subject. The late Dr. Anstie, especially, made some exhaustive experiments in the matter, and came to the conclusion that of the alcohol administered but a very small fraction was yielded by all the secretions combined. He proved that an animal, a terrier dog, weighing 10 lbs., could take with comparative impunity nearly 2,000 grains of absolute alcohol in ten days, and that on the last day of his regimen, he only eliminated by all the channels of elimination 1.13 grains of alcohol. This fact was of itself sufficiently remarkable, but another still more important remains to be told. In completion of his research after an animal had been treated with alcohol, as above described, Anstie killed it, instantly and painlessly, two hours after it had received the last quantity—95 grains—of spirit. Then the whole body, including every fragment of tissue with all the fluid and solid contents, was subjected to analysis, with the result of discovering only 23.66 grains of spirit.

Alcohol, it thus appears, is decomposed in the animal body. By its decomposition in air, heat and power may be obtained, and why may it not then in the other case? The answer to this, that it is not. As a result of his researches Dr. Richardson recognizes four progressive stages of change of animal function from alcohol, which are shortly described as follows:

The first is a stage of excitement when there exists that relaxation and injection of the blood vessels of the minute circulation with which we have become conversant. The second is the stage of excitement with some muscular inability and deficient automatic control. The third is a stage of rambling, incoherent, emotional excitement, with loss of voluntary muscular power, and ending in helpless unconsciousness. The fourth and final stage is that in which the heart itself begins to fail, and in which death in extreme instances of intoxication closes the scene. These stages are developed in all the warm-blooded animals, and the changes of temperature throughout the whole are relatively the same.

In the first stage the external temperature of the body is raised. In birds—pigeons—the rise may amount to a fall degree on Fahrenheit's scale; in mammals it rarely exceeds half a degree. In man it may rise to half a degree, and in the confirmed inebriate I have seen it run up to a degree and a half. The heat felt in this stage might be considered as due to the combustion of the alcohol; it is not so, it is in truth a process of cooling.

In the second stage, the temperature first comes down to its natural standard, and then declines below what is natural. In birds it reaches from one and a half to two degrees; in other animals, dogs and guinea pigs, it rarely exceeds one degree; in man it is confined to three-fourths of a degree.

During the third degree the fall of temperature rapidly increases, and as the fourth stage is approached it reaches a decline that becomes actually dangerous. In birds the reduction may be five degrees and a half, and in other animals three. In man it is often from two and a half to three degrees. There is always during this stage a profound sleep or coma, and while this lasts the temperature continues reduced.

Thus it would appear that alcohol fails also as a heat-producing food; that it is, in fact, a lowering of the temperature. These facts are of great interest to those living in cold climates where spirits are so frequently taken to "keep one warm." It is well known that men exposed to long continued cold cannot venture to use spirits.—*Ex.*

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San Francisco:

Saturday Morning, May 8, 1875.

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Charles Burleigh and His Drill.

The inventor of the celebrated Burleigh drill
arrived in San Francisco last week, on his first
visit here since 1845, at which time, judging
from his present appearance, he must have
been a very youthful voyager.

We last saw Mr. B. in the Patnam machine
works (of which he was part proprietor), in
Fitchburg, Mass., in 1867. He was then the
owner of more than a dozen patents on his
pneumatic drill, which seemed at that date to
be a complete device. He has added many im-
provements since, and doubtless a number of
patents, in simplifying its operation.

Our prediction in 1867, accompanying the
first newspaper illustration of the device, has
been slowly but positively verified, viz.: that
it would prove to be a great desideratum for
large mining and other tunneling operations
on this coast. And now it is safe to say that
fairly started on its errand here, it will, in con-
junction with cheaper and more powerful
blasting agencies, create much of its own field
for future operations. It will render feasible
and profitable many large mining enterprises
formerly impossible to carry through without the
aid of such improved machinery.

If properly supported in his enterprise, Mr.
Burleigh proposes to build up a special man-
ufacture of his drills and air compressors in San
Francisco. In this he has struck a key note which
must certainly resound to his credit. It will
tend to the perfection of his inventions, to the
benefit of our manufacturing interests, and to
the profits of the manufacturers. He should
not be allowed to waste time in finding cap-
ital or proper encouragement to start such an
enterprise in what is already becoming the lead-
ing mining mart of the world.

Nearly all of the best mining inventions of the
past twenty years have been made on this coast.
Mr. Burleigh's drill was born on the wrong
side of the mountain. It would have grown
into use twice as fast on this side, where it
naturally belongs—with its inventor.

Coal and Asphaltum.

A Few Hints to Prospectors.

Within the past year the attention of many
of our prospectors has been turned to coal and
quicksilver, instead of silver and gold. At
present prices of quicksilver, mines of that
character, unless very good, are of little value
to the common miner. Indications of coal, or
what is supposed to be coal, have been found
in many places in this State, and at present
considerable prospecting is being done for it.
Some brief items of information concerning the
distinctive qualities of coal may therefore be of
interest to some of our readers. The best
classification of coals, satisfying both the re-
quirements of science and commerce, is that
which does not take into consideration the
geological age, but only the quality of the com-
bustible. By means of such an arrangement
coals may be divided into two classes. First,
non-bituminous, comprising anthracite or stone
coal; and second, bituminous, common or pit
coal, included under four heads, 1st, caking
coal; 2d, splint or hard coal; 3d, cherry or soft
coal; and 4th, cannel or perrot coal.

From anthracite the passage is into graphite
and even diamond, which is pure crystallized
carbon, while cannel coal passes into brown
coal, imperfectly earthy lignite, into fossil
wood with its fibrous tissue preserved and
finally into peat and turf, so that the complete
series would be diamond, graphite (which is
nearly pure carbon), anthracite, common coal,
lignite, fossil wood, peat and turf. There is
some dispute at present among geologists as to
the nature of the California coals, whether true
coals or lignite, but the public, who do not
understand such discussions, only want to
know in new discoveries whether there is really
any coal, and whether it burns well.

The most important kinds of coal or fossil
carbon are the anthracite, the black or stone
coal proper, and the brown coals (lignite);
the latter two may also be termed bituminous
coal, both furnishing tar when distilled. As-
phaltum resembles bituminous coal consider-
ably, but contains much more oily matter.
As there is considerable of this material in Cal-
ifornia, and it is not so easy to distinguish it
from coal as may be imagined, we give their
distinctive chemical properties briefly as
follows:

Anthracite cannot be kindled by the flame of a
candle. When heated in a retort or flask it
yields, with the exception of a little water, very
little or no embitimate of bitumen (tar), and
which placed before the blow-pipe it is slowly
consumed, leaving a small residuum of ashes.
Boiled in a solution of potassa, it gives no
color to the liquid.

The bituminous or brown coal, as well as the
asphaltum, inflame by the light of a candle and
burn with elimination of a bituminous odor.
When heated in a flask they yield brown and
brownish yellow tar drops.

Asphaltum and bituminous stone coal impart
to potassa, when boiled therein, only a very
slight yellowish color or none at all. If their
powder is boiled in ether (which is best done
in a flask or on a tube closed on one side and
this placed in boiling water), the asphaltum
colors the ether some, a brownish red. Bit-
uminous stone coal colors the ether slightly yellow.
Asphaltum, however, melts much earlier than
most of the lighter coals, and flows like seal-
ing wax.

Brown coal is distinguished from the former
by giving a brown color to the liquid when
boiled in a solution of potassa. These tests
are simple, cheap and easily applied, and
should be remembered by prospectors for coal
in this country.

Heavy Hoisting Machinery for the Comstock Mines.

The mining machinery now being made and
shipped to the Comstock mines is probably the
heaviest ever made anywhere. The machinery
is of a kind which will not need replacing for
years. Many of the mines are preparing to
sink from 2,000 to 4,000 feet and even deeper,
so that very heavy machinery is required. All
this machinery is being very solidly anchored
in place, and foundations are in many places
laid in solid granite, in beds prepared by ex-
cavating to the bed rock.

As an instance of this class of work, we may
mention the new hoisting works being built in
this city, at the Pacific Iron works, which we
examined this week. This machinery is to go
on the "C & C" shaft—the joint shaft of the
California and Consolidated Virginia mines, on
the Comstock. These hoisting works are being
made on the same principle of those at the Mt.
Diablo coal mines, also manufactured at the
Pacific Iron works, in which the hoisting is
done from the engine shaft, there being no
spur wheels. This will be the first one of the
kind on the Comstock and is of a capacity to
hoist 4,000 feet. There are two engines 26 inch
bore and six feet stroke, fitted with balance
poppet valves and cross-cut off. The cylinders
are very ponderous, weighing 16,000 pounds
each. The weight of the pillow blocks is about
12,000 pounds each, and the bed plates will
weigh between 16,000 and 17,000 pounds each.
There will be one engine on each end of the
shaft, the distance between them being twenty-
four feet from center to center. The main

shaft is sixteen inches in diameter in the main
journals and eighteen inches where the reels
are to be placed. Double reels for flat wire
rope are to be used. The reels commence at
six feet and wind up to fourteen feet in
diameter.

The engines are fitted up with two steam
brakes, one for each reel, and also an independ-
ent hand brake for each reel. The steam
brake is so arranged that the brakeman or
engineer can put it on at will, and if the cege
should rise higher than it ought to a connection
is automatically made so that steam is shut off
from the main engines, and the steam brake
applies itself, barring any possibility of an
accident.

There are six tubular boilers to go with the
machinery, fifty-four inches in diameter and
sixteen feet long. Each pair of boilers is set
independently, the intention being to use only
four at a time, and keep the others for emer-
gencies or for relief boilers. Globe valves are
used to disconnect any pair at any time. The
clutches to throw the engines into gear weigh
4,500 pounds each and have wrought iron
bends shrunk around them for additional
strength. There are no gear wheels at all, and
the two fly wheels act as brake wheels.

The overhead sheave wheels are eleven feet
in diameter. The specifications called for these
twelve feet, but they could not be taken over
the railroad, so the size was reduced. There
are two of them weighing 6,000 pounds each.
These are the largest hoisting works ever sent
to the Comstock, and are well worth seeing.
The machinery will all be fitted up at the
shop before being shipped. Everything is
being handsomely fitted, and the whole will be
a model of strength. The excavations for the
reception of this new and powerful machinery
at the mine are about completed and the
anchor bolts and plates are being placed in
position ready to commence the heavy mason
work.

It is stated that a duplicate of this machinery
has been contracted for by the Lady Washing-
ton mining company, on the Comstock, and
grading is going on at the surface of the shaft
of that mine for its reception.

An Improved Arrastra.

David Trumbull, Jr., of Conlterville, Mari-
posa county, has patented through the MINING
AND SCIENTIFIC PRESS Patent Agency, a ma-
chine of interest to the mining community, for
crushing and grinding quartz, which is, essen-
tially, an improved arrastra, or stone pan. It
consists first in a peculiar construction and ar-
rangement of the grinding surface; secondly,
in a novel construction of the driving shaft that
drives the miller. A pan or tub, similar to the
ordinary grinding pan, which may be made of
wood or metal, is used. On the bottom and sides
of this pan is placed a layer of stones, so as to
provide a surface as possible, and make, in
effect, a stone pan. The miller and standard
are arranged in the usual way. The miller
consists of a skeleton frame in which stones of
various sizes are firmly bolted, so as to provide
a solid stone grinding surface. This makes a
solid stone miller, which can be operated the
same as the ordinary iron miller. The verti-
cal driving shaft steps at its lower end in the
upper end of the standard. A collar fits
around the lower end of the shaft, resting upon
the top of the standard, and is held in place
by chains, which connect it with the upper end
of the standard. The lower half of the driving
shaft is provided with screw threads and a key
seat cut on one side. A nut, which has an
arm depending from opposite sides, moves on
this threaded portion of the shaft, and can be
fixed at any point desired by means of a key
which fits in the key seat. The arms of the
nut extend downward a short distance, and are
then bent outward so that their extremities will
strike two of the opposite standards, where the
nut has been fixed near the lower end of the
crew or driving shaft, and thus drive the mul-
ler when the shaft is rotated. The ob-
ject of thus constructing the shaft and driving
mechanism is to permit the miller to be re-
moved. The inventor of this machine is of
course aware that loose stones have been used
to form a grinding miller in combination with
a lower stone grinding surface, and he claims
only the pan with its stone bottom and sides
in combination with a skeleton miller having
stones bolted firmly thereto, and also the pecu-
liar arrangement of the upright driving shaft.

Society of Engineers.

The regular monthly meeting of the Society
of Engineers of California was held on Tues-
day evening last. President Allard in the
chair. Mr. Dickie acted as secretary. Mr.
Irving M. Scott read a brief paper "On Heavy
Grade Locomotives," which gave details of ex-
periments made at the railroads at the Black
Diamond coal mines. The paper elicited some
little discussion in which several of the mem-
bers took part. The promised discussion on Mr.
Hanscom's paper, read at the previous meet-
ing, "On Screw Propellers," was postponed
on account of the absence of Mr. Hanscom.
The next meeting of the Society will be held on
the first Monday in June, when we believe Mr.
Hyde will give details of experiments with road
engines and some account of the progress of
steam plowing in California. Mr. Hyde has
had great experience in this direction, and as
he has kept an accurate record of his work for
several years, the paper will be a valuable and
instructive one.

Work at the Foundries.

The city foundries are all very busy just now,
as they have been for some time. The prin-
cipal work being done is mining machinery and
house fronts. Mining machinery, especially, is
plentiful and all of our foundries are busy with
it. Few people have any idea how much of
this class of work is being done, unless they
take a walk around among the foundries and
see for themselves. At the

Pacific Iron Works,

The principle work being done is on the heavy
hoisting works for the C & C shaft, described
in detail in another column of this issue. They
are also making an engine 14x30, for the Snr-
rise mining company at Panamint. They are
making for the same company, to go with this
order, a complete 10-stamp mill, pans, settlers,
and all complete. This is all being fitted up at
the shop with timbers and everything, and will
be shipped all ready to set up and go to work.
These works are also making a 10x20 engine to
go to Cerro Gordo district, Inyo county, to be
used at a smelting works there. They are also
making two quicksilver furnaces, one for the
Great Western and the other for the Edith
quicksilver mine. These are of the pattern
known as the "Green Furnace." A 16-horse
power engine and boilers is being made for
each of these furnaces. At the

Occidental Foundry,

Steiger & Kerr, proprietors, they are building
a Janin furnace for Oceanic quicksilver mine,
San Luis Obispo county. This furnace is the
invention of Mr. Louis Janin, M. E., of this
city, and will have a capacity of from 20 to 24
tons per day. In this furnace there will be
about nine feet of ore above the fire bridge,
and as the sectional area of the shaft is about
24 square feet, each foot of height should give
about one ton of ore of 2,000 pounds; though
the weight will vary with the compactness of
the mass and the specific quality of the ore.
If the furnace charge weighs nine tons, then
every hour one ton of ore is drawn out and
the charge in the furnace is lowered by one
foot, then a fresh charge is added. Therefore,
every ton of ore remains nine hours above the
fire bridge and an additional time of three or
four hours below the fire bridge. This, as a
rule, will give ample time for burning the ore
thoroughly. This furnace is not yet completed,
and will be, we believe, the first one of its kind
in this State. At this foundry they are also
engaged in making the well known Hepburn
pans.

The Pneumatic Thermometer.

Mr. Theodore Gidley, of this city, has re-
cently invented a pneumatic thermometer which
is intended for use on board vessels. The ma-
chine consists of a copper cylinder capped by
a diaphragm of stout India rubber hermetically
sealed, the whole being covered with a metal
dome having an opening in its summit to admit
an iron pipe connecting with the deck. A
slight metal rod rests on the diaphragm and
passes up through the pipe to a stand on deck
on which is placed a dial plate. The action of
heat in the cargo is instantly communicated to
the cylinder, expanding the air in it, thus rais-
ing the diaphragm and with it the rod connect-
ing with the hand on the dial, marking the
amount of heat generating, as would an ordi-
nary Fahrenheit thermometer.

Mr. Gidley's invention has received the
unanimous endorsement of the Board of Marine
Surveyors, and considering the number of vessels
which have been lost lately from spontaneous
combustion it certainly appears to have been
invented at a most opportune period. A para-
graph in the London Standard states that her
majesty Queen Victoria has appointed a royal
commission composed of prominent scientific
men of the United Kingdom to examine into
the cause of spontaneous combustion of coal on
board vessels, "and the remedies which it may
be possible to adopt for preventing and guard-
ing against the same." Mr. Gidley's invention
seems to meet the case exactly. The working
model of the machine which we examined may
be seen at Viester & Co.'s, 17 New Montgomery
street, under the Grand Hotel. The intention
is to place three or four of these machines in
different parts of the cargo of a coal ship so that
if the cargo commences to heat means may be
immediately taken to extinguish it. By having
several, the location of the fire can easily be de-
termined. As the machines are simple and
cheap they can be very generally applied to all
vessels.

HOOSAC TUNNEL.—Massachusetts is complet-
ing her big hole by dressing it into shape,
arching places where water drips from over-
head, and preparing for the double track
through its entire length. The central shaft,
which was 15x27 feet in dimension and 1,050
feet deep, has to be closed up on account of
the tremendous draft it created from both
ends of the tunnel. In the winter season the
draft had a tendency to freeze the dripping
water so as to block up the passage of train.
The high range of mountains pierced by the
tunnel runs north and south. In the morning,
the warming up of the atmosphere on the
Eastern slope creates sufficient vacuum to
draw a strong current of air from the western
side of the mountain. In the afternoon, when
the sun strikes hotly on the western side,
the current is reversed.

Short Lectures on Patents.

No. 2.—By JNO. L. BOONE, of Dewey & Co's MINING AND SCIENTIFIC PRESS Patent Agency.

The Model.

A large number of the inventions for which patents are applied for, could be fully and sufficiently represented by proper drawings and specifications without models, and in many cases it seems preposterous to compel inventors to go to the expense of furnishing models, when their inventions could be just as well understood without them. On the other hand, there are some cases in which models are absolutely requisite to enable the examiners to act intelligently upon the applications. With an eye to remedy this difficulty, the new patent law of 1870 left the question as to whether a model should be furnished in any particular case entirely with the Commissioner of Patents, intending thereby to relieve those inventors whose inventions were simple and easily understood; but before the inventor could know what the decision of the Commissioner would be, he was required to present his case without a model, and await the Commissioner's decision. The cure was worse than the disease. In the first place, if the Commissioner should decide that a model must be provided, a long delay was created before the case could be acted upon, and as the models of simple inventions are inexpensive and easily made, this class of inventors preferred to make and forward them at once rather than suffer the delay. In the second place, those whose inventions were complicated and whose models would necessarily be expensive and troublesome to make, were the most eager and persistent in their efforts to have their models dispensed with, and as this class of cases could not be acted upon intelligently without models, the Commissioner had no other course than to use the discretion which the law gave him to compel every applicant to furnish a model whether the invention was simple or complex, and this is now the case. None are allowed to escape this requirement if their inventions can be represented by a model. The object of requiring a model in each case is two-fold; first it assists the examiner in understanding the construction and operation of the device sought to be patented, so that he may act intelligently upon it; and secondly it is a tangible evidence which corresponds with the specifications and drawings of the patent, and serves as an index by which the actual intention of the patentee is interpreted as long as his patent is in force, and to more fully illustrate the invention so that it can be better understood by the public after the patent expires.

In constructing a model much is left to the discretion of the inventor. He can make it of wood, iron, leather, lead or any other durable material, so long as he makes it substantial and shows the devices or particular parts he wishes to cover by a patent. If he chooses he can make it plain and unostentatious, or he can construct and finish it in the highest style of mechanism and art. A frail model is always objectionable and will even be refused by the Patent Office. Where the invention consists of a machine which embodies entirely new ideas or principles or is intended to produce a new result, a complete model showing its construction and arrangement must be furnished; but where the invention is an improvement on some already existing and well known machine, only the invented or improved portion combined with sufficient of the old machine or device to show its relation and arrangement need be represented by the model. In the latter case the old machine can be represented by a dummy or imitation; for instance, if the invention is an improvement upon an ordinary steam boiler, a simple block of wood turned out and painted to represent the boiler can be used, and the improvement can be applied to it, and in this way much trouble and expense can be avoided, while the model is in every respect as sufficient as if the real parts were shown. Model makers generally understand and take advantage of this fact. It is a point greatly in the favor of an applicant to furnish a neat model. It not only creates a better impression upon the examiner who passes upon the case, but also indicates that the inventor has a pride in his invention, and understands how to combine and arrange the parts with a view to practical operations.

As the drawing which accompanies each application for a patent must be an exact representation of the model, and as the drawing accompanies and forms a part of the patent when it is issued, it is of great advantage to the inventor to have the model as complete as possible, so that persons who are not entirely familiar with the machine can more readily understand the drawing when the patent is exhibited to the public.

Again, the model is placed on file in the Patent Office, where it remains as a permanent and tangible representation of the invention. It forms a part of our National Museum, and in fact, is placed on exhibition where it can be examined by all who have the curiosity to inspect it. I will venture that hundreds of in-

ventors have felt ashamed of the models which they have placed on file in the Patent Office to represent their inventions, when they came to examine them where they are placed on exhibition beside other models of more pretensions workmanship. Still I do not advise expensive models. Neatness can almost always be obtained without additional expense.

Many an otherwise good model is spoiled by a thick coat of red, green or blue paint artistically daubed over it, and often the working parts of a model are so completely gummed and glued with varnish that it is impossible to move them. Such jobs are inexcusable.

Hard wood is the best and usually the cheapest material to use in making models, and when finished a simple coat of shellac varnish is all the covering they require. Heavy varnishes should be avoided. If a portion of the model is to represent metal, that portion can be painted black to distinguish it from the remainder. Paint should always be sparingly used, as it gives a model a coarse look. The name of the inventor and title of the invention must be permanently marked upon the model. The cheapest and best method is to paint them on, or engrave them upon a metal plate and attach the plate to the model. Writing the name and title on the wood with ink or scratching them on with a knife makes a good model look common and poor, while the extra expense of having it done neatly and correctly is but a trifle when compared with the difference in appearance.

Brass models always look well when they are first made and polished, but they soon lose

their polish and become tarnished unless great care be taken of them, so that a brass model which is brilliant and showy when it is first filed in the office soon becomes green with verdigris and unattractive. If they are plated with silver or nickel or are varnished, they will always look well.

For the construction and preparation of models for the Patent Office the following rules and requirements should be observed:

Every model must be inside of one foot in each dimension.

The invented portion must be represented in complete order, whether the old parts of the machine are represented by real or dummy mechanism.

Never use glue alone in putting together wooden models. Nails must also be used.

If models are not put together with strength and substantially made they will be rejected.

Never use paint on a wooden model unless it is to indicate a part which is to represent metal.

Never use heavy body varnishes.

Use shellac varnish.

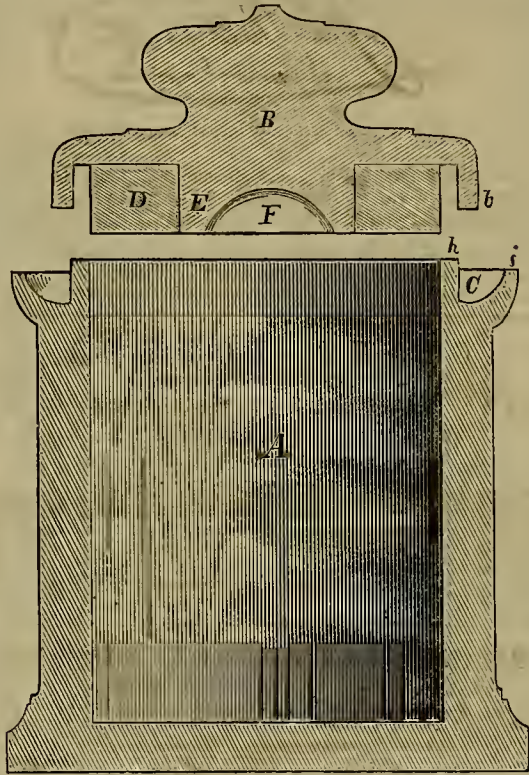
Paint or engrave the name and address of the inventor, and of the invention, on the model.

COPPER is ruling in Liverpool at £79 10s to £80 for good ordinary brands. Ore is selling at 15s 9d to 16s 3d per unit. The arrivals during March amounted to 4,004 tons fine and the quantity of copper float from Chili is now much reduced. There is very little speculation in the copper market, the transactions being mainly done by local and Swansea smelters.

THE NEW incline at the old works of the Caldonia mine is now down 180 feet below the 1000-foot level. It is timbered throughout in the most substantial manner, and the Gold Hill News thinks it is one of the truest and finest pieces of work of the kind on the Comstock lode.

An Improved Fruit Jar.

As the season for canning and putting up fruit approaches, those who intend to put up their winter's supply begin to look around for the best jar for this purpose. We herewith illustrate an improvement in fruit jars which was recently patented by Pierre Darbce, of this city, through the MINING AND SCIENTIFIC PRESS Patent Agency. This improvement relates more especially to the manner of constructing the cover and sealing the jar. The jar *A*, it will be noticed, is provided with a gutter, *C*, around its upper rim, of which the inside wall, *h*, is the highest. The jar may be made of glass, earthenware or other suitable material. The cover, *B*, is made of glass and has a central portion, *E*, which extends downward into the mouth of the jar when the cover is in place. It also has an annular downward projecting rim, *b*, around it, which fits into the gutter, *C*, around the top of the jar. The projection *E*, can be made round or square as desired; around it Mr. Darbce secures a cork, *D*, which will fit down inside of the mouth of the jar; when this cover is forced down upon the jar the cork will fit in the mouth of the bottle inside of the wall, *h*, the annular rim *b* will enter the gutter, *C*. In the bottom of the gutter, *C*, Mr. Darbce places, a piece of wire so that it will pass entirely around the top of the jar; he then fills the gutter with wax so as to seal the joint. He



DARBCE'S IMPROVED FRUIT JAR.

thus provides two joints, an inside cork joint, that prevents the wax from entering the jar, and an outside sealed joint which hermetically seals the jar. He thus prevents the disagreeable consequences of getting sealing wax in the fruit and provides an easy and cleanly method of unsealing and opening the jar, as by taking hold of the end of the wire which lies in the bottom of the gutter and pulling upon it the wax will be lifted out without trouble.

CERRO GORDO DISTRICT.—We see by the Inyo Independent that about the 8th of April, Beaudry's furnace, at Cerro Gordo district, shut down, it was generally supposed, for the usual repairs. It remains shut down and is likely to be for an indefinite term. The reason is the big chimney of ore in the Union is exhausted, and the mine has yielded no ore for two months past. Pending the law-suit it is not deemed advisable to spend money in hunting for more ore, so every man in the mine has been discharged and all work is suspended. Belshaw has ore enough on his dump to keep his furnace running about four months longer. The outlook for Cerro Gordo is not pleasant just for the time being. The Union has been the main stay of this portion of the county, but should it yield no more there are plenty of other mines on that hill quite as promising as it ever was at the same stage of development. Besides that, the Potosi tunnel goes ahead, and is bound to make big strikes.

AT THE Savage mine, on the Comstock, all work on the lower levels is stopped for the present, pending the tearing down of the old gallow of the hoisting frame and the putting in of a new frame adapted to the use of new incline hoisting machinery. This work will occupy from seven to ten days' time, during which interval nothing can be done in the mine. The new incline hoisting machinery is all ready for use as soon as the new gallow frame is completed.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Foreign and American Patent Agency, the following are worthy of mention:

STATIONARY CUTTING AND PLANING TOOL.—Charles Cummings, Virginia City, Nevada. This invention is an improvement in the construction of such stationary tools for cutting and planing metal as are used on lathes, planes, shapers, slotting machines and other like machines. This tool, which is fixed to the ordinary tool holder, consists of a circular metal plate, the rim of which can be made into any desired shape, according to the style of groove or cut it is desired to make. Across the rim of this circular plate is cut a notch or recess, so that one edge of this notch or recess will form a cutting bit. This tool has a hole through its center and a conical boss or hub upon one side, through which the central hole passes while the opposite side of the plate is countersunk around the hole. When the cutting bit of this tool becomes dull it will only be necessary to grind it off until a sharp edge is again presented, and as the tool is circular in form its center rim can be thus utilized and always present a bit of the same size and shape, thus saving greatly in the time and labor involved in grinding ordinary cutting bits. As the rim is filed off in sharpening the bit, the tool is turned in its bearing or socket so as to keep the bit at the proper working point. This tool will be especially useful for cutting screw threads on metal rods, as the rim of the plate or tool can be made wide enough to have a number of threads cut around it, when by filing out a transverse section a number of bits will be provided equal to the number of threads formed around the plate; and by slightly beveling the edge of the plate before cutting the grooves in it, the threads will be graduated in height so that cutting bits or teeth of different heights will be provided. By this arrangement, one tooth will follow in the track of another and cut out a thin shaving, so as to gradually deepen the grooves and thus complete the screw at one operation. Any desired form of bit can thus be provided so as to cut mouldings or grooves of particular shapes. This tool can be used for cutting inside screw threads where the opening is large enough to admit it.

COMBINED SCOURING BRUSH AND WRINGER.—Richard C. May, Sacramento, California. This invention relates to an improved mop head and brush holder, and an improved wringer for the mop cloth, which may be used in connection with the brush. The head consists of a socket, into which the end of the handle is received, and an angular cross bar, into the angle of which one edge of the back of the brush is secured. A spring arm extends out from the socket and is bent so that its extremity will bear against the opposite edge of the brush. The mop cloth is secured to the T shaped end in a peculiar manner. When the mop cloth is to be wrung the handle is pushed and turned so as to twist the cloth between an arm and head of the mop, permitting it to be completely wrung out by the ordinary twisting method. The movable arm on the handle can be moved up or down so as to accommodate the wringer, and when the cloth is used for mopping the arm is moved down close to the head so as to allow the cloth to double over the brush. When the brush is being used this arm is drawn up the handle until the cloth is stretched between it and the head and a pin or other fastening to secure it in place.

IMPROVED WATER ELEVATOR.—This is an improvement in that class of water elevators in which an endless chain or series of buckets are employed for raising the water, and it consists in an improved manner of constructing the buckets and the pulleys over which they pass, so that the chain will be properly supported upon the pulleys and prevented from slipping on account of the weight of water on one side. The chain consists of a number of buckets, each of which is secured to a curved shield or plate, so that the shield forms the front side of the bucket, while its upper end extends back of the opposite side of the upper end of the bucket. The curved plate or shield is wide enough to extend out on each side and form a bearing as the bucket passes the pulleys. The pulleys each consist of two disks, the inner edges of which are turned down a little smaller than the outer edges, so that as the buckets pass between the disks their wings or projecting sides will bear upon the reduced edge. The chain is formed by connecting the extremities of the shields together by rings or links. As the curve of the plates corresponds with the circumference of the pulleys, each bucket will be firmly seated on the upper pulley while it is being emptied.

SADDLE-TREE.—P. B. Horton, San Francisco, Cal. This invention consists in making saddle-trees out of wood pulp, formed in proper shape by compression in moulds. The side bars and cantels of this tree are made of wood pulp, while the pommel is made of metal and secured to the forward end of the side pieces by means of bolts, rivets or screws; or, if desired, the entire tree can be made of wood pulp. This saddle-tree can be made cheaply, and the inventor says it will be strong and light. It is covered with rawhide or other suitable covering in the ordinary way.

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FARMERS, MECHANICS,
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MEN in general. They
are manufactured of the
Best Material, and in a
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will convince everybody of
this fact.

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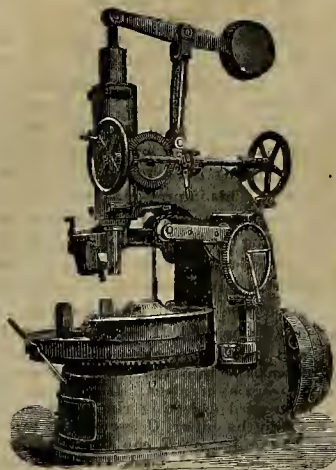
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Patented May 26, 1868.

THE ONLY SAFE BLASTING POWDER IN USE.

GIANT POWDER, NO. 1,

For hard and wet Rock, Iron, Copper, etc., and Submarine Blasting.

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The only Blasting Powder used in Europe and the Eastern States.

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DUNBAR'S WONDERFUL DISCOVERY.

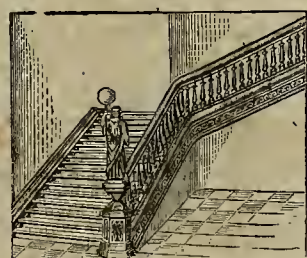
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Of Waukesha, Wisconsin.We claim Bethesda to be a specific in all cases of Diabetes Inflammation of the Kidneys, Inflammation of
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There is no remedial agent known to man that can cure the foregoing diseases as effectually as Bethesda
Water. This fact has been demonstrated wherever the water has been used according to directions, which can
be had at the General Agents' by application to them. The water is sweet and pleasant to the taste. It can be
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Mechanics' Mills, Mission Street,
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the country promptly attended to. All kinds of Stair
Material furnished in order. Wood and Ivory Turn-
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Gobblers, 30 to 40
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STEEL SHOES AND DIES
FOR QUARTZ MILLS,Made by our improved pro-
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Examination solicited.

OAKES'S PATENT



Quicksilver Strainer.

Patented January 26, 1875.

For description see MINING AND SCIENTIFIC PRESS,
March 6, 1875.For Cleaning Quicksilver Before Using it
for Amalgamation.Mill-men are invited to examine the Patent Quick-
silver Strainer at the office of the Agents,

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TRIP HAMMER QUARTZ BATTERY.This machine, complete, weighs 1,500 lbs. Has an iron
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which strike 2,000 blows per minute, in a mortar provided
with screws on both sides, and crushes FINE 600 lbs. per
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METALS.

[WHOLESALE.]

THURSDAY M., May 6, 1875.

American Pig Iron, 40 ton	46 00	46 00
Booth Pig Iron, 40 ton	46 00	46 00
White Pig, 40 ton	46 00	46 00
Oregon Pig, 40 ton	46 00	46 00
Red Hat, good assortment, 40 ton	46 00	46 00
Red Hat, good assortment, 40 ton	46 00	46 00
Sheet, No. 10 to 14	54 00	54 00
Sheet, No. 16 to 20	54 00	54 00
Sheet, No. 22 to 24	54 00	54 00
Sheet, No. 26 to 28	54 00	54 00
Horse shoes, per keg	7 00	8 00
Nail Rods	10 00	10 00
Roller Irons	6 00	6 00
Other Irons for Blacksmiths, Miners, etc.	4 00	4 00
Brass	35 00	35 00
Copper Tin	37 00	37 00
C. N. A. Pat.	37 00	37 00
Cheating, Yellow	40 00	40 00
Cheating, Old Yellow	40 00	40 00
Composition Nails	24 00	24 00
Composition Bolts	24 00	24 00
TIN PLATES		
10x14 C. Charcoal	12 00	12 50
10x14 X. Charcoal	14 00	14 50
Roasting Plate 1 C. Charcoal	11 00	11 50
Hanna Tin	30 00	32 00
Antimonial	28 00	30 00
Lead	20 00	22 00
Anderson & Woods' American Cast	18 00	18 50
Drill	18 00	18 50
Flat Bar	18 00	18 50
Pipe	18 00	18 50
ZINC		
By the Tank	11 00	11 00
Zinc Sheet 73 1/2 in. No. 7 to 10 P.D.	11 00	11 00
do do 73 1/2 in. No. 11 to 14	11 00	11 00
do do 73 1/2 in. No. 15 to 18	11 00	11 00
do do 73 1/2 in. No. 19 to 22	11 00	11 00
do do 73 1/2 in. No. 23 to 26	11 00	11 00
do do 73 1/2 in. No. 27 to 30	11 00	11 00
do do 73 1/2 in. No. 31 to 34	11 00	11 00
do do 73 1/2 in. No. 35 to 38	11 00	11 00
do do 73 1/2 in. No. 39 to 42	11 00	11 00
do do 73 1/2 in. No. 43 to 46	11 00	11 00
do do 73 1/2 in. No. 47 to 50	11 00	11 00
do do 73 1/2 in. No. 51 to 54	11 00	11 00
do do 73 1/2 in. No. 55 to 58	11 00	11 00
do do 73 1/2 in. No. 59 to 62	11 00	11 00
do do 73 1/2 in. No. 63 to 66	11 00	11 00
do do 73 1/2 in. No. 67 to 70	11 00	11 00
do do 73 1/2 in. No. 71 to 74	11 00	11 00
do do 73 1/2 in. No. 75 to 78	11 00	11 00
do do 73 1/2 in. No. 79 to 82	11 00	11 00
do do 73 1/2 in. No. 83 to 86	11 00	11 00
do do 73 1/2 in. No. 87 to 90	11 00	11 00
do do 73 1/2 in. No. 91 to 94	11 00	11 00
do do 73 1/2 in. No. 95 to 98	11 00	11 00
do do 73 1/2 in. No. 99 to 100	11 00	11 00

LEATHER.

[WHOLESALE.]

WEDNESDAY M., May 5, 1875.

City Tanned Leather, 40 ton	26 00	26 00
Santa Cruz Leather, 40 ton	26 00	26 00
Country Leather, 40 ton	26 00	26 00
Stocking Leather, 40 ton	26 00	26 00
Jodot, 8 Kil, per doz	50 00	50 00
Jodot, 10 Kil, per doz	50 00	50 00
Jodot, 12 Kil, per doz	50 00	50 00
Jodot, 14 Kil, per doz	50 00	50 00
Jodot, 16 Kil, per doz	50 00	50 00
Jodot, 18 Kil, per doz	50 00	50 00
Jodot, 20 Kil, per doz	50 00	50 00
Jodot, 22 Kil, per doz	50 00	50 00
Jodot, 24 Kil, per doz	50 00	50 00
Jodot, 26 Kil, per doz	50 00	50 00
Jodot, 28 Kil, per doz	50 00	50 00
Jodot, 30 Kil, per doz	50 00	50 00
Jodot, 32 Kil, per doz	50 00	50 00
Jodot, 34 Kil, per doz	50 00	50 00
Jodot, 36 Kil, per doz	50 00	50 00
Jodot, 38 Kil, per doz	50 00	50 00
Jodot, 40 Kil, per doz	50 00	50 00
Jodot, 42 Kil, per doz	50 00	50 00
Jodot, 44 Kil, per doz	50 00	50 00
Jodot, 46 Kil, per doz	50 00	50 00
Jodot, 48 Kil, per doz	50 00	50 00
Jodot, 50 Kil, per doz	50 00	50 00
Jodot, 52 Kil, per doz	50 00	50 00
Jodot, 54 Kil, per doz	50 00	50 00
Jodot, 56 Kil, per doz	50 00	50 00
Jodot, 58 Kil, per doz	50 00	50 00
Jodot, 60 Kil, per doz	50 00	50 00
Jodot, 62 Kil, per doz	50 00	50 00
Jodot, 64 Kil, per doz	50 00	50 00
Jodot, 66 Kil, per doz	50 00	50 00
Jodot, 68 Kil, per doz	50 00	50 00
Jodot, 70 Kil, per doz	50 00	50 00
Jodot, 72 Kil, per doz	50 00	50 00
Jodot, 74 Kil, per doz	50 00	50 00
Jodot, 76 Kil, per doz	50 00	50 00
Jodot, 78 Kil, per doz	50 00	50 00
Jodot, 80 Kil, per doz	50 00	50 00
Jodot, 82 Kil, per doz	50 00	50 00
Jodot, 84 Kil, per doz	50 00	50 00
Jodot, 86 Kil, per doz	50 00	50 00
Jodot, 88 Kil, per doz	50 00	50 00
Jodot, 90 Kil, per doz	50 00	50 00
Jodot, 92 Kil, per doz	50 00	50 00
Jodot, 94 Kil, per doz	50 00	50 00
Jodot, 96 Kil, per doz	50 00	50 00
Jodot, 98 Kil, per doz	50 00	50 00
Jodot, 100 Kil, per doz	50 00	50 00

Gold, Legal Tenders, Exchange, Etc.

[Corrected Weekly by CHARLES BUTLER & CO.]

SAN FRANCISCO, May 5, 3 P. M.
LEGAL TENDERS IN S. F., 11 A. M., 5 1/2% to 8%.
Gold in N. Y., 1.15%.
Gold Bars, 890, SILVER BARS, 4 and 4 1/2 per cent discount.
EXCHANGE ON N. Y., 1/4 per cent premium for gold; Mexican Dollars, 1/4 and 2 per cent discount.
London, 14 per cent; London, 49%; Commercial, 4 1/2%. Paris, 6 francs per dollar.
LONDON - Consols, 94 1/2 to 94 3/4; Bonds, 102 1/2; Liverpool West, 94 3/4; Omb 94 3/4 to 94 1/2.
Quicksilver in S. F., by the tank, per B, 65c to 75c.

Tenth Industrial Exhibition of the Mechanics' Institute, S. F., 1875.

PRELIMINARY ANNOUNCEMENT.

The Board of Managers of the Tenth Industrial Exhibition have the pleasure of announcing that an Industrial Exhibition will be held, under the auspices of the Mechanics' Institute, in the city of San Francisco, to be opened on Tuesday, the 17th of August, 1875, at 11 A. M., and to continue open at least one month thereafter.

In making this public announcement, the Managers desire that those who intend to exhibit should send in their applications for space as early as possible, so as to avoid the necessity of excluding, as has been the case heretofore, the many desirable exhibitors who are unusually tardy in making applications.

The forthcoming Industrial Exhibition will be the tenth held under the auspices of the Mechanics' Institute, and the Managers are justified in saying that it will undoubtedly surpass in completeness of detail and general arrangement any heretofore held.

The last Exhibition was attended by 700,000 visitors, attracted hither by the fame of these Industrial Fairs, and for the purpose of investigation, business and pleasure.

All the available exhibiting space was applied for several weeks before the day of opening, and the Managers were compelled to deny admission to many desirable exhibitors.

The Board of Managers desire particularly that the arts, the industries and natural products of the country should be well represented at the forthcoming exhibition, and no pains will be spared to make these classes of exhibits a special feature there.

The Exhibition will be held in the building constructed for that purpose in 1874, but it will be materially enlarged and improved in many details for the Exhibition of 1875.

The space under roof will exceed 180,000 square feet, or about four and a half acres, exclusive of the Horticultural Garden, which will occupy 24,500 square feet additional.

The location of the Exhibition Building, on Eighth street, between Market and Mission streets, cannot be surpassed for convenience and accessibility, and can be approached from every part of the city by means of the various lines of street railroads, any of which bring visitors within two blocks of the entrance gate.

The utmost care has been exercised in providing for ample ventilation and light, and during the evening the building is brilliantly illuminated by over 5,000 gas lights.

The promenade avenues are broad, and 3,000 seats are provided for the comfort of visitors, for whose convenience there is also an excellent restaurant, under the management of a first-class restaurateur.

Every afternoon and evening the best orchestra the city can supply will disengage excellent music under the direction of an accomplished leader.

The building is always well attended by visitors, and during the last Exhibition over 29,000 were daily admitted for a number of days, and under no similar circumstances can the manufacturer, the mechanic, the inventor, producer or business man so advantageously place himself before the people of the Pacific Coast.

Persons desiring to obtain information, or to make application for space, should address "Managers of Tenth Industrial Exhibition, San Francisco, California," or make personal application as below.

It is expected that the various transportation companies will convey goods intended in good faith for exhibition, at half the usual rates.

Exhibitors from abroad, if they have no agent or consignee in San Francisco, can consign goods and mark the same to the "Manager of the Tenth Industrial Exhibition, 17 Post street, San Francisco," and they will be stored, if they arrive before the day of opening, free of expense; but no charges or expenses for freight or forwarding, etc., will be paid by the Managers.

In order to secure space, application should be made on or before July 20th, 1875.

Blankets will be furnished on application.

Premiums will be awarded as follows, viz: 16 gold medals, 50 silver medals, Society Diplomes, Certificates of Merit and Special Premiums, as the Board may determine.

Blankets for space can be obtained at the Mechanics' Institute on application by letter or otherwise; and any information will be given, by applying to any member of the Board of Managers, as below:

A. S. HALLIDIE.....113 Plus street.
JAMES O. PATRICK.....122 Battery street.
HENRY L. DAVIS.....421 California street.
D. E. HAYES.....213 Fremont street.
ASA R. WELLS.....Mechanics' Mill.
J. B. CONWAY.....Cor. Spear & Harrison streets.
CHAR. ELLIOT.....516 California street.
GEORGE SPALDING.....414 Clay street.
RICHARD SAVAGE.....139 Fremont street.
W. P. STOUT.....604 Merchant street.
J. H. MACDONALD.....217 8th street.
J. P. CURTIS.....320 Jackson street.
R. B. WOODWARD.....Woodward's Gardens.
JAMES SPIERS.....311 Howard street.

To the Librarian of the Mechanics' Institute, or to J. H. CULVER, Secretary, 27 Post street, San Francisco.

Rules and Regulations of the Tenth Industrial Exhibition, Mechanics' Institute, S. F., 1875.

1. The Pavilion will be open for the reception of goods on Monday, August 2d. The exhibition will be open to the public on Tuesday, August 17th, at 11 o'clock A. M.

2. Applications for space must be made on or before July 20th, stating character of exhibit, amount and kind of space required—well, table or floor. And, if cases, state length, width and height of cases. Blankets will be furnished for this purpose, and a class will be in attendance at the Library of the Mechanics' Institute, every day from 12 to 1, and 7 to 10 P. M.

3. All persons presenting articles for exhibition must have them registered by the Receiving Clerk, who will give a receipt for the same, which receipt must be presented when the articles are withdrawn, at the close of the Exhibition.

4. Judges will be appointed by the Board of Managers immediately upon the opening of the Exhibition, to examine all articles presented, in accordance with Article III, and the Managers will award premiums on such articles as the judges shall declare are worthy, which will be delivered as soon as they can be prepared. Due notice will be given of the announcement of premiums.

5. The mornings of each day, until 10 o'clock, will be appropriated to the Judges, and no visitors will be admitted during the time thus appropriated, except at the special request of the Judges, or by permission of the Managers.

6. Articles intended for sale may be labeled accordingly, but cannot be removed until the close of the Exhibition, except by written permission of the Managers.

7. Steam power will be provided, so that machinery of all kinds may be seen in actual operation, and every facility possible will be given to exhibit working machinery to the best advantage.

8. The name of every article must be attached by the exhibitor to it.

9. Articles intended for exhibition must be entered and placed on exhibition on or before Saturday, August 21st.

10. Perishable articles will be received, or may be removed at any time during the exhibition, with the consent of the Managers.

11. The most effectual means will be taken, through the agency of the Police and otherwise, to guard and protect the property on exhibition; and it will be the purpose of the managers that all articles shall be returned to the owners without loss or injury. Still, all articles deposited will be at the risk of the OWNERS.

12. In case of any misunderstanding, application may be made to the Managers, who will at all times be in attendance.

13. The Managers are desirous that articles should be presented early. Those from abroad, intended for exhibition, should be properly packed, and if not consigned to exhibitor's agent, must be marked, "MANAGERS OF TENTH INDUSTRIAL EXHIBITION, SAN FRANCISCO, CAL." All articles thus received, arriving too early, will be stored free of cost to the exhibitor, and the Managers will have them duly placed in proper position for exhibition. No freight charges will be paid by the Managers; but exhibitors are notified that arrangements are being made with various transportation companies to repay freight charges on evidence of goods exhibited.

Information will be furnished by addressing MANAGERS OF TENTH INDUSTRIAL EXHIBITION, SAN FRANCISCO, CAL.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labor of canvassing, by lending their influence to encouraging favors. We intend to send none but worthy men.

J. L. THARP—San Francisco.
B. W. CROWELL—California.
A. C. CHAMPTION—Tulare, Fresno and Inyo Counties.
D. J. JAMES—Australia Colonies.
J. O. EWING—Santa Cruz County.
H. W. ROBERTSON—Maricopa County.
W. C. QUINCY—Eastern and Western States.
B. E. LLOYD—Nevada and Placer Counties.
B. GOODWIN—California.
A. C. KNOX—Southern California.
G. W. MCGREW—Santa Clara County.
L. F. MCGRAW—Santa Clara County.
H. D. MCGRAW—Santa Clara County.
J. W. RILEY—San Joaquin and Stanislaus Counties.
CHAS. T. BELL—California, Oregon and W. T.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

No AGENTS are authorized to receive subscriptions for this paper at less than our advertised rates.

Mining and Other Companies.

Benjamin Mill and Mining Company—Location of principal place of business, San Francisco, California. Location of works, Devil's Gate District, Lyon County, Nevada.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 14th day of April, 1875, an assessment of \$2.00 per share was levied upon the capital stock of the corporation, payable on the 21st day of April, 1875, in United States gold coin, to the Secretary, at the office of the company, Room 7, 401 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 21st day of May, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 14th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

LEANDER LEAVITT, Secretary.
Office, Room 7, 401 California street, San Francisco, Cal.

California Consolidated Mill and Mining Company. Location of principal place of business, San Francisco, Cal.

Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of April, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Burke, T.....	33	100	\$ 50 00
Burke, T.....	34	50	25 00
Burke, T.....	35	50	25 00
Hendy, Joshua.....	34	70	35 00
Hendy, Joshua, Trustee.....	73	24,550	12,275 00
Hendy, Joshua, Trustee.....	78	2,116	1,058 00
Beard, John.....	39	50	25 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of April, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the company, 408 California street, room 16, on the 18th day of May, 1875, at the hour of 1 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office, Room 16, No. 408 California street, San Francisco, Cal.

Carbon Coal Company—Principal place of business, San Francisco, California. Location of works, Contra Costa County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1875, an assessment of \$1.25 per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, N. O. Fassett, No. 220 Clay street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the 14th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, No. 220 Clay street, San Francisco, California.

Cincinnati Gold and Silver Mining Company—Location of principal place of business, San Francisco, California.

Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 17th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Cuthbert, Wm.....	12	100	\$10 00
Cuthbert, Wm.....	18	200	20 00
Cuthbert, Wm.....	108	100	10 00
Pilcher, W. J.....	80	100	10 00
Pilcher, W. J.....	81	100	10 00
Pilcher, W. J.....	82	100	10 00
Pilcher, W. J.....	111	100	10 00
Dorman, S. M.....	99	50	5 00
Dorman, S. M.....	100	20	2 00
Follingsby, T. H.....	100	4	4 00
Follingsby, T. H.....	121	13	1 30
Woods, Mrs A.....	44	1,000	100 00
Woods, Mrs A.....	71	500	50 00
Woods, Mrs A.....	115	500	50 00
Woods, S. D.....	83	5	50
Woods, S. D.....	201	207	10 00

And in accordance with law, and an order of the Board of Directors, made on the 17th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the company, Room 1, No. 531 California street, San Francisco, on the 17th day of May, 1875, at the hour of 1 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale. WM. SMALL, Sec'y.

Office, Room 1, No. 531 California street, San Francisco, California.

Gold Mountain Mining Company—Location of principal place of business, City and County of San Francisco.

Notice.—There are delinquent upon the following described stock, on account of assessment (No. 3) levied on the 25th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
W. A. Knapp, Trustee.....	16	100	\$25 00
W. A. Knapp, Trustee.....	19	100	25 00
W. A. Knapp, Trustee.....	78	100	25 00
G. D. Roberts.....	29	2,000	500 00
J. F. Woodmen.....	50	100	25 00
D. M. Hoemer, Trustee.....	49	400	100 00
W. A. Knapp.....	13	500	125 00
W. A. Knapp.....	75	200	50 00
T. B. Kent.....	44	4,125	1,031 25

And in accordance with law, and an order of the Board of Directors, made on the 25th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the Secretary, No. 15 Leldesdorf street, on Monday, the 17th day of May, 1875, at the hour of 1 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office, 116 Leldesdorf street, corner of Halleck, San Francisco, California.

Keystone Quartz Mining Company—Location of principal place of business, San Francisco, California. Location of works, Butte Township, Sierra County, California.

Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 8th day of March, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Milton S. Latham.....	42	1,000	\$100 00
Milton S. Latham.....	43	1,000	100 00
Milton S. Latham.....	44	400	40 00
Peter Dean.....	45	200	20 00
J. F. Greenman, Trustee.....	58	774	774 00

And in accordance with law, and an order of the Board of Directors, made on the 8th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the Secretary, No. 15 Leldesdorf street, on Monday, the 17th day of May, 1875, at the hour of 1 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office, 408 California street, Room 15, San Francisco, California.

Manhattan Marble Company of California
—Location of principal place of business, San Francisco, California. Location of works, Oakland, Alameda county, California.

Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 30th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
S. G. Beatty.....	29	10	\$50 00
S. G. Beatty.....	30	10	50 00
S. G. Beatty.....	34	10	50 00
John Curry.....	305	119	595 00
Chas Barlow.....	94	60	300 00
Chas Barlow.....	95	60	296 00
C. Beech.....	75	25	125 00
C. Beech.....	76	25	125 00
C. Beech.....	77	25	125 00
C. Beech.....	78	25	125 00
C. Beech.....	79	19	95 00
C. W. Howard.....	126	119	595 00
T. J. Arnold.....	133	69	293 00
D. M. Bokes, Trustee.....	259	7	35 00
D. M. Bokes, Trustee.....	260	3	15 00
J. A. Lawson.....	304	20	100 00
Alphonso Dan.....	281	20	100 00

And in accordance with law, and an order of the Board of Directors, made on the 30th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at the office of the company, 13 and 15 Fremont street, San Francisco, on Monday, the 17th day of May, 1875, at 12 o'clock P. M., to pay the delinquent assessment thereon, together with cost of advertising and expenses of sale.

Office, Nos. 13 and 15 Fremont street, San Francisco, California.

Martin & Walling M. & Co.—Principal place of business, San Francisco, California. Location of works, Contra Costa County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of April, 1875, an assessment of fifty (50) cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 408 California street, room 16, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 24th day of May, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 15th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—408 California street, room 16, San Francisco, Cal.

Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Grass Valley Township, Nevada County, California.

Notice is hereby given, that at a meeting of the Board of Trustees of said corporation, held on the 27th day of April, 1875, an assessment (No. 4) of one dollar per share was levied upon the capital stock of said company, payable immediately, in gold coin of the United States of America, to the Secretary, at the office of the company, room 8, No. 315 California street, San Francisco, California.

Any stock upon which said assessment shall remain unpaid on Tuesday, the 1st day of June, 1875, will be advertised on that day as delinquent, and unless payment shall be made before, will be sold on Tuesday, the 22nd day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 8, No. 315 California street, San Francisco, Cal.

Theresa Mill and Mining Company—Location of principal place of business, San Francisco, California.

Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 13th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Brigham, Chas B.....	167	100	\$3

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San Francisco Boiler Works,

123 and 125 Beale Street.....SAN FRANCISCO

F. I. CURRY.

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High and Low Pressure Boilers of all Descriptions.

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James D. Walker.

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JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary
24v17-27

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24v22-3m JOSEPH MOORE, Superintendent.

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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

PATENTED NOVEMBER 25th, 1873.

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Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

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21v29-16p-3m

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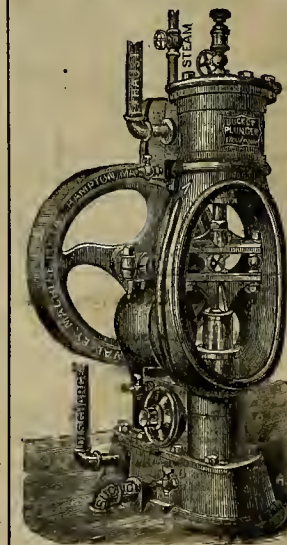
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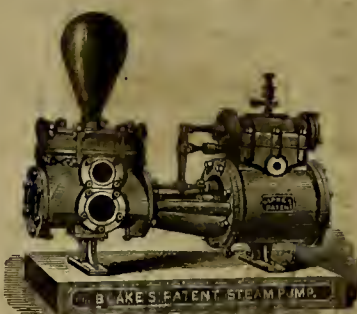
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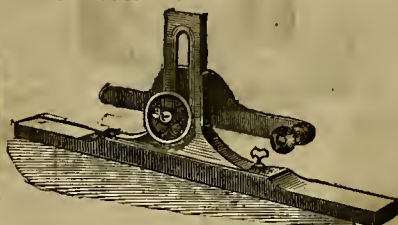


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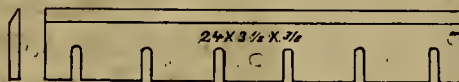
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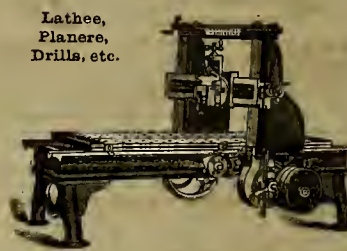


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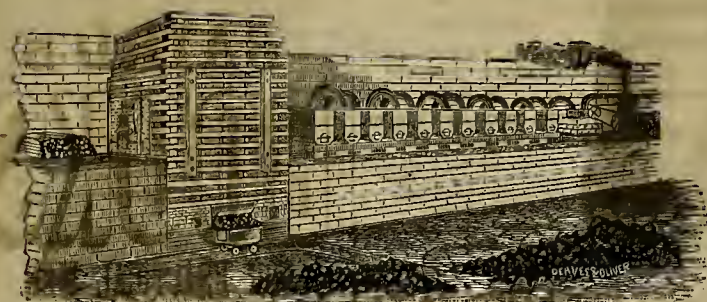


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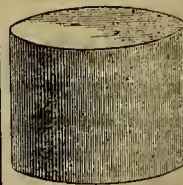
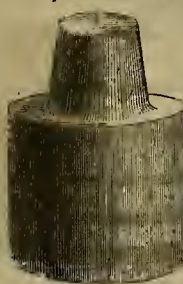
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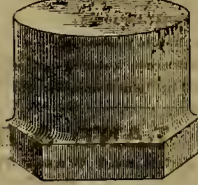
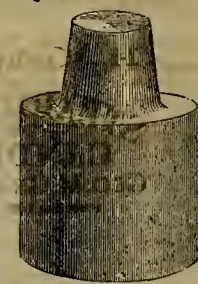
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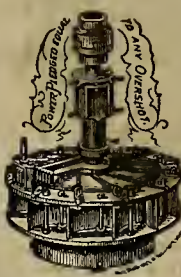
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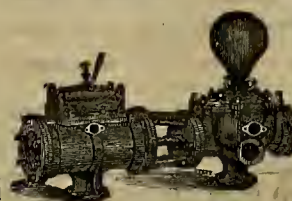
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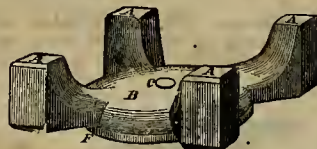
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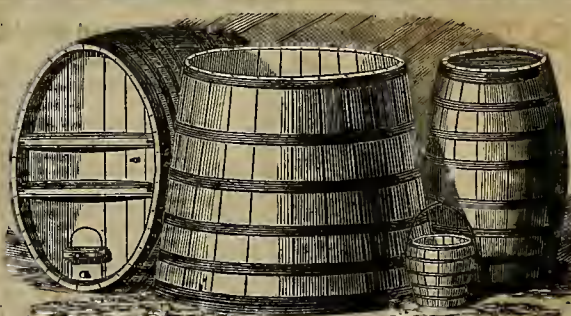
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MINING AND SCIENTIFIC PRESS.

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SAN FRANCISCO, SATURDAY, MAY 15, 1875.

VOLUME XXX
Number 20.

An Improved Dry Ore Concentrator.

John Vincent, Sr., of this city, has recently patented, through the agency connected with this office, an improved machine for concentrating and separating the heavy particles of dry pulverized ore from the light and worthless portion. The machine consists of a number of peculiarly constructed plates or concentrator trays, placed one above the other in a closed box. The box is mounted on journals inside a frame, and the frame is provided with appliances for handling the box and giving it the concentrating sleeve motion and concussion.

The accompanying engraving is a perspective view of the machine from one corner. A is a strong box which is mounted on journals, b, between the two sides, C C, of a frame. The journals, b, bear in hangers, D, which are suspended from the middle of each side of the frame, so that the box can swing in the frame, and be tilted so as to bring either end uppermost. Inside the box are placed the concentrating trays, e e e, one above the other, one inch apart. Each tray consists of a plate of metal, or other suitable material, having parallel rows of depressions or cavities, f, made in it transversely across the plate. These depressions or pockets are separated by a metal strip, g, which is so secured to the plate that one edge will project considerably above the level of the plate, while the opposite edge is fastened closely to it, thus providing an inclined division plate between the rows. The depressions or pockets, f, serve to receive and retain the heavy particles, which are settled by the motion and concussion given to the box, and the projecting edge of the separating plate prevents the particles from moving in one direction, while it does not prevent them from moving in the opposite direction. The ends of the box, A, are closed by doors, H. The hinged end, H, has side boards, which are made in the shape of a quadrant, so that they can move in a narrow slot or space at each side of the box when opening or closing the ends. Both of the upper corners of the sides, C C, of the frame are connected by strong shafts, K. The shaft, K, with the lever, has a fixed arm, l, extending downward near each end, and the lower ends of these arms are attached to the opposite ends of a rod, m, which extends across and is secured to the end of the box by detachable fastenings as shown.

By securing a lever, n, to the middle of this shaft, the box can be swung back and forth motion. A stop bar, p, is secured near the hangers, D, against which the hangers strike when the box moves forward, so as to produce a concussion for settling the heavy particles of ore by gravity. This need not be used if a concussion is not desired.

In operating the machine the rod, m, is detached from the box, A, which is then turned by means of the shaft, K, and rope or chain, Q, used in the manner of a windlass, so that it will stand on one end inside the frame. The hinged end of the door at the upper end of the box is then opened, and the pulverized ore is shoveled into the box until it has been fully charged. The door is then closed, and the box is moved back to its horizontal position by means of the windlass. In this case the hook on the end of the rope, Q, is attached to a ring on the lower end of the box, and the roller turned until the box is in the proper position. The rod, m, is then again secured to the end of the box, and the lever, n, applied to the shaft so as to form a handle for operating the box. This operation causes the heavy particles of ore to settle through the light portions into the depressions in the trays. The direction of the concussion is such that the heavy particles will be prevented from moving over the trays by the projecting edges of the strips, g, so that when they will settle into the cavities they will remain there.

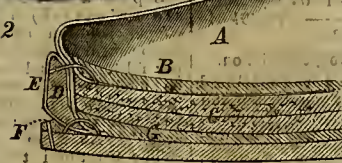
After the agitation has been continued long enough to thoroughly concentrate the ore, the box is tilted one way to discharge the light or waste portions from the lower end of the machine, and by tilting it the other way the valuable contents can be discharged from the other

end. A double concussion can be given to the ore, if desired, by using double stops or knockers for the pendent arms, D, to strike against. For this purpose a pivoted bar, X, similar to a pawl, is secured to the frame opposite the stop bar, p, as shown. This bar can be used or not as desired. A horizontal plate, y, is secured to each of the hangers, D, and extends along the box, A, and through the corner part of the frame. The plate has two or more holes in its end, into which a hook, z, on the corner part, can be placed, so as to hold

Fig 1

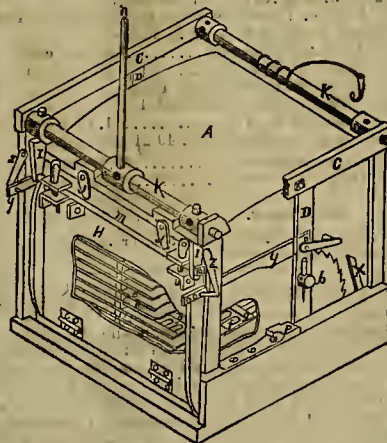


Fig 2



BROOKS' CORK-SOLED BOOTS.

the box in a horizontal position when required. Although the machine is especially intended for concentrating dry pulverized ore, it can also be used for concentrating wet ore by submerging the machine after it is charged, in a tank of still water, and giving it the motion described. This would of course greatly favor the concen-



Vincent's Dry Ore Concentrator.

tration, as the water would keep the particles loosened up and allow the heavy particles to settle more readily. It will be seen from this that the machine is adapted to localities where water is scarce, and may be used for working tailings. It can be run either by hand or steam power. The inventor can be addressed care of this journal.

Almost the entire business portion of Eberhardt, White Pine district, Nev., was destroyed by fire on the 12th inst.

Improved Cork-Soled Boots.

The accompanying illustration represents a novel plan for making boots and shoes with cork soles. A very thick but very light sole is provided, which effectually keeps out the cold and wet of winter, and in summer shields the foot from the excessive heat of the sun-baked pavements. The device is as easily repaired as the common sole, and its use in bad or

Air Sollars.

In ventilating mines a natural current of air may often be produced in a long level by means of an "air soller." To form an air soller the floor of the level carrying the tram road is laid about six inches above the actual bottom of the level, and is supported by cross sleepers, resting upon blocks of wood or stones. A simpler method still, when in soft ground, is to cut the center of the level somewhat deeper than the sides. Planks are then laid over the sleepers mentioned to form a kind of deck, the whole being rendered air-tight by plastering with mud. This will divide the tunnel into two very unequal portions. Through the lower division or air soller a current of cool, and therefore heavy air, will pass into the end, and this will be further cooled if there be water issuing from the lode at any points. The air heated by the breathing of the men, burning of candles, etc., will pass on through the level itself, and so a constant current will be kept up. The level should be as truly level, or "dead" as possible, for several reasons, two of which may be here mentioned: First, if there be water flowing out through the level, and the fall be considerable, the rapidity of the current of water will, to some extent, check the incoming current of air. Second, if the level rise rapidly the floor at the upper end will soon be at a higher actual level than the back of the entrance, when the heated air will actually have to descend in order to make its escape, although the natural tendency of heated air is always to ascend.

A level can, of course, be ventilated the same as shafts sometimes are, by having a pipe run to the back end from the mouth. The opening of the pipe at the tunnel mouth is enlarged, and a current of fresh air is forced into the tunnel. This mode of ventilation, however, can only be adopted when there is wind; but it is in time of calm that underground ventilation is most wanted. To meet this difficulty a small fan, worked by hand, water or steam, is arranged to force pure air in, or, still better, to draw the impure air out. In many cases a jet of high pressure steam from a boiler may be discharged into the outer end of the pipe, when an outer current will be at once set up.

Work at the Foundries.

The San Francisco Boiler Works will remove about the first of June from its old location on Beale street to the northwest corner of Harrison and Main streets. Mr. Curry informs us that he is now working 357 men, and working about twenty-three hours out of twenty-four. They have in course of construction a large amount of hydraulic pipe; one lot for the Auburn H. G. M. Co., is about completed. They have just completed eleven miles of iron water pipe, twenty-four and forty-eight inches, for the Contra Costa water company.

At the Miner's foundry and machine shop orders are being filled for Mexico, Chili and Peru, as well as Pacific coast orders. This foundry is now turning out all the work for the Diamond Drill company.

The Hope iron works, over on the Potrero, are not yet in running order. The buildings are, however, all completed, and some of the machinery is in. Considerable of the machinery needed here was ordered from the East, by Mr. Hanscom, and it has not all arrived as yet. Everything in these works will be brand new, and of the best patterns obtainable. We hope before long to see Mr. Hanscom carry out his own ideas on a fast steam launch, both as to model and machinery.

The Grading at the Prospect mine, on the Comstock, for the foundation for the new hoisting works building, and the new and powerful steam hoisting machinery, about being erected, is being driven ahead with all the vigor possible. The main hoisting works building will be 40x120 feet in size, with carpenter and blacksmith shops immediately adjoining on either side of the main building.

PROFESSOR R. E. ROGERS, of the University of Pennsylvania, has left Philadelphia lately for San Francisco, to superintend the construction of an extensive bullion refinery in the new mint. It is expected that the new refinery will be completed and in readiness for operation in about ninety days.

A TOLL ROAD company has been organized to build a toll road from Battle Mountain, Nev., to Silver City, Idaho, by way of Caruncopia and South Mountain. Work has been commenced. The road will be 183 miles long.

The graders are at work on the fourth mile of the Los Angeles and Independence railroad, between Santa Monica and Los Angeles.

STEAM hoisting machinery has been ordered for the new shaft of the Europa mine, on the Comstock.

CORRESPONDENCE.

Geological Formations—Quartzite.

EDITORS PRESS:—With the advancement of geological research, which may now, in spite of its many shortcomings, be classed as a science, mineralogists as well as practical miners are leaning upon its conclusions as an index to their fields of operation. Consequently, the inquiry is almost universal with the latter classes, when a new mining locality is announced—what is its geological formation? In most instances the answer may be readily given by a mere novice in geology. Not so, however, in all. As, in regard to a knotty legal problem, it is often remarked that "it would puzzle a Philadelphia lawyer," on the assumption, probably, that they have reached the *ne plus ultra* of legal acumen; so with the geological problems of some localities, and especially in regard to this mining district, he may well say that it would puzzle the most astute geologist to give a very satisfactory elucidation.

The portion of the district containing the mineral belt is called quartzite. There are a few granite dykes, so called, although from the entire absence of mica in them, except in one instance that I have seen, they are more probably syenite. A few small trap dykes, a few inches in thickness, and an occasional cropping of silicious limestone, or, as some writers call that kind of rock, "calcareous quartz," make up the formation. The silicious limestone also appears in the form of dykes. Now the query arises, what is quartzite? Of course it is composed almost entirely of silica, and Dana defines it to be a granular quartz. But this quartzite is not granular, except in a few places; it has more of a vitreous structure. Some pronounce this to be a metamorphic structure. But metamorphism would not obliterate its seams of stratification and cleavage, and the evidence in other respects is very slight on which to base such a conclusion.

In some localities in California and Nevada there are dikes perfectly identical with our quartzite, from a few inches to twenty feet in thickness, but I have not been able to learn of any general formation of miles in extent made up almost entirely of this species of rock. Again, in all other localities quartzite, so far as my observation or information extends, is non-metalliferous. The reverse is true here in an eminent degree, as I will show quite fully in future communications. Yet, although "argenteous galena ores exist here in such vast stores as to astonish miners from other points, it must be confessed that the mining interests are not prosperous. The reason I alluded to in a former communication, and affords a striking exemplification of what all success men will meet with when they take hold at the wrong end of things, or "put the cart before the horse." Instead of procuring their coke for smelting from a distance of twelve to fifteen hundred miles, at a cost of \$35 per ton, it could and should be procured almost at our own doors, say from a distance not to exceed seventy-five or eighty miles, and an article equally as good. A concert of action to that end by those most interested, or by private individual investment, which would be highly remunerative, would work an astonishing and rapid change in the prosperity of this inter-oceanic region. WILLIAM TEAL.

Bingham, U. T., May 1.

TIMBER FOR THE CENTENNIAL.—In a letter from Whitefield, Oregon, published a few days since, mention was made of a gigantic mast-cut at Puget's sound, by Mr. Brown, a New Englander, who is engaged in the lumbering business in that locality. It was stated that the stick was a foot through at the upper end. The dimensions should have been stated as follows: 120 feet in length and 42 inches through at the top. Trees grow to an enormous size there as in California. A Mr. William Squire of Norenton, Oregon, writes to the Centennial Commissioner for Oregon that he will furnish at Tillamook bay, a fir plank, twelve feet wide and one hundred feet long; a spruce plank eight feet wide; cedar, seven feet; larch, seven feet; Hemlock, five feet. He says he can get much larger ones if transportation could be furnished, and can also supply hard wood planks of like proportion, including shittim wood, of which Noah built his ark.

THE BLACK HILLS scientific expedition, now being organized at Cheyenne, under orders from the Interior Department, for the purpose of establishing the boundaries of Northern Wyoming and ascertaining the mineral resources of the Black Hills, will not be able to start before the end of the present month, owing to the cold weather. The party consists of Professor Walter J. Jenny, geologist in charge, formerly of the Texas Pacific railroad survey; Henry Newton, assistant geologist, of the Ohio survey; Captain H. P. Tuttle, astronomer, of the Cambridge observatory; F. P. Gillicuddy, telegrapher of the Northern boundary; D. Newberry, and a corps of surveyors. The delegation of Indians from the Black Hills country en route to Washington, in charge of Agent Saville, will start about the 10th inst.

On the Assay of Sugar.

[Written for the Press by HENRY G. HANKS.]

The determination of sugar by chemical means is attended with difficulties which render the results more or less inaccurate, according to the skill of the chemist.

Several methods have been proposed—all more or less objectionable—but the one based on the reaction of grape sugar on sulphate of copper is generally preferred.

The weak point of all chemical determinations of sugar is that only the practical manipulation of a skillful chemist ensures their correctness, and the above mentioned method is not an exception.

I have never seen this process explained in such a manner as to be easily understood by the unscientific reader, and this paper is an attempt to supply the deficiency.

The assay is based on the well established fact that one equivalent of grape sugar reduces exactly ten equivalents of oxide of copper to the sub-oxide.

One equivalent of grape sugar has the following composition:

12 Equivalents of Carbon....(C ₁₂) =	72
12 Equivalents of Hydrogen...(H ₁₂) =	12
12 Equivalents of Oxygen.....(O ₁₂) =	96
	180

Let this sum be represented by (A) (A = 180.)

One equivalent of oxide of copper consists of	
1 Equivalent of Copper (Cu).....	31.7
1 Equivalent of Oxygen (O).....	8
	39.7

Let (B) represent 10 equivalents of oxide of copper (B = 397.)

One equivalent of sulphate of copper contains	
Oxide of Copper (CuO).....	39.7
Sulphuric Acid (SO ₃).....	40.0
Water.....(5H ₂ O).....	45
	124.7

[124.7 = (C).]

By the above it is shown that the oxide of copper in one equivalent of sulphate of copper = 39.7 = (D)

Formulas.

It is required to make a solution of anhydrous copper in which the oxide of copper in a litre shall equal five grammes of grape sugar. The amount of sulphate required is found by the two following equations:

1st. The oxide required, found thus:

$$A : B :: 5 : X \quad (X = \frac{B \times 5}{A}) = 11.03.$$

2d. The amount of sulphate of copper containing this amount of the oxide, found thus:

$$D : C :: 11.03 : X \quad (X = \frac{C \times 11.03}{D}) = 34.64$$

Preparation of the Standard Copper Solution.

(E) 34.64 grammes of pure and dry crystallized sulphate of copper, previously pulverized and pressed between folds of blotting paper, is carefully weighed and dissolved in 200 C.C. distilled water.

In another vessel 173 grammes of double tartrate of soda and potash, (Rochelle salt) is dissolved in 480 C.C. of a solution of pure caustic soda of specific gravity = 1.14. The two are then mixed and the deep blue solution diluted to the volume of one litre and filtered. This solution will keep for some time if the precaution is observed to preserve it in full bottles and in a dark place.

When in the proper condition it can be boiled without decomposition. It is therefore necessary, if it has stood for some time, to test its condition by boiling. If a precipitate falls it is worthless. This solution is decomposed by boiling with grape sugar, but is not acted on by cane sugar.

1 Equivalent Cane Sugar =

C ₁₂ =	72
H ₁₂ =	11
O ₁₁ =	88 = 171

It may be here stated that 100 parts of grape sugar equal 95 of cane sugar.

As it has been shown that the sulphate of copper in one litre of this solution is equivalent to 5 grammes of grape sugar, it is evident that each 100 C.C. is equal to .5 grammes of grape sugar, or .475 grammes of cane sugar. (.5 × .95 = .475). Cane sugar can be converted into grape sugar by boiling its solution with dilute acid. As the optical properties of the sugar are changed by this operation the cane sugar is said to be inverted.

To prove the strength and purity of the standard copper solution, dissolve .475 grammes of the whitest and best loaf sugar, perfectly dry and clean, in a little distilled water in a clean porcelain dish. Boil with 30 or 40 drops of dilute sulphuric acid, (1 part strong acid to 5 parts water,) for half an hour, replacing the evaporated water from time to time, keeping the volume the same. This solution, diluted to 100 C.C., should exactly decompose and discharge the color from 100 C.C. of the copper solution. Before diluting the sugar solution, the acid should be carefully neutralized with carbonate of soda.

The sugar to be assayed should be diluted with water, so that it contains not over one per cent. of sugar. If it is of a dark color, the solution must be heated to boiling, a few drops

of milk of lime added, filtered through animal charcoal, washed and diluted to a measured volume.

Example.

(F) Ten grammes of sugar to be assayed is dissolved in 300 C.C. distilled water, hoiled in a clean porcelain dish for half an hour with 10 C.C. of dilute sulphuric acid with precautions given above, the acid neutralized with carbonate of soda, milk of lime added if necessary, the whole thrown on a filter in which some animal charcoal has been placed; when the solution has nearly all run through the filter, it is washed with distilled water until every trace of sugar is removed; the washings now containing all the sugar are made up to the volume of one litre and thoroughly mixed. Each 100 C.C. of this solution contains one gramme of the sugar. 50 C.C. of the copper solution (E) is placed in a clean porcelain dish, 200 C.C. of water added, and the whole brought up to gentle boiling. The dilute sugar solution (F) is then added from a graduated burette, until the precipitated oxide of copper has a vermilion red color; the lamp or burner is then removed and the precipitate allowed to settle. The dish must then be held in a good light near a window, and gently tilted to one side so as to allow the clear liquid to flow over the white porcelain uncovered with the precipitate. If any blue color remains, more sugar solution must be added while boiling. When the color is wholly discharged the operation is ended, and it is only necessary to note the quantity of liquid used as indicated by the graduation on the burette, and to make the calculation.

It should not be expected that the first trial will be correct, but it will be a guide to the second or third, which can be made perfectly so. Suppose the first test required 43 C.C. of sugar solution; in making the second 40 C.C. may be safely run in at once, and the last few C.C. carefully added drop by drop.

The sugar necessary to discharge the color from 50 C.C. of the copper solution contains .25 grammes of grape sugar, (it having been shown that 100 C.C. is equivalent to .5 grammes).

The calculation may be understood by the following example:

42 C.C. of sugar solution (F) discharged the color from 50 C.C. of copper solution (E). 84 C.C. would, of course, do the same for 100 C.C. of copper solution. .84 or 84 C.C. of the sugar solution therefore contains .5 of grape sugar. .01, or 1 C.C. would contain .00595 (.5 ÷ 84 = .00595).

One gramme of the sugar, or 100 C.C., would then evidently contain .595 grammes of grape sugar, and 100 grammes, 59.5, which is 59.5 per cent. This amount multiplied by .95 would equal 56.52 per cent. of cane sugar.

Sometimes sugar contains both cane and grape sugar, mechanically mixed. In this case the grape sugar already present must first be estimated and the amount found be deducted from the total grape sugar, after invertingly acid.

Suppose a case, a solution of sugar is made as described in (F), a portion is boiled with copper solution before treating with acid. Grape sugar is present if any red oxide of copper falls. Two solutions must in such cases be made exactly alike; except that one is boiled with acid and the other is not. We will call these solutions "No. 1, hoiled with acid," "No. 2, not hoiled with acid."

The titration is the same in both cases. As No. 2 will not generally contain as large an amount of grape sugar as No. 1, it will require a greater volume of solution to discharge the color from 50 C.C. of the copper solution.

Example.

No. 2 required 324 C.C. to discharge color from 50 C.C. copper solution; 324 C.C. therefore contains .25 grammes grape sugar; 100 C.C. (containing 1 gramme of sugar), contains 25 ÷ 3.24 = .77 = 7.7 per cent.

Let No. 1 result as in the first example. The result would then stand as follows:

Total Grape Sugar.....	59.5 per cent.
Grape Sugar in No. 2.....	7.7 per cent.
Grape Sugar resulting from	
acid in No. 1.....	51.8 per cent.
51.8 + .95 = Cane Sugar. 49.21 per cent.	
Cane Sugar =	49.21 per cent.
Grape do =	7.70 per cent.

Total Sugar.....56.91 per cent.

*C.C. means Cubic Centimeters, or thousandths of litre, French measure.

CAPE COD SHIP CANAL.—The old project of making a ship canal across Cape Cod is under vigorous discussion at Boston. The Legislature having recently granted an extension of time to the company, in which to complete the work. The company has a nominal capital of \$1,000,000. They want to begin operations within a year, and if they do the contract for constructing the canal will be given to European parties. The entire cost would be nearly \$3,000,000. The valley through which the canal is to pass is north of the town of Sandwich, and extends from shore to shore about 7½ miles, and in a direct line from the waters of Buzzard's Bay to those of Barnstable Bay, about 6½ miles, the general direction of the course being northeast and southwest. The canal is intended for tow boats and barges, but would also be of sufficient capacity for all vessels now engaged in the coasting trade around the Cape. It is claimed that the canal would reduce the distance by the Vineyard Sound route nearly eighty miles, and fully 140 miles by the outside route around "Fishing Rip."

Sierra County Mines.

A correspondent of the *Mountain Messenger* says: After twenty-five years of gravel mining in this vicinity, in ravines, bars and benches that have been as rich as any place in the known gold regions of the world, it is no wonder that the chief reasons that have made this place prosperous should in that length of time be exhausted, and dullness be a general complaint. Miners and business men must look to some other source for a revival of that prosperity that all are so anxious to see realized. After setting aside the gravel claims on the mountains, where untold wealth has never been disturbed, and which requires a large amount of capital to develop, we must look to another and more permanent source to bring back those good old times that the pioneers delight to dwell upon. And there is quartz mining, the source from whence all the alluvial gold has come. The number of ledges that gold is known to exist in, in and around here, have richly fed the gravel claims. The ledges that are now lying idle from various causes have, very few of them, had any thorough systematic work done on them, or labor applied to bring out the hidden, rich deposits they must contain.

The one great drawback has been the old district mining laws that allow a person a hold on a claim for years, and willing prospectors were debarred from trying to develop any ledge that was known to contain gold, the owners, like the dog in the manger, would neither work their claims nor allow others to do so. Again, sometimes the owners have asked impossible prices, where little work has been done, and by that means deterred capitalists from taking hold of them; consequently they are no benefit to any one.

Another drawback has been San Francisco adventurers that have come here with a slight acquaintance with perhaps some men of capital, trying to get the ledge for a mere trifle, and misrepresenting them below, and turning anything into stock, they retaining the greater part, and by false and wild reports they make money for a time, but in the end supplies are stopped, and prospecting is discontinued. My opinion is that when a poor man has discovered a ledge, and the rock is to be crushed by machinery, and he has a chance to sell at a fair price, the best he can do is to let it slide, and use the money to find a better ledge. By this means we induce capital to come in, and the capitalists once successful, you will see men testing quartz on every mountain and hill-side, and in my belief not all in vain. One great want is a custom mill, one that will save the gold, with all the latest appliances. When the miner knew that his rock had a fair test and he could take one ton or fifty and have it crushed, and by that means make a living while he was prospecting, I fully believe that Downville would see again, not the wild, extravagant days, but a prosperity and contentment that would be far more pleasant in a social view, and the rising generation, instead of emigrating, make a home in the place of their birth.

Fireless Locomotives.

A correspondent, writing from New Orleans, Louisiana, says: Fireless locomotives are in constant and successful operation on a city and suburban railway in New Orleans; namely, the New Orleans and Carrollton railway, under the able management of Gen. G. T. Beane, who is a skillful engineer, and yet who is alive to, and keeps pace with, the improvements of the age. This success has been achieved, too, under the most adverse and unpromising circumstances. The road, under other running arrangements, had become nearly valueless, its stock having gone down to seven cents; but it is now a paying and valuable road.

The road is about six miles in length. From the center to the outskirts of the city it is run by mule power; there the mule is taken from the car and the little fireless locomotive is attached, which is accomplished in less time than would be occupied in attaching another mule. The train is then off like a rocket, the driver still on the platform of the car, working the engine, managing the brakes, and making change as usual; there is no other person on the train to attend to these duties. The car is started and stopped quicker than when drawn by the mule.

The locomotive is simply a cylinder of boiler iron, perhaps three feet in diameter and ten feet long, mounted on four wheels and partly filled with water. The engine (a double vertical) is attached to the end of the cylinder next to the car, being within reach of the driver. The cylinder is then filled with steam at a proper pressure, from a stationary boiler at Carrollton, when the locomotive is ready, and it will run to the city and back without care or expense. There is no fire, no ashes, no pump, no danger, and less noise than from the hoofs of horses. The expense of this means of propulsion is less than by mules. The cost of the locomotives is \$1,250 each, which includes the builder's profit.—*Ex.*

A vein of graphite was recently discovered near Greggville, in Gold run district. The mineral is said to contain ninety-seven per cent. carbon, and is probably the finest quality of plumbago found in the United States. The vein is about six feet wide and as well defined as ore quartz leads generally.

About 5,000 workmen belong to the Virginia and Gold Hill miners' union.

MECHANICAL PROGRESS.

Apparatus for the Fusion of Platinum.

We have already made mention of the construction, at the Conservatory of Arts, at Paris, of the international standard apparatus, in which operation the largest mass of platinum was employed which was ever melted at one time. The furnace was constructed on a principle already before used by M. Deville and Debroy, but which, in this instance, greatly exceeded the dimensions of any previously employed for such a purpose. The experiment, as already reported, succeeded beyond expectations, and demonstrated the feasibility of liquification by heat of unusually great masses of platinum—the limit to which is not, of course, as yet been reached. This experiment will, no doubt, have an important bearing in the future progress of art and science.

The ingot of platinum which was taken from the interior of the apparatus had a volume of 1.15 litres, its length being 1.15 metres, its width 0.17 metres, and its thickness 0.08 metres. The value of the mass of metal is estimated at \$50,000. Following is a description of the furnace, as recently given by M. Deville.

The furnace of the conservatory is 1.4 metres in length; it is formed of the stone of Saint-Waast, the substance of which is a fine-grained limestone, containing about five per cent. of silica. When it is necessary to melt a small quantity of platinum in the laboratory, by the aid of the oxy-hydrogen blow-pipe, a crucible of unslaked lime is used, as it is the action of the highest temperature obtainable.

This substance, however, does not admit of construction of a crucible of large size. M. Deville and Tresca have had recourse to limestone and carbonate of lime.

Under the action of heat the surface of the lime is decomposed, the carbonic acid is evolved and leaves the lime with which it was united. With ordinary limestone this escape of gas causes great inconvenience, as the bubbles of gas pass through the bath of molten lime and form irregularities on its surface; besides, the ingot after cooling firmly adheres to the lime with which it is in contact. It is necessary to find a stone of special quality.

That of Saint-Waast, being porous and highly pulverized, gives the very best results. In platinum is melted in the cavity in the stone the carbonic acid only escapes along the borders of the liquid mass without passing through it; the decomposition of the limestone is placed to the depth of about 0.02 metre, so the metal really rests on a bed of lime of a considerable depth.

At two ends of the furnace are two cylindrical openings, through which the bars of platinum to be fused were successively introduced. When the seven blow-pipes, represented on the upper part of the cover, through which they pass, were lighted, the platinum melted with great rapidity. Small openings gave a view of the interior and the melting of the metal. It was of a dazzling silver-white, as bright as mercury, and formed a reflecting surface like that of a mirror. By the lateral openings the large, intensely luminous flames could be seen hurrying forth. The temperature was in the neighborhood of 2300°C., which is a little above the melting point of platinum.

The seven blow-pipes were connected by rubber tubes with reservoirs of illuminating gas and oxygen. These tubes are attached to each other and united by a sphere of copper.

The consumption of oxygen in the experiment of May 13th was nearly 120 litres per gramme of platinum; in the former operation a volume of 150 litres was required. The results recently obtained are in favor of the arrangement of the beautiful apparatus of the Conservatory of Arts and Measures.

MAGNETIZATION OF STEEL.—The magnetic force is limited to a certain thickness, which can never exceed. This limit varies in different steels. It is very great in those which are soft, and diminishes as the proportion of carbon and manganese and as the temper is harder. Certain bars which the author has studied show that he has specimens where it is less than 1-10 m.m. The latter only receive what may be called a superficial magnetic coating, the thickness of which it is not possible to augment by increasing the intensity of the current. If by the depth of the magnetization diminishes along with the magnetic conductivity, the intensity of the magnetism increases. It follows that the quantity of magnetism is subject to two canons of inverse variation—the depth to which increases, and the intensity which lessens, as the conductivity increases.—*M. J. Leclercq.*

AMERICAN LINE OF EUROPEAN STEAMERS.—The Boston Commercial Bulletin reports the construction of a fleet of trans-Atlantic American-built steamers to be ahead of any now afloat in speed and carrying capacity.

Interesting Incident in the History of Nail Manufacture.

The difficulties which the early workers in iron were so often called to encounter is forcibly illustrated in the following incident connected with the history of the old splitting mills so common in early days of rolling mills, given in Scribner's "History of the Iron Trade."—"The most extraordinary and the best attested instance of enthusiasm existing in conjunction with perseverance is related of the founder of the Foley family. This man, who was a fiddler, living near Stourbridge, England, was often witness of the immense labor and loss of time caused by dividing the rod of iron necessary in the process of making nails.

"The discovery of the process called splitting, in works called splitting mills, was first made in Sweden, and the consequences of this advance in art were most disastrous to the manufacturers of iron about Stourbridge. Foley, the fiddler, was shortly missed from his accustomed rounds, and was not again seen for many years. He had mentally resolved to ascertain by what means the process of splitting of bars of iron was accomplished; and, without communicating his intention to a single human being, he proceeded to Hall, and thence, without funds, worked his passage to the Swedish iron port. Arrived in Sweden, he begged and fiddled his way to the iron foundries, where, after a long time, he became a universal favorite with the workmen; and, from the apparent entire absence of intelligence, or anything like ultimate object, he was received into the works, to every part of which he had access. He took the advantage thus offered, and having stored his memory with observations of all the combinations, he disappeared from amongst his kind friends as he had appeared—no one knew whence or whither.

"On his return to England he communicated his voyage and its result to Mr. Knight and another person in the neighborhood, with whom he was associated and by whom the necessary buildings were erected and machinery provided. When at length everything was prepared, it was found that the machinery would not act; at all events it did not accomplish the sole end of its erection—it would not split the bar of iron. Foley disappeared again, and it was concluded that shame and mortification at his failure had driven him away forever. Not so; again, somewhat more speedily, he found his way to the Swedish iron works, where he was received joyfully, and, to make sure of his fiddler, he was lodged in the splitting mill itself. Here was the very end and aim of his life attained beyond his utmost hope. He examined the works, and very soon discovered the cause of his failure; he now made drawings or made tracings; and having aided an ample time to verify his observations, and to impress them clearly and vividly on his mind, he made his way to the port, and once more returned to England. This time he was completely successful, and by the results of his experience enriched himself and greatly benefited his countrymen. This I hold to be the most extraordinary instance of credible devotion in modern times."

AMERICAN BESSEMER IMPROVEMENTS IN ENGLAND.—Four years ago an American engineer who had had considerable experience at the Bessemer steel works of this country, and who was in England at the time, offered the Barrow steel works complete details of the improvements in the working of the Bessemer process in America for a very small royalty per ton. The offer was not accepted, and we presume the managers were not a little astonished at the insolence of the "hardest Yankee" in attempting to teach them. Last September Mr. Holley, another American engineer, read before the Iron and Steel Institute (England) a paper showing that by these despised American improvements we were getting from one-half to three-fourths more work out of a pair of Bessemer converters than the English. And Mr. Smith, the manager at Barrow, stated that "they, at Barrow, would endeavor to see why they could not do as well with regard to quantity as they had done in the United States." And now comes this satisfactory part of the whole affair to the American engineer first mentioned. A few weeks since a gentleman from these same works at Barrow, where his offer was refused, came into the Bessemer works where he is engineer to examine them, doubtless to carry out Mr. Smith's idea of "seeing why they cannot do as well at Barrow." There was a look of quiet satisfaction on the countenance of our friend as he related these circumstances.—*American Manufacturer.*

A NEW BELTING MATERIAL.—In engineering shops in Germany a new kind of belting is being adopted. It is made from hair, presumably that of the alpaca, and is delivered by the makers in a single piece without seam. It has a coating which consists principally of masticum. It is spoken of as most satisfactory, and being more durable than either gutta-percha or leather.

THE SAND-BLAST.—The contractors who have undertaken to furnish 240,000 headstones for the national cemetery at the names, in their works at Rutland, Vt., by means of the sand-blast. This is a name in four minutes, and they complete 500 stones daily.

FLAT AND ROUND BELTS.—A three-fourth inch round belt, running in properly grooved pulleys, will convey the same power as a two inch flat belt.

SCIENTIFIC PROGRESS.

Development of Magnetism in the Rails of Railways.

M. Heyl, engineer of one of the German railways, in a recent report upon the special section under his charge, calls attention to the development of magnetism in the rails. He says: "I have observed that all the rails are transformed at their extremities, after they have been placed in position a few days, into powerful magnets, capable of attracting and of retaining a key or even a heavier piece of metallic iron. These rails preserve their magnetism even after they have been removed, but they lose it gradually. When in position, however, the magnetism is latent, only becoming free when the chairs are removed, and disappearing again when they are replaced. Hence it is necessary to assume that two opposite poles come together at each junction, and that each rail is a magnet, the poles being alternately reversed throughout the line. This production of magnetism in the rails examined is undoubtedly attributable to the running of the trains and to the shocks, frictions, etc., thereby produced. The hypothesis of electric currents, induced or direct, must be rejected, since it is negatived by experiments upon the subject made with suitable apparatus. Although the interest attaching to the fact above stated is at present purely scientific, it is not impossible that the magnetism thus developed may exercise an influence actually beneficial upon the stability of the roadway, increasing the adherence to the rails and the friction. It is possible also that the magnetic currents may be stronger at the moment of the passage of the trains, than either before or after. If this be so, the observations may acquire a still higher practical importance.

Excrementitious Matter as Fuel.

The scientists have not yet done with devising ways and means for utilizing excrementitious matter. The latest reported experiments in this direction have been conducted by Dr. Petri, of Berlin, who has perfected a process for producing odorless blocks of fuel from excrements, which also burn without odor, with a heating effect equal to brown coal, and affording an ash excellent as a phosphate fertilizer. The excrements are first rendered perfectly odorless in the receptacles before removal, by the addition of a chemically prepared powder, and are then concentrated by evaporation in a peculiarly constructed vessel (without the least annoyance to persons present), to the consistency of clay, and the mass then delivered by the machine, so as to be cut by wires into blocks, which are pressed and dried like bricks. It is not necessary to separate solid from liquid excrements, and the disinfected matter can be transported at any time without annoyance to any one. Since the machines act rapidly, and without requiring many hands, the establishments need not be very large or remote. The results of experiments conducted before the authorities of Berlin are said to have been very satisfactory, and calculations were made according to which it would appear to be very economical to the city to remove excrementitious materials in this way.

THE AGES OF DARKNESS.—The ignorance which prevailed during the Middle Ages respecting the geography of the earth is surprising. The true orthodox system for more than ten centuries taught that the earth is a quadrangular plane extending 400 days' journey east and west, and exactly half as much north and south; that it is inclosed by mountains on which the sky rests; that one of these mountains on the north side, higher than the others, by intercepting the rays of the sun produces night; and that the plane of the earth is not set exactly horizontally, but with a little inclination from the north; hence the Euphrates, Tigris and other rivers running southward are rapid; but the Nile, having to run up hill, has necessarily a very slow current. It is important to state, however, that such vagaries were not believed by every one. There were, even in those dark times, a few superior minds that rose above the ignorance, superstition and ecclesiastical dogmatism of the age, and groped their way into a less murky light. But gross ignorance enshrouded the minds of the masses, and a horrible intellectual darkness prevailed, which was deeper than the pall of night. Advancing science has fortunately brought to us a better knowledge of nature.

NEW IMITATION SILVER ORNAMENTS.—In several stores in Munich various objects of art have lately been displayed, which are remarkable for their brilliant silver luster. It appears that they are mere plaster models covered with a thin coat of mica powder, which perfectly replaces the ordinary metallic substances. The mica plates are first cleaned and bleached by fire, boiled in hydrochloric acid, and washed and dried. The material is then finely powdered, sifted and mingled with collodion, which serves as a vehicle for applying the compound with a paint brush. The objects thus prepared can be washed in water, and are not liable to be injured by sulphuretted gases or dust. The collodion adheres perfectly to glass, porcelain, wood, metal, or papier mache. The mica can be easily tinted in different colors, thus adding to the beauty of the ornamentation.

Purification of the More Easily Fusible Metals by Filtration.

If the substance of which a filter is composed has no attraction for the particles of the liquid to be filtered—i. e., is not wetted by it, the interstices of the filter do not act like capillary tubes, and the liquid will not pass through.

Mercury will not run through a very fine sieve of iron or copper wire unless the wire is amalgamated. If the wire be amalgamated, although the meshes be very fine, the mercury will pass through, easily, while any pieces of iron, copper or amalgam will be retained on the filter. Lampadius, formerly Professor of metallurgy in Freiberg, has attempted to make use of this principle in purifying easily fusible metals, and with what success the following will show: Tinned sheet iron, as thin as paper, was cut into strips six inches long and four inches wide. Five hundred of these were placed face to face and fastened in an iron frame, with wedges driven in to bring them closely together. This frame was lifted into the bottom of a graphite crucible. Some impure Bohemian tin was melted in another crucible, and allowed to cool until crystals began to form on the surface, when it was dipped into the filtering crucible. The tin which was still fluid, ran through almost chemically pure, while a pasty magma remained on the filter, which contained iron, arsenic and copper chemically combined with tin.

SULPHUR AS A FIRE EXTINGUISHER.—*Les Mondes* suggests that brimstone should be carried on board every ship for use in case of fire. Half a hundred weight (30 kilos.) of brimstone would be sufficient to abstract the whole of the oxygen from 3,531 cubic feet of air, thus rendering it unfit to support combustion. In a closed space, like a ship's hold, the sulphurone gas produced by the burning of the brimstone would penetrate where water from the decks could not be brought to bear, and the density of the gas would prevent its rising or spreading if care were taken to close the hatches with wet sails, etc. It is suggested that the brimstone should be made up in the form of large matches, the ends of which could be passed through scuttles prepared for them in the decks or bulkheads in case of need. It is asserted that \$4 or \$5 worth of brimstone would be sufficient to stifle and annihilate all traces of combustion in an air space of 35,000 cubic feet.

In connection with the above we may remark that chloroform vapor has been lately found by a chemist in Antwerp to act with great rapidity in extinguishing the flame of the vapor of petroleum. Combustible gases mixed with chloroform vapor immediately lose their explosive properties, and even their combustibility. It is suggested that chloroform might be advantageously employed upon a large scale for extinguishing fires in petroleum stores and on board ship.

A SIMPLE GLYCERINE THERMOMETER.—This instrument, suggested by A. Jaksoh, of Bohemia, is made as follows: An ounce bottle is two-thirds filled with glycerine of any desired color, and the bottle placed in a freezing mixture of sal-ammoniac, saltpetre, and water, so as to cool the liquid to 32°F. A glass tube twelve to fifteen inches long is passed through a good fitting cork, so as to dip nearly an inch into the glycerine. The cork is inserted in the bottle and rendered air-tight with sealing wax or a cement of varnish and chalk, and the thermometer is then ready to be graduated. On inserting the cork, the liquid rises in the tube a few inches. The bottle is placed in melting ice, and the level of the liquid marked 32°, if the scale is to be Fahrenheit's. It is next placed in warm water, say at 132°, and this point marked. The space between these points is divided into one hundred equal parts, and this division carried down to the Fahrenheit zero, and upward to the top of the tube.

NEW PROCESS OF GILDING ON GLASS.—Prof. Schwarzenbach, of Berne, has recently devised the following new method of gilding on glass: Pure chloride of gold is dissolved in water. The solution is filtered and diluted until, in twenty quarts of water, but fifteen grains of gold is contained. It is then rendered alkaline by the addition of soda. In order to reduce the gold chloride, alcohol saturated with marsh gas and diluted with its own volume of water is used. The reaction which ensues results in the deposition of metallic gold and the neutralization of the hydrochloric acid by the soda. In practice, to gild a plate of glass, the object is first cleaned and placed above a second plate slightly larger, a space of about one-tenth of an inch separating the two. Into this space the alkali solution is poured, the reducing agent being added immediately before use. After two or three hours repose the gilding is solidly fixed, when the plate may be removed and washed.

NITRO-GLYCERINE.—Professor Mowbray, in a recent lecture before the Stevens Institute of Technology, on the subject of explosives, stated that nitro-glycerine is now largely made from the fatty waste of stearine and soap factories. Its density, which is 1.6, water being 1, enables it to exercise its tremendous force; for, in a given bulk, there is 60 per cent. more gaseous matter than would be contained in it were it only of the density of water.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

BUTTE.

KENT BAR MINING CLAIM.—Oroville *Mercury*, May 7: We learn from Deputy Sheriff Stevens that extensive preparations are being made for mining in this claim during the coming season. The long spell of dry weather, it is thought, will make the river low enough to mine any part of it without serious trouble before the winter rains come again. A large number of men will be employed. Prospects have revealed the fact that the claim is full of good pay dirt, and the owners are confident of taking out something handsome. This is only one of a number of like enterprises that will be undertaken during the coming season.

CAVED ON.—One day last week, as William O'Connell was working in the mines at Cherokee Flat, in this county, he was caved on and one of his legs broken in two places, and the other in one, besides which he received internal injuries that were thought to be fatal. Last Friday he was brought to town and sent below to the Bay where he will become an inmate of St. Mary's hospital.

CALAVERAS.

REN HILL.—Calaveras *Chronicle*, May 8: The work of washing up the tailings, at the Red Hill hydraulic, is completed, and piping gravel commenced last Tuesday. The mine is now in first-rate order for working to good advantage, and operations will be pushed energetically forward as long as the necessary amount of water can be obtained.

IRON ROCK STRAOK.—The pay chute has been struck in the 100-ft east level of the San Bruno mine at Mosquito gulch. The rich ore was uncovered twenty ft from the shaft. The ledge shows about its usual thickness—two ft. Stopping will be commenced as soon as the level is driven far enough ahead to admit of it.

RELOCATED.—We learn that parties have relocated the old What Cheer claim, in Chili gulch, and are making preparations for working it. A good deal of money has been expended on the mine in days past, but the ground has not yet been thoroughly prospected. There is considerable water to contend with in working the claim—so much that machinery will be necessary to keep it out. The What Cheer is located on the "blue lead," a channel that can only be reached by sinking a shaft or running an incline. The present locators of the ground, however, will have nothing to do but to put up machinery; free the old works of water and go to taking out gravel. Former owners of the mine ran an incline that a little repairing will put in good condition. The new enterprise has good prospects of success.

THE PIONEER CHIEF.—Calaveras *Citizen*, May 8: During the past week a party of Eastern capitalists have visited San Andreas and examined Sheriff Thorn's quartz mine, described in his U. S. patent as the "Pioneer Chief," with a view to negotiating a purchase. After a thorough examination of the mine they expressed themselves highly gratified with the results obtained from prospecting as well as with the location of and general appearance of the lode. There is no doubt in regard as to the genuineness of the lead. It is a true and rich vein, and when properly developed will prove one of the best paying mines in the State.

FRESNO.

THAT QUARTZ MINE.—Fresno *Expositor*, May 10: Last week we mentioned that Messrs. Jensen & Keyes were about to erect a four-stamp water power mill, on a quartz lode on the Rose-lawn farm. Since then we have learned from Thomas Whitlock some additional particulars regarding the mine. The ledge has been prospected by means of an inclined shaft, following the slope of the ledge, to a depth of thirty feet. At that depth the ledge has attained a width of three feet. The walls of the ledge are well defined. The gold is fine, hardly perceptible to the naked eye, and seems generally diffused through the ore. Several small lots have been tested by working process, and found to yield handsomely. The ledge has been traced some miles, and several claims have been located on it. Messrs. Cartwright & Smith own one of the most extensive claims, and they have made some very satisfactory discoveries.

INYO.

PANAMINT MINING ITEMS.—Panamint *News*, May 4: We called on Captain Bell yesterday morning to interview him in regard to mill and other matters and found him more enthusiastic than ever over the bright prospects for Panamint, since his return from San Francisco. He says the work on the twenty-stamp mill will be driven ahead as fast as possible, and as soon as this one is running, work on the lower mill will commence. The lower mill will be supplied with a Bruckner revolving cylinder, or roaster. When this is done the company will immediately commence the erection of a sixty-stamp dry crushing mill, with two Statefeldt furnaces, on their mill-site on Stewart's Wonder Point, just above the Jacob's mill. The company have secured the right for the Statefeldt in Panamint and Rose Spring districts. They have also given orders for the manufacture of five hundred thousand bricks, instead of two hundred thousand, as first determined upon. It will be seen by the extent of the above operations by

the company, that a large number of men will be needed, and Captain Bell authorizes us to say that good carpenters and millwrights can now find employment, at good wages, for several months to come. In addition thereto the company will, in about ten days, put a large number of miners to work in their mines, taking out ore. The Captain is now engaged in setting four immense boilers for the upper mill, and will soon have things in such shape that a large number of bricklayers can be worked advantageously.

SUNNYSIDE.—Among the mines that will soon occupy a prominent position with the best of those in this district, we note particularly the Sunnyside, situated in the same mountain ridge as that of the celebrated Jacob's Wonder, but being some 500 feet lower down, running parallel to and beginning at the southwest end of that mine. The vein is well defined and shows in no place a width of less than four feet, all the croppings showing ore of a high grade. The ore chute of this mine is the longest of any we have seen in this district. The mine is owned by James F. Ward, of Los Angeles, an old, experienced prospector and miner, who has made his wealth by legitimate mining.

THE SUNRISE MILL AND MINING COMPANY.—Having commenced work but four or five days ago, in sinking a well for water on their mill site, have succeeded in striking a fine body already. Work in clearing and otherwise preparing the ground progresses rapidly. Their machinery and lumber are expected to commence to arrive at any day, and it would not surprise us to see this company turn out the first bar of bullion in Panamint.

DARWIN DISTRICT ITEMS.—Cor. Inyo *Independent*, May 8: Since my last items to you there have been several changes of ownership in some of our most prominent mines. Mr. C. E. Hoffman, of Santa Clara, has bought the "Lucky Jim," and Mr. G. D. Roberts, of San Francisco, has bought Bill Gill's interest in the "Christmas Gift." Mr. Roberts is now one of the largest mine owners in this district. I understand that the intention of these parties is to commence developing their mines immediately, and that Mr. Hoffman will return here in two or three weeks, for the purpose of building a furnace. Mr. H. is a gentleman of long experience in the furnace business, both in this country and Europe, and I think from his actions while here that he means business. Being a practical assayer, he has sampled and assayed ore from most of the mines in the district, and is well satisfied with the result.

MODOC.

NEW MINES.—Modoc *Independent*, May 1: Considerable excitement prevails in Surprise over the newly discovered mines. The ledge is situated in the Surprise valley range of mountains and an easterly direction from Dorrisville. Some of the ore has been sent below for a test, and it is from the favorable reports recently received the excitement began. Many locations have been made along the croppings for about ten miles. Every test so far made is of the most flattering character. New locations are being made every day and many are now sanguine of developing rich mines in Modoc county.

MONTEREY.

QUICKSILVER.—Salinas *City Index*, May 1: Another quicksilver mine has been discovered in this county. It was found by B. F. Dillard, of this city, one day last week. It is located in the mountains, about six miles south of this city, and is said to be rich. The specimen looked like the pure stuff.

NEVADA.

GASTON RIDGE.—Nevada *Transcript*, May 8: A. J. Pelham & Co., who for the last six or eight months have been running a tunnel on the old Gaston Ridge mine, about six miles above Washington, and about the same distance from Eureka South, were rewarded on Friday last by striking a splendid ledge of very rich rock, which, according to the judgment of experts, will pay \$200 per ton. Many years ago this mine was worked somewhat extensively and a chute of very rich rock followed several hundred feet. This rock was milled in the old California mill, which being destroyed by fire about the same time the pay chute of rock pitched below the water level, work was suspended and owing to disputes in the company, was never resumed till Mr. Pelham and the present company purchased it, when they immediately started a tunnel about 125 ft lower than the old works, upon which they have been steadily employed ever since. They have now tapped the ledge over a hundred feet deeper than the old works, and the presumption is that they have at least 100 ft of rich "bocks," between this point and the bottom of the old works.

NEBRASKA MINE.—The Wood brothers have been for a year or more prospecting in the Nebraska mine, with the view of striking the ancient river channel which runs through on the east side of Sugar Loaf mountain. We understand they have at last found it, and the gravel is very rich. They have labored under very discouraging circumstances, such as would have made less resolute persons abandon the enterprise long ago. They are deserving of success, and from all we can learn, they are sure of it now. The success in this mine will encourage others located on the channel to persevere until there is a succession of mines all along where the channel is known to run between Sugar Loaf and Cement hill.

HOWARD HILL.—Foothill *Tidings*, May 8: The work of pumping out this mine has been

going on for some time and we understand is expected to be completed early next week, when regular mining operations will begin.

THE HARRINGTON GRAVEL MINING COMPANY, whose property is on Alta Hill, adjoining the Picayune mine, have their tunnel retimbered and will soon be driving ahead again. They expect to reach the channel with about 200 feet of tunnel. Those well posted on gravel think this a splendid property.

NEW YORK HILL.—Things at this mine are fast assuming shape. The building over the new hoisting works is completed, most of the machinery is set and it is expected that connections will be made so that steam will be raised on Tuesday or Wednesday next.

BUCKHAM MINE.—This mine is located southwest from Grass Valley, near Bear river. The location was made years ago and the ledge has been worked with good success. The rock had to be hauled to Grass Valley in order to have it tested, and it has been worked through two or three different mills, in different lots. The ore has paid all the way from \$15 to \$29 per ton, by mill process, and without estimating sulphurets. The average of all the ore worked has been something over \$20 a ton. The ledge averages over two feet in thickness, and has been tested to the depth of ninety feet. A letter from J. G. Worthington, received yesterday from the Buckham mine, states that the rock is improving rapidly in the shaft, showing free gold (a thing that has seldom been seen in the rock which has been worked) and plenty of sulphurets. The mine only needs a mill on it to prove a success. This thing of hauling quartz from ten to fifteen miles is not economy. The owners are men without capital and they would like to arrange for a mill. They can show the certified figures for the yield of the rock, and from the best and most careful mill men in this district.

PLACER.

GREENE MINE.—Placer *Argus*, May 8: The Greene mine cleaned up this week about \$7,000 from a run of 35 days. The rock crashed averaging a little over \$21 to the ton. This mine is in excellent running order, the machinery being complete and of the most approved patterns. Mr. Greene, the superintendent, informs us that the prospects are flattering. New chutes are being developed that promise rich pay.

THE ST. PATRICK cleaned up \$5,000 from 300 tons of rock. The 440, 360 and 212-ft levels are looking well and improving, with every indication of producing abundant rich rock. This mine has more than paid expenses this month, and the prospects are that it will continue in the future, as it has in the past, to be a paying one, at least this is the determination of the present superintendent, who thoroughly understands his business.

THE GOOD FRIDAY mine, under the indefatigable exertions of its present superintendent, J. M. Bryan, has been rewarded by striking very rich rock, where gold predominates. The future prospects of this mine are very flattering.

THE ST. LAWRENCE mill and mining company have on hand over 100 tons of rock, from which they expect handsome returns. They started up their mill on Thursday.

THE HOTELS are crowded, many miners are prospecting, and everything looks prosperous and encouraging in the Ophir district.

FURTHER COAL DISCOVERIES.—H. Stone showed as a specimen of Cannel coal, the surface croppings of a vein discovered by Mr. Crombie, about ten miles from here near Wolf creek. Mr. Stone, who is thoroughly posted on coal, pronounces it superior, he thinks, to that taken out at Lincoln in this county, although he has not given it a practical test. The extent of the vein is unknown, but the discoverer expects to find it in paying quantities.

GOOD RUN.—Placer *Herald*, May 8: The Enterprise hydraulic mining company, of Iowa hill, in which our townsman, Judge Spear, we believe, is largely interested, cleaned up about a week ago, after a nine days' run, about \$2,000. This is something over \$200 per day, which, when we consider the almost everlasting character of these mines, is very good indeed, and indicates plainly, we think, the great wealth that district will produce as soon as the arrangements for water supply are perfected. The Iowa Hill canal is now near enough completed to bring in quite a large supply of water, but owing to an accident that occurred to the main reservoir this last winter, they have not been able to turn this water to full account. This accident is, we learn, about repaired. It is estimated that with plenty of water this district is capable of turning out \$300,000 a year, at least.

THE JULIAN mine at Jenny Liud Flat, below Newcastle, is running steadily, with good results. It is one of the substantial mines of the county, and is opened up in such shape that rock is taken out fast enough to keep its 20-stamp mill running continually. About thirty men are employed in and about the mine, and for several months the mill has never been stopped, only to clean up. The average daily crushing is about twenty-five tons, and the average yield of the rock is about ten dollars. The ledge maintains an average width of about four feet. This mine is the property of C. H. Schnabel.

THE AUBURN gravel mining and ditch company are driving the work on their new ditch in a lively manner. The main ditch is far advanced, and the small ditch, in which the large twenty-two-inch pipe is to be laid, is almost completed, and the work of laying the pipe on the ground has commenced. The tunnel on the line of the new ditch is in something over fifty feet.

PLUMAS.

SOLD OUT.—Plumas *National*, May 8: We learn that the Hallsted Brothers have recently disposed of their mining claims at Kingsbury Ferry, above 12-mile bar, the East Branch mining company purchasing, for the sum \$10,000. The ranch, houses, etc., were a part in the sale. The new company propose to pipe the water from Kingsbury's creek across the river and raise it to a sufficient height to obtain pressure for their giants, and if report is correct this can be done at a small expense, compared with some of the water projects now operation in this county. The claims are known to be rich and extensive, and the investment promises to be a paying one.

MINTO ITEMS.—The North Fork company are cleaning up and the results are astonishing the owners. One box yielded over fifty ounces. An extract from a letter from Dm hill says: "The yield surpasses our most sanguine expectations. Gold, gold everywhere. Pierson & Winter are still making big wag in their gravel claim under the bluff, in Nelson, and the claim promises to be extensive."

BIO STRIKE AT GIBSONVILLE.—"Shep," La Porte mail carrier, informs us that the Union company, whose claims are located by Gibsonville, have recently struck it rich and the best part is, it proves the existence of the big blue lead under the main ridge, a will cause the owners of the adjoining claim to drive ahead their works, with a certainty being rewarded for their toil. The Union company washed up fifty-three ounces from car-loads. There are sixteen shares in the claim, and the owners are jubilant, feeling certain of a fortune. The chances are now favorable for Gibsonville to regain all its lost gold and come back to the lively time of two years ago. The owners in the Union are entitled to credit for their perseverance, having run their main tunnel over 3,000 ft, and that, without being positive that they would pay. We hope the strike may make rich many of all of them.

SANTA CRUZ.

FIAT CLAY.—Santa Cruz *Sentinel*, May 8: It has been whispered here that very large body of fine clay, suitable for making fire brick, has been discovered on the Chonero ranch east of the San Lorenzo river. Parties are now negotiating to commence manufacture of fire brick. The clay is similar to that found at the Mount Savage iron works near Cumberland, Md.

BLUE CLAY.—Last week we noted the discovery of a large body of bi-carbonate of lime on the Dodero farm and below Mrs. Major's house. This week, we are informed that inexhaustible body of the Benicia blue (necessary in the manufacture of cement), has been discovered in Week's leegoon, west of Blackburn's orchard and in Corcoran's lagoon on the line of the Santa Cruz and Pajaro road. Now let the old Major's mill be at or utilized to grind the cement. Firewood burn the cement can be procured and delivered at the mill for \$3.50 per cord, and probably at \$3 when the San Lorenzo railroad is completed. Staves for barrels, headings, hoops, etc., can be procured in the woods within five miles of the works. This new branch of business will, in time, give thousands men employment in this county.

SIERRA.

NORTH FORK.—Mountain *Messenger*, May 7: The North Fork company have gravel in the tunnel. The gravel prospects in fine gold are getting coarser as they go ahead.

BONDED.—The Bald Mountain company have bonded their mine for a large sum. It is said the buyers will get a very valuable property.

It is said that the South Fork company has struck gravel in their tunnel.

YIELD.—The Empire company, of Monte Cristo, took out 115 ounces of gold for the day's run with nine men in April. This is equal to about fifteen dollars per day to the men. The company are unable to work more men want of water.

NUCKET.—A nugget weighing over \$1,000 was taken out of the Bald Mountain claim on Monday last week. The night foreman, during the shift one night recently, took out thirty ounces with his candlestick. Hard to be beat.

SISKIYOU.

IRON AND COAL.—Yreka *Journal*, May 5: One of the greatest advantages of a railroad to the Siskiyou county would be the development of extensive iron mines in various parts of the county, a probably coal mines. While all the mountains on the west side of Shasta valley contain quartz, nearly all the mountains on the east side contain iron and coal. Mount Shasta itself is a great iron mountain, and no doubt contains much coal, but it is useless to work without a railroad to transport the ore to smelting works. Out at the Oregon elbow north of town, is also a well developed iron mine, of as handsome ore as a person would desire, and all over the flats around this town can be found any quantity of kidney ore, which is the very best quality of iron. If that Eastern company puts up the proposed smelting works at Sacramento, and the railroad is tended to this county, the iron fields of this section could supply it with raw material generations to come.

In this vicinity are vast tracts of mine land that could be taken up by the settlers in twenty-acre blocks, and patented for mining purposes; which land besides being used for mining purposes could be used as a homestead and farm. There are thousands of acres of this kind of land in all the mining districts

the county, very little of which is occupied, and if ditches or artesian wells could be built, furnish water every man settling on such land in many places could secure a good mining claim and farm combined. Quartz claims could be taken up with a similar privilege, though the locator would not be as liable to ad good soil covering quartz claims as often over placer diggings.

AN BENITO.

Moaz QUICKSILVER.—San Benito Advance, May 8: The quicksilver developments near the head of Cholame valley are very promising. R. Pitte, who is working in connection with the San Francisco mining company, has already excavated a pile of ore valued at over \$100,000. Messrs. Lee & Spencer are very much encouraged by the rich assays made from the corries, a mine which promises to be as rich as cinabar as any in the State.

UOLUMNE.

NEW ALBANY MINE.—Union Democrat, May 8: The owners of the New Albany mine are engaged in constructing a ditch and flume two miles in length, to bring water to the mine for filling purposes. There is a force of twenty men at work. It will be pushed forward as fast as it can be and the lumber required is secured and furnished. The mine is developed enough to justify the erection of extensive works; no time will be lost in getting up a mill of other improvements to put it in proper working condition. Dr. Walker, the superintendent, has first found there is a mine before making expenditures for machinery and appliances.

QUICKSILVER has been talked about this week. Ore claims were recorded in the Marsh Flat section, and Jack Knowles came down from the mountains with some specimens he took near the summit of the Sierra. He went through the snow, found the vein, traced some 1500 feet. Parties from the other side reported to have been over but were unsuccessful in finding it. When the weather allowed snow will permit, thorough explorations will be made, and if cinabar in paying quantities is lying in the mountains, it can hardly escape being found this summer. There is much faith with those engaged in prospecting Marsh's Flat that something valuable will be developed there.

TRINITY.

STUBBORN IT GOOD.—Trinity Journal, May 8: The Bowermen was in town this week and learned that Muncey & Reed have opened a claim on Buckeye creek, at the mouth of Dutch John, which is paying them well. Water is scarce, they work it by shoveling into all boxes, and in this way they realized an average of a day to the hand last week. On Wednesday last they picked up a nugget weighing nearly \$200. Such items are particularly interesting these dry times.

FROM CINNABAR.—Under date of May 2, our faithful Cinnabar correspondent furnishes the following interesting and cheering intelligence: "Butler & Hawlett are working in their second level, and have richer ore than they have heretofore worked, the ore seeming to get better as they go down and the stringer wider. The stringer at the present time is from 16 to 18 ft in width. They are opening three breasts and expect to be able to keep their retorts running day and night. They are taking out, from their retorts, from five to six tanks of quicksilver daily. Butler & Worland are getting very rich ore out of their shaft, and as soon as they get their furnace completed expect to take out quicksilver in paying quantities."

CLARE.

BUALHIGH DRILL.—Visalia Delta, May 8: We learn that Mr. Brown, the superintendent of the New England mining and smelting company, is about to introduce the Burleigh drill the Mineral King mines. "It is to be employed in running a tunnel from the bed of the wet fork with a view of tapping all the principal leads of the district, in all of which this company possesses more or less interest. The machinery is to be worked, we believe, by hydraulic power."

Nevada.

ASHOE DISTRICT.

CALIFORNIA.—Gold Hill News, May 6: All the cross-cuts eastward on the 1500-ft level are being steadily advanced with the exception of Nos. 1 and 2, there being no material change in the report of them. Sinking the winze from the 1400 to connect with the 1600-ft level is making steady progress, the bottom still in ore. **OPHIE.**—There is no change of material value either the look or yield of the ore stopes on the 1465-ft level. The northeast winze on the 65 ft level has been sunk to the depth of 85 ft the bottom still in good ore.

CONSOLIDATED VIRGINIA.—The joint prospecting cross-cuts on the 1300 and 1400-ft levels are steadily advancing, without change of interest to record. Work has not yet been resumed on the 1550-ft level. Everything in and out the mine is working finely, and its future looks more prosperous than ever.

BULLION.—The quartz and ore in the face of a drift on the 1700-ft level of the Imperial shaft is of a very solid and encouraging character. The further the drift is driven the more settled becomes the conviction that the ledge at this point is large and well defined and of a most promising character. The quartz body on the 800-ft level continues to develop rapidly, but as yet affords no bodies of paying ore.

CROWN POINT.—Daily yield, 550 to 600 tons ore. The ore breasts throughout the mine are looking finely, and show no signs

whatever of giving out. Prospecting the 1600 and 1700-ft levels is still vigorously prosecuted, with some favorable indications of ore developments ahead on the 1600-ft level.

HALE & NOBACROSS.—The steady and persistent prospecting of the 2100-ft has developed nothing new during the past week. The cross-cutting of this level has been very thorough, and although considerable quantities of quartz have been encountered no paying bodies of ore have been found. Preparations are now being completed for sinking the main incline 200 ft deeper, at which point the ledge will be again cross-cut and prospected.

SIZAAA NEVADA.—Sinking the old shaft is making the usual good progress, the rock in the bottom working soft and favorable. Driving the east drift on the 700-ft level is making steady progress, the face still in a very encouraging character of ledge material.

BELCHER.—The water is being rapidly drained from the main incline, so that work can be again resumed on the 1500-ft level in a very few days more. The north and middle winzes from the 1400-ft level will reach the 1500-ft level in a day or two more, the bottoms of both being still in ore. Daily yield, 450 tons of ore. The ore stopes are all looking well throughout the mine.

EUROPA.—The quartz in the face of the drift or cross-cut east from the winze, 113 ft below the adit level, continues of the most favorable character. It is low-grade ore, but there is a good solid body of it, and valuable deposits of ore may be looked for before long.

CHOLLAR-POWELL.—Sinking the main incline is resumed, and is making good progress. The main south drift on the 1500-ft level is at a distance of 420 ft, the face in porphyry. The main south drift on the 1150-ft level is in 250 ft, the face also in soft porphyry. Daily yield, 36 to 40 tons of ore from the old upper levels, the assay value of which is \$28 per ton.

ORIGINAL GOLD HILL.—This mine is at the present time looking better than ever before. The air-pipe just introduced throughout the north drift, at the 340-ft level, gives good ventilation and excellent facility for driving ahead. A second cross-cut from the south drift is being made into the ore body, and shows very good milling ore. The new ore dump is about completed.

SURRO.—The rock in the face of the main west tunnel, which has been very hard for the past three weeks, is gradually softening, and shows evident indications of a near approach to the ledge.

AMAZON.—The shaft is sunk and thoroughly timbered to the depth of 96 feet. This shaft is being sunk at the foot of the mountain, 100 ft below the surface cropping of the ledge, so that a drift started at the 100-ft station will cut the ore vein at a depth of 200 ft below the surface and will open the mine at a depth of 100 ft below the bottom of the old works.

LEO.—Sinking the winze below the main east tunnel level is progressing at the rate of two feet per day. The vein matter shows a steady improvement, the clay being of a deeper blue color and the quartz of the white Comstock character, with occasional seams of ore showing free gold.

GOLIN & CURRY.—The new pumping machinery is all working splendidly, and the water has been drained to the 1700-ft level, at which point work has been again resumed in the north drift, which will connect, in a distance of about 80 ft more, with the south drift from the Best & Belcher winze. Burleigh drills, driven by compressed air, are used in the face of the drift, and good progress is being made.

SAVAGE.—The steam was turned on the new incline hoisting and pumping engine day before yesterday, everything working as smooth and perfect as it was possible to have it.

JULIA.—Sinking the main shaft is making fine headway; the Burleigh drills working well, and the rock in the bottom blasting splendidly. Driving the main south drift on the 1000-ft level is making steady headway.

NIAGARA.—Sinking the shaft is making splendid progress, following the foot-wall of the ledge, occasionally cutting bunches of excellent ore.

BUCKEYE.—The east cross-cut on the 550-ft level has reached the east wall of the ledge, and is stopped for the present without finding any milling bodies of ore. A drift has been started to the northward on a streak of quartz cut in this drift, the streak gradually widening from one to four feet as the drift progresses, the whole vein being ore that will assay from \$12 to \$30 per ton.

BEST & BELCHER.—Driving the main south drift from the bottom of the winze on the 1700-ft level, to connect with the north drift from the Gould & Curry shaft, is making good progress, the Burleigh drills used in the face doing good execution.

BALTIMORE AND AMERICAN FLAT.—The cross-cuts on the 700-ft level are showing a decided improvement in the quality of the ledge material penetrated. The cross-cut on the 850-ft level are also showing improvement.

YELLOW JACKET.—Driving east toward the ledge on the 1840-ft level is making excellent progress. The drift is now in a distance of 100 ft, and will have about 80 ft to run to reach the ore vein.

SILVER HILL.—The water has been drained and sinking the shaft resumed, the sinking making excellent headway. The new pumping machinery is all working finely.

LADY BRYAN.—The water is drained to the 380-ft level, and will now, soon be sufficiently overcome to admit of a resumption of work on that level.

SOUTH COMSTOCK.—Shaft now down 173 ft, and sinking in ledge matter, with quartz which gives fair assays. Milling ore is evidently not far off.

DATTON.—Building the mason work for the engine beds, and putting in the anchor and engine bolts, has made good headway during the past week.

IMPERIAL-EMPIRE.—The east cross-cut on the 2000-ft level has cut through the clay wall and is showing much more favorable indications than for some time past. Sinking the main incline is making steady progress.

LADY WASHINGTON.—Grading for the heavy new machinery is getting along finely, the excavations for the foundations of the pump engine and bob being nearly completed. The mason work will be commenced next week.

PHIL. SHERMAN.—The rock in the face of the main west drift works softer and better, and more clay and quartz seams are coming in. Quite a promising and important change seems to be taking place.

MEXICAN.—A chamber is being opened in the north drift on the 1465 ft level for the purpose of commencing to sink a winze on the ore body recently developed at that point.

CORNUCOPIA DISTRICT.

THE LEOPARD.—Cor. Virginia Enterprise, May 9: In speaking of the Leopard mine, a writer says: "This mine is certainly very rich, and will prove a good one after a time. They have the ledge in a tunnel at a depth of about 150 ft, and it certainly looks splendidly. It is the only mine at present which is taking out ore. There are several other mines prospecting. What is wanted now is another mill with a large run of stamps. The one we have is only a ten-stamp mill, and it is kept constantly at work, crushing Leopard ore. The consequence is outsiders have no opportunity of crushing rock. Another drawback is the scarcity of wood. There is none nearer than 17 miles. The mill is compelled to burn sage-brush for fuel. From what I have seen of this section, I think it is a very good place to prospect in. Almost every mountain is covered with quartz, and now is the time to prospect, as the snow is all off the mountains."

Idaho.

NEW MINES—OWYHEE.—The Owyhee Avalanche, of May 4, referring to the newly discovered placer diggings at Wagon town, ten miles below Silver City, says: The hills in which the precious metal has been discovered are a short distance from Tom Wall's house, and the belt of ore is supposed to extend through to Trout creek, a distance of ten miles. Prospecting thus far has been attended with the most favorable results. J. B. Jones, hearing of the excitement yesterday, rode quietly down there, took a survey of the country at daylight this morning, and made up his mind to secure the water right. Two other parties were already en route to Silver on the same mission. Jones passed them on the road, making speed at the rate of twenty miles an hour, and got to the Recorder's office first, securing his title. Mr. Jones believes the diggings are worth a million dollars. If they continue to develop as they look thus far, active work will soon commence.

There are rumors on the street of a very rich and important strike which has been made within a day or two at the Pauper mine. The ore is entirely different from any yet seen in this camp, and bears a striking similarity in appearance to that of the great Comstock lode of Virginia, so much so that samples placed together cannot be distinguished from each other. Tests are being made, and the indications are that it will assay from \$250 to \$700 per ton.

Utah.

MINING MATTERS.—Reports from the eighty-six mining districts in Utah Territory are very favorable, considering the difficulties the miners have had to surmount in the way of late snows, slides, and high water. The settled weather is causing many to resume work on prospects which have been lying idle during the winter. The producing mines in several of the leading camps have been making their regular shipments to the mills and smelters, and have been increasing their facilities for more thorough developments. The outlook for greatly increased production over that of any previous year is very promising, and the yield of precious metals for 1875 may, the Salt Lake Tribune thinks, safely be set down at \$9,000,000.

HEATING IRON WIRE.—An anomalous and remarkable change takes place in the heating and cooling of iron wire. While the iron is first heated there is a sudden contraction or cooling; and so again, when the heat is cut off, the wire cools a little and then suddenly reheats and glows, afterwards quietly passing down to a blackness. Professor Barret, of the Royal Society, explains the notable points in the jerks or changes, by stating that the iron in the first instance loses its magnetism and in the last jerk or oscillation regains it.

DELICATE RADIOMETER.—At the last annual soiree of the Royal Society, Mr. Crooke exhibited some simple delicate radiometers. These consisted of a glass stem supporting a little four-bladed windmill, carrying four discs, one on each end of the four slender glass rays. These work horizontally, supported by a steel point on a small topaz, and the radiation of light from a common candle at some distance away suffices to make them rotate with great liveliness in a vacuum in a small glass globe.

Steam Launches.

Steam launches have become so much the rage in England within the past few years, and so many are built, that there is great competition among the marine engineers as to who can get the greatest amount of speed out of the smallest possible amount of machinery. The English builders have become very expert in this class of work, and are far ahead of our people. Boats are made now to attain a marvellous speed with so light a draft of water as to seem only to sit on top of it. Many of the water courses upon which these little craft are used are very shallow in places, but the long flat boats, with double propellers, overcome this obstacle readily.

Of course in such diminutive specimens of marine architecture as these little launches every inch of room is desirable, and therefore it is necessary to keep the boiler and engine in as compact a form as possible, so that there will be room for passengers. Moreover, as a high rate of speed is one of the requisites, considerable steam surface is wanted, which is hardly compatible with small boilers. The engines, too, must be small and compact, with as little gear as possible, and improvements are being constantly suggested to combine all the requirements of this class of boat building.

We notice in *Iron* a description of the latest of these improvements, in the shape of a very compact little engine to drive a single screw, the invention of P. W. Willans, of the factory of John Penn & Sons, marine engineers at Greenwich. It was built for a boat where, as usual, large cabin accommodation was wanted, and therefore the engine was wanted to set very far aft; so far back, indeed, as to render the use of the usual yacht engine impossible.

This little engine is constructed with three cylinders, and the only working parts are three pistons, three connecting rods, and a three-throw crank axle. These are enclosed in a cast-iron casing, so that nothing can be seen of the engine itself except the two ends of the axle wheel, which appear through the casing. The cylinders are placed side by side, and it is by a system of ports which connect the cylinders with the other, together with a peculiar construction of piston, that the piston of one cylinder acts as a slide, and admits steam to the next or third cylinder. All of these ports meet in a three way cock, and by turning this cock the direction of the steam is altered, and the engine is stopped or reversed with marvellous rapidity. It will thus be seen that all slides, eccentrics, link motion and other complicated reversing gear are done away with. There is no exposed machinery to catch the clothing of persons passing, no oil or grease flying about, and none of the other disadvantages which make steam engines in small boats disagreeable. Besides this, the engine is so simple that it is completely under the control of any one, and is so compact that it can be lifted in or out of the boat by two men; two men can also take it to pieces, examine it in every part, and put it together again in less than an hour.

The steam in the engine acts on one side of the piston only, and as the pressure is always downward the engine is almost noiseless. By means of a very simple arrangement the engine works expensively, and cuts off at five-eighths of the stroke. Though in the particular case described more than 380 revolutions were not required, it is stated that an engine of this kind has been constructed to run up to 1,000 revolutions, and at these great speeds, by allowing a small quantity of oil to remain in the bottom of the casing the lubrication of the working parts is perfect and such a thing as a hot bearing is unknown. The diameter of the cylinder of the engine under notice is seven inches, the stroke being the same, and with ninety pounds of steam and 380 revolutions the indicator card showed a little under forty horse power. The engine weighs 700 pounds, and is fitted on a boat fifty feet long and seven feet four inches beam. The preliminary trial showed a speed of thirteen miles in twenty-five minutes. As soon as the boat is in trim further trials will be made. However, the speed spoken of is well enough, provided the engine and all are out of the way, compact and light. People would rather have a little slower boat provided they could have more room and more comfortable quarters, with no smell of greasy machinery right in the center of the boat, in front of the cockpit. This engine itself is a new move in the right direction, by getting the machinery in a small space and well out of the way.

TIDE CALCULATING MACHINE.—At the last annual soiree of the Royal Society in London, Sir Wm. Thomson's tide calculating machine was exhibited and bore off the palm of the exhibition. By means of the first one observation of the rise and fall of the tides is made daily from the shore, and the facts so accumulated are the constants, and form the basis for setting the second or calculating machine, in which a continuous wire passes over a series of wheels placed at various distances, the result being that of harmonic motion of different periods and epochs by which the year's facts can be ground out by turning a handwheel, and recorded on the paper carrying drum.

A Great Hydraulic Claim.

A correspondent of the *Call* writes as follows from Cherokee Flat, Butte county, Cal.: Cherokee is located in one of the richest mining districts in Butte county, about twelve miles north of Oroville. The town is not remarkable for its elegant mansions, beautiful gardens and grand scenery, though there are some small orchards and a few fine gardens; but the general aspect of the place is barren, and the surrounding hills are barren and rocky. Everything speaks of mines and minerals. All depends upon the mines, and the wealth produced is in the shape of gold bricks. The whole industry of the place has to do with mining.

Spring Valley Canal and Mining Company.

The sources of water supply for this remarkable mine are Butte creek and the branches of Feather river, as well as the water-shed of Table mountain. Butte creek and the west branch of Feather river furnish the entire summer supply. The former is twenty-six miles in length from the head dam at Butte creek to the extensive reservoir at Concord valley; the ditch is five feet wide on the bottom by three feet deep. The ditch, in its course, crosses two streams or deep canons, by means of iron pipes thirty inches in diameter. The first is 1,064 feet in length, with a maximum depression of 150 feet. The second, crossing the west branch of Feather river, is 3,555 feet in length; maximum depression, 650 feet. It flows into the large reservoir at Concord valley, which covers 320 acres of land.

The Dewey ditch takes its water from the head of the west branch, up in the region of eternal snows, is eighteen miles in length, and serves as feeder for Butte creek ditch, into which it empties. From the great Concord reservoir the water is brought twelve miles in a large ditch six feet wide on the bottom by four feet deep; it again crosses the west branch of Feather river in a pipe of the same diameter as those mentioned—thirty inches—but with a maximum depression of 856 feet, which is believed to be the most severe hydraulic strain which engineers have attempted to control in any enterprise of this kind. The pipe of the water company at Virginia City, Nevada, has a depression of 750 feet, but being only eleven inches in diameter, falls short in aggregate pressure to the running foot. The pipe is nearly three miles in length; the heaviest iron used is three-eighths of an inch. It has a head of 180 feet perpendicular pressure, and its greatest capacity is 2,200 inches by actual measurement, or 37,445,760 gallons every twenty-four hours. The above represents the summer supply of the company. In addition to these extensive ditches and reservoirs, they have about forty miles of ditches ranging from two feet wide and eighteen inches deep to ten feet wide and four feet deep, which furnish the mines with a vast supply during the winter months—probably increasing the supply to 5,000 inches.

The Great Claim.

Butte county has its large claims, as well as large and extensive estates. The Spring Valley company claim between 250 and 300 acres of mining ground, averaging 100 feet in depth—enough of good paying ground for fifty years to come, at the present rate of working. This extensive mine has three openings.

Flumes.

They have three miles of triple line of flume, two of which are six feet in width and the other four. They are constructed so as to shut off the water, so they can clean up any portion of either at any time.

Undercurrents.

They have also in connection with the flume twenty-four undercurrents, ranging from six feet in width to thirty.

Hydraulic Chiefs.

They have nine hydraulic chiefs or giants, the streams from which are forced out under a pressure of 250 feet of water, and they are constructing a ditch which will give them a pressure of 302 feet. These giants under the former pressure with seven-inch nozzle will throw 1,000 inches of water; six-inch nozzle, 700 inches; five-inch nozzle, 500 inches. From the mouth of this powerful water gun is projected a stream of water which is as solid as a bar of steel as it leaves the mouth of the gun, and remains so for a distance of 200 feet, or until it impinges against the face of the bank. It is said by scientific men that its force is equal to about one-tenth the velocity of a cannon ball. There the great mass of auriferous gravel, good and bad, has to start on its path through the sluices, shafts, tunnels, undercurrents and flumes, downward toward the lovely valley of the Sacramento. Think of the faith of these men. They believed in the problem before them, and it took them years of hard labor and thousands of dollars to solve it.

Gold Production.

Since the 1st of August, 1874, the yield has been \$290,548.49. Running expenses during the same period, \$144,000. The company employ from 120 to 160 laborers, and pay their hands from \$65 per month to \$4 per day.

The Company's Farms.

The tailings flowing from the mines have flowed down the channel of Dry creek, and during the winter freshets have been washed out over the lands adjoining the same, and have damaged them to some extent, so they have adopted the wise policy of purchasing all the ranches through which the creek flows. They

have now in their possession some 12,000 acres, which have cost the company the sum of \$280,000. For farming purposes this land is the cream of the country, and they are now busily engaged in protecting the same by building substantial levees, which will protect the land from any future overflow.

Diamonds.

In addition to the product of gold, the mines of Cherokee yield diamonds and platinum. About fifty beautiful diamonds have been found, ranging from about one carat to three and a half. They have been pronounced by experienced lapidaries in Boston, Paris, and Amsterdam, as first rate stones, and many have been cut and set as gems. Mrs. General Bidwell, of Chico, has a very handsome one, weighing about two carats. The greater part of the stones possessed at Cherokee were found during the earlier days, when primitive modes of mining were in operation. The present system of hydraulic washing, with its immense streams of water and gravel, flowing away so rapidly, renders a search for precious stones impracticable. But in the black sands which gather in the bottom of sluices, tons of which are shovelled out in the process of cleaning up, may be seen with an ordinary magnifying glass, great numbers of perfectly formed diamonds, varying from merest mite to almost a pin-head in size.

Platinum.

Is found in considerable quantities, but no effort is made to save it; though it does not amalgamate, it affiliates with the gold amalgam, and is brought in that shape; small lots have been gathered from time to time. The company have a pound or two in the office.

Small Steam Engines.

The demand for small motors for driving printing presses, farm pumps, turning lathes, coffee mills, washing and sewing machines, for sawing wood and for many other uses in small shops and in dwellings and on farms is very great, and is rapidly increasing. The engines most in demand for such purposes may be rated at from one-half to a full horse power.

If some person would make such an engine and boiler, that could be sold at a reasonable price, large numbers could be sold; as they would be used by amateurs in or about residences. They should be as simple as possible. No money should be expended on them merely for show, such as planing or polishing parts which can be painted; but they should be strongly built, and special care should be taken to furnish ample boiler capacity, with strength sufficient to prevent accidents. Thinking persons are now convinced that much of our domestic labor can and should be done by power. It is a disgrace to our civilization that a woman should be compelled to break her back over a wash tub and board. Very few men would be willing to do the same work all day; and there is no reason why this operation, which is a combined chemical and mechanical process, should not be done by machinery; and so of many other domestic labors.

Twelve or fifteen years ago there was no manufacturer who was prepared to turn out small foot lathes neatly and compactly put together and at a reasonable price. Nearly all the foot lathes then in use were "home made," clumsy and hard working. Some one saw the need and set himself to work to devise a small, compact, easy going machine, to be operated by the foot. The result was a greatly increased demand, and neatly constructed foot lathes can now be had almost everywhere, and at prices which place them within the reach of every one. The same would follow the introduction at a low price of small, safe engines of the description alluded to at the outset of this article.

BUILDING A HOUSE IN EIGHT HOURS.—The rapidity with which American mechanics turn off work is a marvel to foreigners. This fact is true even when we leave out of the question the more general introduction of machinery for hand labor in American shops. We have a letter before us, just opened, as we write, from a French-speaking German, who is having a machine made in Paris, from the same drawings used in the construction of a similar machine in San Francisco, where he complains bitterly of the tardy progress made on account of the slow mode of manipulation there. The same is true of all European countries. Time there forms, comparatively, but a small factor, in turning out a job of work, while here it is a most important essential in all jobs or contracts. We are led to this remark on perusing the letter above referred to, just previous to our eye falling upon the following item from the *American Manufacturer*: Last year Dr. A. Mischler erected in Lancaster city, Pa., a two story brick house in ninety hours. He now proposes to build on the Centennial grounds in Philadelphia, next summer, a two-story brick house, 24 by 40 feet, in eight hours! He has arranged with Capt. Geisinger, of Reading, for the furnishing of the cornice and door and window caps, which will be of galvanized iron. The Captain will be allowed half an hour in which to put up the cornice, though he thinks he can do it in a quarter of an hour.

TUNNEL UNDER ST. BERNARD.—Another tunnel under the Alps is proposed. It will pass under the St. Bernard, and be 20,000 feet in length. The novel feature of this undertaking is that under the summit the tunnel will be widened out to make a station, and a shaft will be cut up, which passengers can be taken to a hotel on the top of the mountain.

Ancient Saws.

A writer in the *English Cyclopædia* says: "The division of wood by riving or splitting was probably the most ancient method of reducing it to pieces of convenient size and shape. If the grain of the timber were straight, this plan would have the advantage of economy; but as it is not so in general, considerable waste is occasioned by riving when the pieces are required to be straight, much wood having to be removed with an adze in order to make it so. Hence arose the invention of the saw." Saws were used by the ancient Egyptians. A saw resembling a table blade knife with a serrated edge was discovered, with several other carpenter's tools, in a private tomb at Thebes, and is now preserved in the British Museum. There is a curious picture among the remains discovered in Herculaneum, representing a carpenter's workshop, with two geni cutting a piece of wood with a frame-saw. On an altar preserved in the Capitoline Museum, in Rome, there is a representation of a bow-saw, exactly resembling in the frame and twisted cord those used by modern carpenters. This establishes the antiquity of the saw. Continental workmen to this day cling to the web-saw, with bow and twisted cord; whilst Englishmen and Americans use almost invariably the hand-saw for cross-cutting and ripping, and the back-saw for dovetail and tenon work. This is a striking instance of the difficulty of ridding ourselves from an inherited prejudice. A properly made hand-saw possesses many advantages to the artisan over the antiquated bow-saw, as may be seen in the manner of his work with one compared to that of the other. The bow-saw requires well balancing to keep it in the cut, and will only saw to the limited depth of the cross-beam; whereas a hand-saw is compact and well in hand, and will cut to any depth commensurate with the strength of the workman.

Each country excels in the manufacture of its favorite tool. Germany makes a web for piercing purposes so remarkably cheap that no one enquires or cares to ask how its fabrication is effected, and the mode of its production is unknown here. France has a high reputation for veneer-webs, mill and hillet-webs, and for small circular saws an inch or so in diameter, for cutting fine specimens of ivory and bone; also very thin circulars for sugar-cutting up to two feet that would sorely tax the skill of an English or American saw-maker to make. The French workman is great in little things, while large ones are apt to stagger him. He will make a ribbon saw that no other workman can equal; but he never makes a circular saw seven feet in diameter, such as are turned out at Sheffield.

The labor in making saw-handles has been greatly reduced by cutting out, planing, boring, and slitting by steam. This is an unhealthy branch of work, arising from the amount of fine sawdust which floats in the atmosphere of the handle-maker's rooms and is inhaled by the workmen at their work. There is scarcely a healthy looking saw-handle maker in the trade; yet few consider it but as a necessity, irremediable. Originally, in finishing a saw-handle, the edges were furnished with a hard bone and a small quantity of oil—a very fatiguing process; now they are almost universally either French-polished or varnished, which is a great protection to the grain of the wood. Fancy handles are made of ebony, mahogany, and other hard woods; but for general purposes beech wood steamed has been found to be the best.

IMPORTANT ENGINEERING WORK.—A great engineering work, the only one of the kind in France, is about to be executed at Lyons. It is that of an iron bridge to connect the plateau of Fourvières with that of the Croix-Rousse, which are two heights, like that of Montmartre, in Paris, at a distance of 300 metres from each other. This undertaking is estimated to cost about 2,800,000 francs, of which a subvention of 600,000 francs only is asked from the city. This aerial bridge will consist of three spans, the central one of 135 metres, and the two others of 70 metres each, resting on open iron columns, in a line with the houses on the quays. The platform of the bridge will be sixty-five metres above the road and nearly fifty metres above the houses. Each of the two central columns will have inside a lift by which pedestrians will be raised in two minutes, at a charge of ten centimes, to the top, whence they may reach the higher parts of the city, where they may have business. The only similar works existing in Europe are the Britannia Tubular bridge, in England, constructed by Robert Stephenson, in 1847, and consisting of one span of 539 feet and two smaller ones; that over the Conway, by the same engineer, of a stretch of 400 feet; and the bridge of Dirschau in Prussia, which has six sections of 129 metres each.

At the Gould & Curry mine the time necessary to complete the repairs to the shaft and pumping machinery, has been much greater than it was at first supposed that it would be, owing to the fact that all the old pump rods, water tanks and timbers were found to be more rotten than was supposed, necessitating their removal and the putting in of everything new, from the surface down. It is now expected that this work will be completed by Saturday next, ready to put all the machinery to work from the top to the bottom of the shaft.

Boise Basin.

Boise Basin, which at one time attained a almost world wide celebrity for the marvellous richness of its placer gold mines, is a circular depression in the southern extreme of an arm of the Salmon river range of mountains. Its surface is uneven, covered by a dense growth of pine, and traversed by numerous creeks, which empty themselves into Grimes creek, tributary of the Boise river, and the only outlet to the waters of the Basin. The Basin has a mean diameter of about 25 miles; and most of its numerous creeks and gulches were originally rich in gold. It was discovered by a prospecting party in the summer of 1862, and enormous quantities of gold, lying almost on the surface of the ground, and the wild and scarcely exaggerated stories set afloat concerning its richness, attracted to it the following year ten thousand or more people. And now a population greatly reduced in numbers, but quiet, law abiding and industrious, occupies the places of the adventurers and criminals of former times. The immensely rich surface deposits which gave to the basin its early celebrity have been worked out, and the principal mining is now done in the heavy gravel deposits in deep channels, probably little less auriferous than were the surface deposits originally mined, but vastly more difficult to work, and hence less remunerative to the miner.

As all very rich mining camps have to do Boise Basin has felt to the fullest extent the damaging depression of the necessary reaction from the feverish excitement of the flush times of '63, and has at last commenced a process of recuperation that will be lasting. The hill and great gravel beds of the basin have long been worked profitably, and attention is now being directed to our quartz ledges, many of which prospect as well that "old quartz miners," "metallurgists," "experts," and other humbugs discredit the facts until shown them, and even then seek to justify their preconceived notions by such unsensational assertions as the quartz worked is only found in "blow outs," or on the surface, or that at best the veins are narrow, and a thousand and one similar ridiculous objections. And these objections, groundless and absurd as they are, are too often coincided with by misanthropes among our citizens, who should, and really do know better. All of these prejudices will wear themselves out before much longer, and Boise and Alturas counties be regarded as the richest quartz fields on the Pacific coast. But time must work out this result just as it has worked out the change in the character of the people.

But even if it were possible for our quartz to prove valueless, there is still left in the beds of our creeks an inconceivable wealth of gold and on our hills an exhaustless supply of timber. This gold the ingenuity of man, spurred on by the greed of riches, will soon find means of extracting, and this timber the needs of Utah and Nevada already demand. A bed-rock flume, the feasibility of which competent engineers have already declared, will enable us to mine on the gold, give employment to hundreds of men and to commerce hundreds of millions of dollars now lying waste under our feet. And it will not be long before this bed rock flume will be put in.—*Idaho World.*

Extravagance in Buildings.

An Eastern paper calls attention to a result of the reckless extravagance in buildings, since the war, in the large number of empty stores and lofts on Broadway and other streets in New York. It says it is almost saddening to see so many elegant stores unoccupied; and adds, that there are hundreds of costly ornamental warehouses which no legitimate mercantile business can ever pay the rent upon in these days. It is customary to point to these buildings as proof of wealth and enterprise and prosperity; they show thrift, extravagance, and folly. Honest merchants, bankers, insurance companies, newspapers, cannot carry such enormous burdens of rent as such ornamental piles impose upon them, and thrive. The architectural mania had got the better of the public judgment.

What is true of New York is equally true of this and other cities, and indeed, the influence of the mania for extravagant show has not been confined alone to buildings in cities.

There is one good, however, that is derived from such extravagance; it makes work for those who push the saw and the plane, and distributes the money of the capitalists among those who are in need of it. Especially is this the case when extravagance is displayed in dwellings. People of small means should pay by the extravagantly furnished stores, and bestow their patronage on those of lesser pretensions, where they can buy the same goods at a less price. If the wealthy choose to pay for the luxury of extravagant stores, why let them do so, and more of their money will thereby find its way into the pockets of the needy. We don't object to extravagant stores and dwellings but we never patronize them—we can't afford it.

CARE OF A GRINDSTONE.—Do not allow a grindstone to stand in the water when not in use. Clean off all grease from tools before sharpening, as grease or oil destroys the grit. When you get a stone that suits your purposes send a sample to the dealer to select by; a half ounce sample is enough, and can be sent by mail.

BLACKFOOT, MONTANA, is terribly excited over the reported discoveries of quicksilver in large quantities in that region.

GOOD HEALTH.

Taking Cold.

If any considerate medical men wants to bring his name before the public, let him publish a series of sound rules for preventing those who will follow them from taking cold. No danger is more serious; there is none that physicians can do so very little to cure, except of course by regimen, of which the sufferers are impatient, and there is none against which the population of all classes is more reluctant to take precautions. They look upon colds as misfortunes which must come and which do not signify; and if urged to take precautions regard the adviser, even if a professional man, as slightly effeminate, or, as they express it, very much given "to coddling himself." It does not strike them that a cold wave kills as many people as a burst of cholera.

Because strong children survive a daily bath in cold water they think cold water "hardens" children in winter as well as summer; and because air and exercise are excellent things, they assume that fog is air, and a long walk in a drizzle beneficial. The very use of a thermometer to regulate the temperature of a room seems to be unknown in most houses, and you will see sedentary men sitting in a room for hours with a fire which brings the temperature up to seventy degrees, and then for hours more with the fire nearly out and the temperature at fifty-two degrees, or lower. They know, we suppose, that a sudden fall of eighteen degrees will kill off men of low vitality in hundreds; will give, perhaps, a third of mankind a "touch of the liver," and will inflict one-half the remainder on "influenza" nearly as annoying and almost as dangerous as fever; but once indoors they fail to realize their knowledge.

This contempt for the thermometer—the only trustworthy guide in fire-making—is positively perverse, and so is much of the popular notion about "hardening." For the average man or woman exposure to the weather may have a bracing or otherwise beneficial effect, but the loss is as great as the gain; and for the old, for children and for persons of low vitality, is probably greater. People will sit, not in the air, but in drafts of the bad kind, drafts for example such as come under badly fitting doors in railroad carriages, with the utmost indifference, and put themselves straight in front of a fire which would not draw if it were not constantly replenished by a stream of colder air.

The same ignorance governs much of the usual practice as to clothing. The anxious mother will protect her child's chest with a care which, if he is not consumptive and wears flannel, he does not want, and then let him run to school in shoes which, if they keep out the wet, do not when he is seated keep out the deadly chill arising from the thoroughly wetted sole. It is not water on the sole of the foot or anywhere which harms people, but the chill which the water induces, and which is as injurious through the sole of the foot as through the chest or loins.

We are not, of course, arguing that a man of ordinary health should be always watching the thermometer, or should attempt to live by rule, or should sacrifice to mere living the things without which life is worthless. But he might make his life more worthy as well as more comfortable by attending to a few broad rules for avoiding colds, which at present he habitually neglects, and which may be reduced to two easily remembered principles: The secret of temperature is even warmth, to be secured by clothing and regulated fires; and it is chill, not cold, general chill, or local chill, which encourages disease.—*Herald of Health.*

THE LESSER EVIL.—Dr. Hall advocates some rather startling ideas concerning cold air. He is most earnestly against cold bed chambers, which he says imperil health and invite fatal diseases. To this—giving a contrast of some fifty degrees between the temperature of the lungs and the air of the room—the writer ascribes frequent and fatal attacks of inflammation of the lungs, and concludes with the assertion (which will astonish some) that it is even safer to sleep in bad air all night with a temperature under fifty than in pure air with a temperature under forty. For the bad air may sicken you, but cannot kill you; while the cold can and does kill very often.

SELF-INDULGENCE.—The great foe of life is indulgence under one form or another. The letting down of the standard endangers the length of the course. To be safe one must be circumspect, prudent, rational, clear in judgment, firm in self control. To the command over his appetite a man will owe length of days; and not length of days only, not mere continuity, but that which gives to continuity, which makes prolonged existence something worthy of being called a "lease of life," and not a stretch of drowsy stupor. As vitality comes to the system it beats off its foes, and conquers one after another the advancing years.

CHLORINE GAS IN A NEW RELATION.—During the late cholera epidemic in Vienna, a remedy called camphorin was used with great success in the hospitals. It is prepared simply by passing chlorine gas into pure turpentine oil until saturated; it gives a thick, heavy, oily fluid, of brown color, with a strong smell of chlorine. This is freed from muriatic acid by washing with water. The remedy is applied by placing a portion in a fat vessel and holding it to the patient to inhale.—*Electric.*

Domestic Remedy for Nightmare.

Slight derangement of the digestive or other functions is often sufficient to occasion a temporary delirium in children, commencing during sleep and prolonged after waking. The suffering is great and the condition an alarming one to parents and friends. The mental excitement is so intense as to resist impressions from without to an extraordinary degree. It is here that the associations of smell can be used more effectively than any others to break up the morbid train. A good whiff of cologne almost always brings the little sufferer back to his ordinary world; or a little ammonia may be used. But an odor which is agreeable is probably more effective than the one which is merely pungent.

It is a common observation that mental associations are awakened by odors more than by the impressions of any other sense. In the case of nightmare the strong, familiar smell seems to break up the train of abnormal mental excitement.

It is not straying from the subject to ask if the associations of smell, such, for instance, as the odor of flowers, have ever been used tentatively in the treatment of the insane.

REMEDIES FOR COLDS.—The severest catarrhal cold can be removed in about ten hours by a mixture of carbolic acid, ten drops, tincture of iodine and chloroform, 7-5 drops. A few drops of the mixture should be heated over a spirit lamp, in a test tube, the mouth of which should be applied to the nostrils as soon as volatilization is effected. The operation should be effected in about two minutes, when, after the patient sneezes a number of times, the troublesome symptoms will rapidly disappear. A hot lemonade is one of the best remedies in the world for a cold. It acts promptly and effectively, and has no unpleasant after effects. One lemon, properly squeezed, cut in slices, put with sugar, and cover with a half pint of boiling water. Drink just before going to bed, and do not expose yourself on the following day. This remedy will ward off an attack of the chill and fever if used promptly.

USEFUL INFORMATION.

How Hot Iron May Be Handled.

About the year 1809, one Lionetto, a Spaniard, astonished not only the ignorant, but chemists and other men of science by the impunity with which he handled red-hot iron and molten lead, drank boiling oil, and performed other feats equally miraculous. While he was at Naples he attracted the attention of Professor Sementem, who narrowly watched all his operations, and endeavored to discover his secret. Sementem's efforts, after performing several experiments upon himself, were finally crowned with success. He found that by friction with sulphuric acid diluted with water, the skin might be made insensible to the action of the heat of red-hot iron; a solution of alum, evaporated until it becomes spongy, appeared to be still more effectual. After having rubbed the parts, which were rendered in some degree incombustible, with hard soap, he discovered on the application of hot iron that their insensibility was increased. He then determined on again rubbing the parts with soap, and after this found that the hot iron not only occasioned no pain, but that it did not actually burn the hair. Being thus far satisfied, the professor applied hard soap to his tongue until it became insensible to the heat of the iron; and after having placed an ointment composed of soap mixed with a solution of alum upon it, boiling oil did not burn it. While the oil remained on the tongue, a slight hissing was heard, similar to that of hot iron, when thrust into water; the oil soon cooled, and was then swallowed without danger. Several scientific men have since successfully repeated the experiment of Professor Sementem.—*Es.*

Saving is Wealth.

One great cause of the poverty of the present day, wisely says an exchange, is a failure of our common people to appreciate small things. They do not realize how a daily addition, be it ever so small, will soon make a large pile. If the young men and women of to-day will only begin, and begin now, to save a little from their earnings and plant it in the soil of some good savings bank, and weekly or monthly add their mite, they will wear a happy smile of competence when they reach middle life. Not only the desire but the ability to increase it will also grow. Let clerk and tradesman, laborer and artisan, make, now and at once, a beginning. Store up some of your youthful force for future contingency. Let parents teach their children to begin early to save. Begin at the fountain head to control the stream of extravagance—to choose between poverty and riches. Let our youth go on in the habits of extravagance for fifty years to come as they have for fifty years past, and we shall have a nation of beggars, with a moneyed aristocracy. Let a generation of such as save in small sums be reared, and we shall be free from want. Do not be ambitious for extravagant fortunes, but seek that which it is the duty of everyone to obtain—Independence and a comfortable home. Wealth, and enough of it, is within the reach of all. It is obtained by one process, and one only—saving.—*Sci. Am.*

Useful Hints.

If you get a fish bone in your throat, and sticking fast there, swallow an egg raw; it will be almost sure to carry down a bone easily and certainly. When, as sometimes by accident, corrosive sublimate is swallowed, the white of one or two eggs will neutralize the poison, and change the effect to that of a dose of calomel.

For chilblains, cut up two white turnips, without paring, into thin slices; put the slices into a tin can with three large spoonfuls of lard; let it simmer slowly for two hours, then mesh through a sieve; when cold spread it on a soft linen cloth and apply to the chilblain at night.

Milk for breakfast, when used in the form of bread and milk, should never be boiled, but steamed; that is, the jug of milk should be stood in a saucepan of boiling water for two or three minutes until hot.

To prevent hard soap, prepared with soda, from crumbling, the bars may be dipped in a mixture of resin soap, beef tallow and wax.

A little camphene dropped between the neck and stopper of a glass bottle will render the latter easily removed if jammed fast.

To make silk which has been wrinkled appear like new, sponge on the surface with a weak solution of gum arabic or white glue, and iron on the wrong side.

A piece of paraffine candle about the size of a nut, dissolved in lard oil at 150 deg. Fah., the mixture applied once a month, will keep boots waterproof.

A strong solution of sulphate of magnesia gives a beautiful quality to whitewash.

Leather can be made hard by saturation in a solution of shellac in alcohol.

Paraffine is the best material for protecting polished steel or iron from rust.

Soap and water is the best material for cleaning jewelry.

Sharpening Files by Acid.

A process of rebiting files by means of acid has been for some time tried and talked of, but no definite information as to the best method was to be obtained till the other day. It appears that the plan has been adopted in the two marine stations of Cherbourg and Lorient, and with complete success.

In the first place, the worn files are well cleaned with potash and hot water; they are then left for five minutes in a solution composed of one part of sulphuric acid and seven parts of water; a quantity of nitric acid equal to the sulphuric is then added to the solution, and as much water also, and the files are left in the solution for about forty minutes longer. They are now ready for use, but if they are to be stored they must be brushed over with a little oil or grease to prevent rusting. The files must not touch each other in the solution, being supported by their tongs only.

In order to obtain the most complete results possible, the proportions of acid should be varied according to the size of the files; for instance, for large files one-sixth acid; for bastard ditto, one-eighth, one-ninth to one-eleventh; and for the finest, one-twelfth to one-thirteenth.

The cost of the operation is from ten to fifteen cents, that is to say, from rather more than a penny to nearly three half-pence, while recutting costs about sixpence; and, as a file sharpened in the acid is, it is said, quite as efficient as one that has been re-cut, the saving is large. Files will often bear the operation twice.—*Iron.*

Kalsomining.

As the season for whitening walls is already arrived, many are enquiring for some approved recipe for a superior article for that purpose. One which has been pronounced very good is as follows: Eight pounds of whitening and one-quarter of a pound of white glue make the right proportions. Soak the glue over night in cold water, and in the morning heat it till perfectly dissolved. Mix the whitening with hot water, stir the two thoroughly together, and have the wash of the consistency of thick cream. Apply warm with a kalsomine brush, brushing it well in and finishing it as you go on. If warm skim milk is used instead of water the glue may be omitted. Before the wash is applied all holes and crevices should be stopped with plaster of paris mixed with water. If it is desirable to tint the walls colors may be procured at any paint shop, and stirred into the kalsomine wash.

Another is given as follows: White glue, one pound; white zinc, ten pounds; Paris white, five pounds; water sufficient. Soak the glue over night in three quarts of water, then add as much water again, and heat on a water bath till the glue is dissolved. In another pail put the two powders, and pour on hot water, stirring all the time, until the liquid appears like thick milk. Mingle the two liquids together, stir thoroughly, and apply to the wall with a whitewash brush.

TO REMOVE DENTS.—A novel way to remove dents from brass kettles is given by a lady in the *Household*. Set the bruise on soft snow, and with a hammer pound gently on it until the part recovers its proper shape. Some patience is required to remove bad bruises. Won't loose sand answer as well as snow?

DOMESTIC ECONOMY.

Facts About Flour.

The *Boston Journal of Chemistry*, in a well-considered article on the effects of fine flour, says,

At the present time it is the practice to a large extent among millers, to grind the finest, soundest wheat into fine flour, and the poorest into what is called "Graham flour." This term, "Graham flour" ought no longer to be used. It is a kind of general name given to mixtures of bran and spoiled flour, to a large extent unfit for human food. What we need is good, sweet wheat flour, finely ground, and scarcely put up for family use.

This article we do not find in the market, and the Western miller who will give his earnest attention to furnishing such flour will realize a fortune speedily. The brown loaf made from whole wheat is to our eye as handsome as the white. It can be made with all the excellencies of the white so far as lightness is concerned, and it is sweeter and more palatable. With this loaf we secure all this important nutritive principles which the Creator, for wise reasons, has stored in wheat.

[The statement with regard to the "Graham flour" manufactured at the East does not hold good with regard to that product here.—*Ens. Press.*]

NUTS AND CHEESE promote digestion as a general rule; the conditions being that the nuts should be ripe and the cheese old, both to be eaten at the close of dinner; the digestive agent in both is a peculiar oil which has the property of acting chemically on what has been eaten, and thus preparing it for being the more easily appropriated to the purpose of nutrition. Many think that the more solid portions of the nut should not be swallowed. This is an error; those particles of solid matter are not digested, it is true but they are passed through the system unchanged and act as mechanical stimulant to the action of the internal organs, as white mustard seed swallowed whole are known to do, thus preventing that constipated condition of the system which is so invariably productive of numerous bodily discomforts and dangerous and even fatal forms of disease.

COOKING "GREENS."—Every housewife thinks she can cook "greens." It is the simplest of all dishes; and yet, in most cases, they are not well served, for much depends on the manner in which they are boiled. The water should be soft, and a tablespoonful of salt added to a large sized pot of it, which should be boiling hot when the greens are thrown in; and then it should be kept on the boiling gallop, but uncovered, until they are done, which can be told by their sinking to the bottom of the pot, and they should be skimmed out as quickly as possible into a colander, so that all the water will run out. Press them with a small plate, then turn upon a platter, add a large piece of butter, and cut up fine. Serve while smoking hot.—*London Garden.*

A NEW DELICACY FOR THE TABLE.—The French have recently devised a new delicacy for the table, which is quite as expensive as truffles or *pâté de foie gras*. It is called "bechamel." In its pure state, looks like frozen lard. It is a jelly made from small fowls; they are simmered over a slow fire until cooked to a semi-liquid condition, the bones are carefully removed, and then to two parts of the material five parts of cream are added, and plenty of mushrooms and champagne to flavor it. It takes a great many small fowls, say twenty or more, to make a single pound of this preparation.

CARROTS FOR EGGS.—It is not generally known that boiled carrots, when properly prepared, form an excellent substitute for eggs in puddings. They must, for this purpose, be boiled and mashed, and passed through a coarse cloth or hair sieve strainer. The pulp is then introduced among the other ingredients of the pudding, to the total omission of eggs. A pudding made up in this way is much lighter than when eggs are used, and is much more palatable. On the principle of economy, this fact is worthy of the prudent housewife's attention.

RABBIT CUTLETS.—Prepare the rabbits as you would for a stew; cut the different limbs into the size of cutlets—such as the shoulders cut in half, also the legs, with the ends of the bones chopped off, and pieces of the back, even to the half of the head. Have ready some bread-crumbs and the yolk of an egg beaten up. Drop each cutlet into the egg and then cover it up with bread-crumbs, as for veal cutlets. Fry them a nice brown, and when you dish them pour round them some rich brown gravy, which may be flavored with tomato sauce if approved, and put round them rolls of fried bacon.

LEMON PUFFS.—One quart of milk, the yolks of six eggs, two cups of white sugar, two tablespoonfuls of flour, three lemons. Beat the eggs, sugar and flour together well; beat the eggs first, then add the lemon juice; have your dish lined with paste; do not add the milk until you are ready to put it into the oven. Beat up the whites, add fine white sugar, a large teaspoonful, and beat very light; flavor to taste. When the custard is done spread the icing over it, set it back in the oven and let it brown nicely. Eat as soon as cold.



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Report of Progress in Suto Tunnel.

The following report of progress made in the Suto tunnel, Nevada, for the week ending May 8th, was furnished us by Pelham W. Ames, secretary of the company:

Number of feet in tunnel, May 1, 9,271

Number of feet driven during week, 71

Distance in, May 7, 9,342

ROCK.—A conglomerate, greenstone base, with angular pieces of trachyte imbedded, so hard and tough as to require repeated charges in some holes before blast would take effect. At the last moment the rock is reported as presenting a more favorable appearance.

WORK DONE.—Holes drilled, 372; holes blasted, 405; aggregate depth, 2,303 feet; average depth, 6 7/32; powder consumed, 1,099 lbs.; explosives consumed, 506.

WATER.—The water which had been running in at the face through an open fissure, was left behind on 3d inst., when the fissure took a sudden turn to the south. On the 2d inst., 30 inches of water, (a new body), were struck, making flow from tunnel 87 inches, but this has since decreased to 71 inches. This is now utilized for cutting a wagon road through a high, sandy bluff, near Carson river.

Temperature of air at heading, 79°; shaft No. 1, east, 76°; west, 70°; shaft No. 2, east, 78°; west, 80°; month, 63°. Temperature of water at heading, 79°; shaft No. 1, east, 77°; shaft No. 2, east, 79°; month, 75°.

Currents of air pass in at mouth and down shaft No. 1, up shaft No. 2.

An Arizona mining company has been organized in Virginia City, to prospect in Arizona for precious metals. An expedition will soon be fitted out under Louie Le Page; twenty-five men will compose the party.

Chinese Coal and Iron.

From present indications it appears as if the reports about the Chinese coal fields will amount to a great deal more than reports after all. We see by the English papers that Mr. Henderson, who has passed thirty years in China, and who is now in England, has been commissioned by the mandarin in charge of the arsenals at Tien-tsin and Shenghai, in pursuance of instructions from the superintendent of the Northern Treaty Ports to procure the necessary plant for working the collieries and iron mines, and for smelting and manufacturing iron in that province according to the most approved European methods. He has also been authorized to obtain the services of competent Europeans to direct the works.

This is quite a step in advance for China and one which will be also beneficial to the Pacific coast. The coal area of China is estimated at 400,000 square miles. In one of the provinces there are beds of 30,000 square miles from twelve to thirty feet thick. Every kind of coal is said to be found, hard and soft, bituminous and anthracite. Millions of tons are gathered by surface mining, but none by scientific, deep mining. Steam coal, quite equal in quality to the best South Wales coal, is said to abound at Chaitang, about forty miles from Peking.

There is not at present a single coal mine in China worked on scientific principles. There is neither steam, engine or pump; and the smelting of iron is carried on in the most primitive manner. Owing to the high prices which the Chinese have to pay for foreign coal and pig iron—for the latter sometimes as high as \$50 per ton, the authorities have determined to utilize some of their coal fields and deposits of iron ore, and work them in a systematic manner. The field which has been selected for beginning operations upon, in the southern part of the province of Chihli is easy of access and rich in coal, iron and limestone. These mines are about twenty-five miles from some small rivers, and to complete the chain of communication, a short railway is to be built. The proposition is in the first place to supply the necessities of the national arsenals, but as soon as convenient manufactured iron of all kinds will be produced.

The unexpected and rapid progress of the Japanese has given us some foreboding of what might be expected from their neighbors. Coal or iron in abundance in a place like China places her in an enviable position. The country is filled with men of ingenious minds and skillful hands, and as soon as proper instructors are procured there is no doubt that the Chinese will aim to do more than supply their own internal demands. The idea of China ever becoming a great manufacturing country has never been dreamed of, but there is now a likelihood that it will be so.

For California, the development of the Chinese coal fields is an important thing. Ships bring coal to us from Cardiff and Liverpool, a long and dangerous journey of 20,000 miles, and here are the vast virgin fields of China only about 6,000 miles away. At the prices we pay in San Francisco for good coal, a few dollars per ton would make the greatest difference to our manufacturing interests, and it is sincerely to be hoped that the Chinese coal and iron fields will turn out as well as expected.

Land Decisions and Mine Patents.

Among the decisions recently rendered by the Secretary of the Interior of interest to miners, is the following: Questions of fact and extent of conflict between two mineral lodes cannot be decided by the Department, but must be left to the Courts; therefore, in all cases, where a mining patent is issued for a claim, A, conflicting with another claim, B, previously patented, the "excepting clause" in the last issued patent will read as follows:

"Excepting from this conveyance surface ground conveyed to said B company by its patent, dated —, and also excepting from this conveyance so much of the B lode, if any there be, as was legally conveyed to the said B company by its aforesaid patent."

Secretary Dalano has affirmed the decision of the Commissioner of the Land Office in the case of Hodgdon & Wheeler, against the State of California, holding that when the sixth and thirty-sixth sections are coal lands such sections do not pass to the State of California, by virtue of the Act of March 3, 1873.

The following mining patents have recently been issued. California—El Dorado county, —Henry Hagar and J. H. Straten, German quartz mine. W. J. Hale, Bg Sandy quartz mine. John Blair et al., Bobby Burns quartz mine. Placer county—Charles D. Dewey, Hancock & Watson quartz mine. John W. Eckley, Greene Walter quartz mine. J. H. and R. Hoakin, Hoskin Brothers' canon, placer. Sonoma county—J. A. Robinson, et al., Eaganie quicksilver mine. San Bernardino county—J. A. Robinson, Cynthia gold mine, Amador county—R. C. Downa, et al., Pioneer gravel mine. H. Trneb and J. B. Belliard, placer. Nevada county—H. B. Tichenor, et al., Canon Creek quartz mine. J. M. English, J. M. English quartz mine. Shasta county—Charles Camden and Joseph Chitwood, placer. Del Norte county—Alta California S. M. G. company, Alta copper mine. Nevada—Storey county—Bullion mining company, Bullwhacker lode. Lander county—H. Heyne-

menn, El Dorado lode. White Pine county—John Shoenbar, Rescue lode. Oregon—Josephine county—H. Carron and J. Harrington, pleaser. Jackson county—Georgia Gunders, Enos A. Wall, et al., Queen of the Hills mine. Salt Lake county—Joseph Merion, Rough and Ready mine, two locations.

Hints on the Washoe Process.

To the last report of the United States Commissioner of Mining Statistics, Mr. J. M. Adams, mining engineer of Silver City, Idaho, contributes a valuable paper under the above title, which is valuable to all mill men. Mr. Adams has had great success in the management of the Washoe process, chiefly due, the Commissioner states, to great skill and care in the management of mechanical details and the constant and minute supervision of details. Some of the points he gives are those too often overlooked by mill men, so that the paper will be found practically valuable to a large and intelligent class of metallurgical engineers. The article is the result of seven years' experience in working ores containing silver and gold by amalgamation in pans without roasting, commonly called the Washoe process, in several mills of which Mr. Adams has had charge, but principally in the Owyhee mill, at Silver City, Idaho, which had twenty 650-pound stamps and sixteen pans. He discusses merely the mechanical details of working ores generally, subdividing the subject as follows: 1, preparation of ore for the stamps; 2, crushing in the battery; 3, settling of sand or pulp in vats or tanks; 4, treatment in the pans; 5, results obtained in settlers, agitators and concentrators; 6, straining the quicksilver, clearing of amalgam and retorting; 7, saving of slimes and their subsequent treatment; 8, loss of quicksilver. This article is written for those who understand the arrangement of ore breakers, stamps, tanks, pans, settlers, etc., so there are no detailed descriptions of machinery, no discussions of chemical reactions, and few explanations of fundamental principles. It is assumed that the general arrangement of the quartz mill is understood; and the question will be treated how to secure from such a mill the greatest economy in working, combined with the largest results. Mr. Adams introduces his subject, however, by a single preliminary suggestion, namely that there should be double floors throughout the mill, so that nothing can sift through and be lost. We commence in this number of the Press the first part of Mr. Adams' paper, which is on the

Preparation of Ore for the Stamps.

The more uniform in size the ore is prepared for the stamps, the more evenly can it be fed into the mortars. The ore should be so fine that a single blow of the stamp will be sufficient to shatter thoroughly each piece of ore. If a large piece is fed into the mortar, it may not be broken up until after several blows or drops of the stamp. Besides a large piece raises the stamp and reduces by so much the fall, thereby taking away part of the effect, and consequently diminishing the production. In preparing ore for the stamps, in my first experience at the Owyhee mill, I used merely rock-hammers. The stamps were dropping sixty times a minute, and were given 8 1/2 inch average drop, running without re-setting till the average drop was 10 inches. Breaking by hand on average, hard ore, we could not work over 28 tons a day. Then, by breaking very small by hand, we increased our production to 30 tons a day. But afterward, by erecting a Blake's crusher, the production of the same stamps was raised to 33 tons a day; by breaking the ore very fine we increased it to 37 tons a day on the same ore; and finally by accelerating the rate of running the battery to 93 and 95 drops a minute, keeping the same height of drop, but using a coarser screen, we were able to increase our production to 45 and 48 tons of ore crushed in 24 hours. But in breaking the ore very fine we found that the lowest end of the die, or fixed breaking surface in the crusher, wore away much faster than the middle or upper part; but the middle part was wasted and lost to us except as old iron. We overcame this by adding to the pattern of the die a projection on the lowest end, thus increasing the thickness at this place, and in this way we were able to get full wear of the whole die. The most economical method of preparatory crushing would be to have two breakers, one set above the other. The mill having, as every mill should have if practicable, plenty of natural fall—in other words, being built on the side of a steep hill—the first breaker should be placed above, and set so as to crush to a diameter of two inches. Of course, a long, flat, and thin piece might go through, but at least one dimension will not be over two inches in diameter. The fine, as well as the coarse ore should pass through this breaker. When the ore is dry, let a very small jet of water flow into the mouth of the breaker, to prevent the dust from flying. This dust involves a loss and also injures the machinery. From the first crusher let the ore pass by chute into the second. This should be set so that the breaking surfaces almost meet at the lower end. From here, chutes should lead to each battery of ten stamps or two mortars. If the ore contains much clay, it may be necessary to separate from the massive pieces the fine ore and clay, and deliver the two later to the battery floor without sending them through the rock-breakers, which the clay tends to choke up. The consumption of iron per ton of ore prepared in this way, by double breaking for the stamps, will be about 0.3 of a pound.

Coal—Relative Value of the Different Kinds Used on the Pacific Coast.

We give below the results of experiments with different kinds of coal at the pumping works of the Spring Valley water works of this city. These figures were furnished to the Mechanics' Institute by Charles Elliott, City Superintendent of the Spring Valley water works. There were four tubular boilers, two used at a time, fifty-two inches in diameter by fifteen feet long; sixty-seven three-inch tubes, steam drum four feet high, three feet in diameter; grate bars five feet by four feet, worked with twenty pounds of steam. Two condensing engines, one worked at a time, out-off at nine inches and ten inches, variable out-off regulated by speed of engine; cylinders, four-foot stroke, forty inches in diameter. Four pumps, double acting, geared from engine to make one stroke to 4 368-1000 of engine. All the pumps are run together. Two pumps, fourteen inches in diameter, seven feet stroke; two pumps, twelve inches in diameter, five feet stroke. Speed of engine, 1,900 to 2,000 revolutions per hour, running continuously.

In these estimates there is no allowance made for ashes or for waste of coal in any way. All the coal was weighed accurately, and all the water measured through a Worthington meter. The smoke stack is 116 feet high above the grate bars, square, five feet in diameter at the bottom and seven feet at the top; natural draft. Duty is given for each 100 pounds of coal in foot pounds—that is, pounds raised one foot high with each 100 pounds of coal.

May 24th, 1872, Mt. Diablo Screenings, 23,000,000 lbs	
May 24th, 1869 " " " " " " " "	Eureka
Dec. 24th, 1870 Mt. Diablo Coal, Black	23,678,000 "
Diamond " " " " " " " "	23,761,400 "
Sept. 5th, 1870, Mt. Diablo Screenings, Union Mine, 6 14-100 pounds of water to one of coal	25,588,636 "
Feb. 4th 1870, Mt. Diablo Screenings, Pittsburg Mine	24,850,450 "
Jan. 26th, 1871, Mt. Diablo Screenings, Union mine	28,102,173 "
Sept. 14th, 1870, Mt. Diablo Screenings, Union Mine, 7 3-100 pounds of water to one of coal	29,333,557 "
June 26th, 1873, Seattle Coal	29,630,000 "
June 5th, 1873, Bellingham Bay Screenings	29,644,000 "
Dec. 2d, 1873, Welsh Coal	37,262,000 "
June 18th, 1873, Sydney Coal	38,215,700 "
July 4th, 1874, " " " "	38,889,200 "
Feb. 8th, 1870, Anthracite Coal	37,600,000 "
Nov. 9th, 1870, " " " "	37,100 "
pounds of water to one of coal	37,657,500 "
May 14th, 1870, Sydney Coal	40,082,000 "
July 3d, 1869, Nantaimo Coal	32,317,600 "
Aug. 29th, 1870, Sydney Coal, ten pounds of water to one of coal	37,036,184 "

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Foreign and American Patent Agency, the following are worthy of mention:

OVERFLOW AND SEPARATING ATTACHMENT FOR GRAIN CLEANERS.—Michael O'Brien, 113 and 115 Mission street, San Francisco. This patent relates to an attachment for grain cleaning devices and a novel mode of employing the same, by which the inventor is enabled to skim off or separate all the coats, barley and lighter impurities from a large body of wheat, so that in place of running the whole quantity through the cleaners, he separates the great bulk of clean grain from a very small proportion of wheat and all the foreign substances, and only the latter will have to run through the ordinary cleaners. By this means the capacity of these cleaners can be reduced to about one-sixth of that now needed. By the means employed, instead of passing all the wheat through cleaning machines and separating it from foreign substances, which would necessitate the use of a number of machines in a mill of ordinary capacity, the great bulk of the wheat can be separated in a clean state, and so small a residue is left to be cleaned in the ordinary manner, that as much can be done with one machine as with six in the old way.

TUCK MARKER.—George Vincent, Stockton, San Joaquin county, Cal. This invention is an improved tuck marker, to be used as an attachment to sewing machines. It consists in the use of a novel creaser or marker, by which the inventor is enabled to use a single edge or point, this being attached to an adjusting bar by which the marker can be moved sideways, or it may be elevated and depressed at pleasure for a heavy or light mark. The marker is operated by the needle bar, but is independent of it, so that by the adjusting device, a long or short stroke can be given at pleasure. The plate of the marker is sored to the presser foot, the cloth plate, or the stationary bar as may be desired, and the marker is elevated after each stroke by means of a spring, and independent of the movement of the needle bar. A gauge or presser extends to one side of the plate, and the ordinary gauge on the cloth plate is set up to it, so that when the work passes beneath this presser, it will be held exactly to its place, against the regular gauge, thus making the tucks absolutely straight.

MINER'S MICROSCOPE.—A photograph of the miner's microscope recently described in the Press will be sent to those desiring it on application to Henry G. Hanke, of this city. Any one can then see exactly what this microscope looks like, the photograph giving the details clearly.

Short Lectures on Patents.

No. 4.—By Jno. L. Boone, of Dewey & Co's MINING AND SCIENTIFIC PRESS Patent Agency.

The Patent.

The granting of a patent is the consummation of a contract between the Government and the inventor. The Government contracts that in consideration of the publication of the invention, so that the public may have the knowledge and benefits of it after the expiration of seventeen years from the date of its publication, it will give the inventor the exclusive right to make, use and sell the same during the said period of seventeen years. The provisions upon which this contract is based, are—first, that the invention shall be new; secondly—that it shall not have been in public use over two years; and thirdly—that the inventor shall fully and clearly explain the invention sought to be protected, and describe the best means of carrying it into effect. In default of either of these conditions the patent will fail, and be voidable. It lies with the inventor to fulfill these conditions, and if he fails he suffers the consequences. A patent, therefore, is a grant or deed based upon certain conditions. The fact that the patent office grants and issues a patent is no evidence that it is a good and valid one. The Government keeps a corps of examiners at work in the patent office, whose duty it is to see that the conditions are fulfilled, as far as possible. This they do by examining each case as it is presented, for the purpose of detecting, if possible, whether any reason can be found to exist for not issuing a patent. If they discover none, the patent is issued, but its validity can be tested at any time in the United States courts, and if upon proof it be found that the patent was wrongfully issued, it is pronounced void and of no effect. A patent is a species of personal property, known in law as an "incorporeal hereditament," that is, it has no body, no tangible form, but is simply a right out of which profits may arise by manipulating it. The manufactured patented article, however, is a "corporeal hereditament," because it can be seen and handled, and has an actual and palpable existence. A patent cannot be seized and sold on execution to satisfy a judgment against the patentee or owner. Being a grant from the Government, the title to it cannot pass from him without his signature, and the document conveying this interest must be recorded in the patent office. A sheriff's signature to an assignment, or any other officer's signature for that matter, would not convey the patent or any interest in it to another party. There is one case, however, in which the law will compel an inventor or the owner of a patent to transfer it to other parties, and that is in case he passes through bankruptcy, either willingly or unwillingly. A bankrupt is supposed to act of his own free will and accord and for his own benefit, even if he should be involuntarily adjudged to be a bankrupt, and the condition imposed upon him in order to allow him to free himself from debt, is that he assign over to his creditors all of his property, both real and personal, which is exempt from execution. His patent, therefore, being considered personal property, and his act being considered voluntary and of his own free will, becomes a part of the estate to be assigned. This is both right and just; otherwise a person who intended to take advantage of the bankrupt law could invest large sums of money in valuable patents, and thus defraud his creditors.

A patent can be bought and sold the same as any other property, either as a whole or in undivided interests, as will be hereinafter more fully explained under the head of assignment.

A patent consists of a deed signed by the Commissioner of Patents and countersigned by the Secretary of the Interior. To it is attached a copy of the specification and claims as prepared and presented by the inventor or his agent, and a copy, or *fac simile* of the drawing which accompanies the application. Previous to 1861, all patents were executed on parchment, 15x20 inches in size. The patents were printed as blank and filled out by hand. The specifications and claims were copied in manuscript on sheets of parchment, and the drawings were made by hand on tracing linen. After March, 1861, the size of patents was reduced to 10x15 inches, and the specifications and claims were printed instead of being copied by hand, but linen tracings of the drawings were still used. In July, 1869, the photo-lithographic process for printing the drawings began to be used and the linen tracing was done away with. The size of the patent was then still further reduced to 8x13 inches, making it at once much more neat and convenient than either of the old styles.

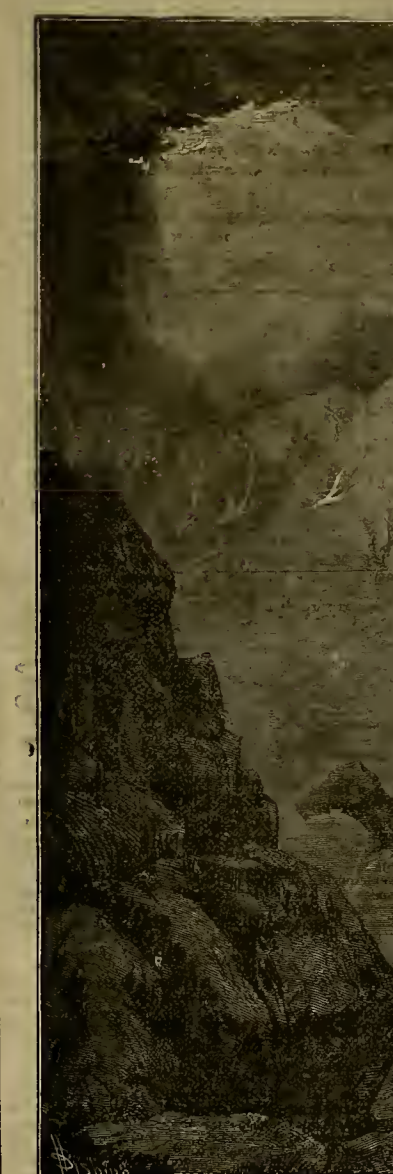
Two independent inventions cannot be covered by one patent, but if two inventions are in any way connected together so that one is necessary to the operation of the other, then they can both be claimed in one patent.

"An American patent expires simultaneously with a foreign patent previously obtained for the same invention, although the American patent was first applied for." (Come. Dec. 1869.) This is for the purpose of giving to the American public the free use of the invention as soon as it becomes free abroad; and thus places our manufacturers on an equal footing

with foreign manufacturers. A patent cannot now be extended after it expires, unless it be by a special act of congress. Previous to March, 1861, all patents were issued for a term of fourteen years, with the privilege of an extension of seven years more at the end of that time, provided the patentee could show that he had not received a sufficient remuneration, considering the value of the invention to the public, but since that date, all patents are granted for seventeen years, and no extension is provided for. The present term is ample. It gives the inventor sufficient time to thoroughly exploit it, and at the same time it does not lay too heavy a burden on the public. A patent dates from the day it is issued, and not from the time the application is made or granted.

If an inventor loses his patent paper, he cannot obtain a new one. He can, however, obtain a certified copy of his patent from the Patent Office, and this certified copy will have all the effect of an original patent and will be recognized in the same manner by the United States Courts.

If an inventor dies before making applica-



THE MOUNTAIN OF THE HOLY CROSS.

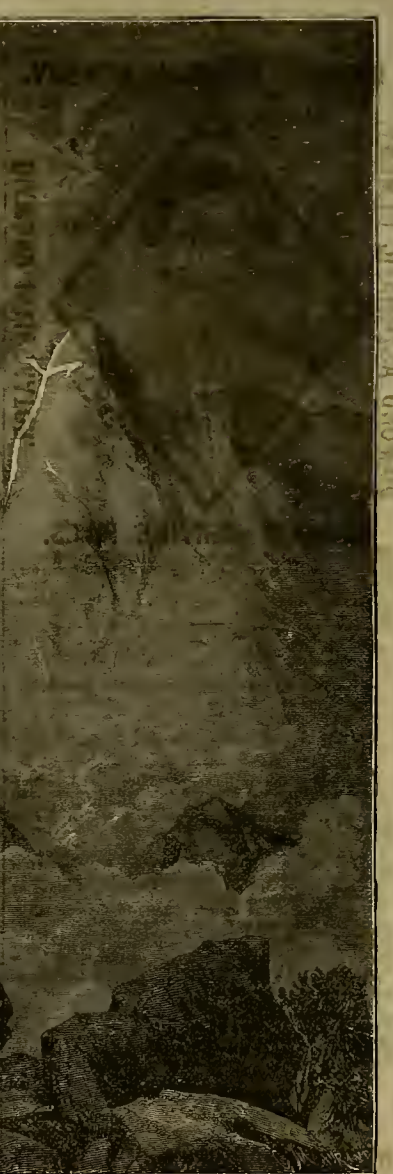
tion for a patent on an invention which he has completed, his administrator can proceed with the application in the name of the deceased, and the patent will be issued for the benefit of the heirs.

Joint owners in a patent are not partners. One owner can make use of and sell the patented articles and sell as many rights to others to make use of and sell them as he pleases, entirely independent of the other owners, but he cannot sell any greater interest in the patent than he owns. Any undivided interest in a patent, even a one-hundredth, is a manufacturing interest, and the person who owns such an interest, has as much right to make use and sell the patented articles or machines as the person who owns the remaining ninety-nine one-hundredths. Neither does he have to account to the other owner for any proportion of the profits. A co-partnership agreement, however, can be entered into by the joint owners of a patent so as to combine the interests and make the profit mutual.

At the Belcher mine raising up on the air shaft from the 1,100-foot level is making steady and favorable progress. Work has again been resumed on the upper levels, which have been abandoned since the destruction of the air shaft. The air is again becoming excellent throughout the entire mine.

Scenery in Colorado.

Very few people were aware before the publication of this report on the Geographical and Geological Survey of Colorado, by Hayden, of the beauty of the natural scenery in so many places in Colorado. These reports are so well written, and the localities all described with so much detail, and with such excellent engravings, that it is almost as good as a trip to the country, to read the reports. A most wonderful region is described from Elk Mountain to Middle Park. The trip down Eagle river was made principally for the discovery of some way of access to the mountain of the Holy Cross. The party were obliged to descend the river about two miles, and then climb the steep mountain side over a network of fallen timber. The obstructions to travel were very great; they often labored for a day or two to find some path to approach the mountain peak, and were obliged to cut their way through the fallen timber, and finally succeeded in getting within



about five miles of the base of the peak. The main mass of the peak, like the whole of the Sawatch Range, is composed of granite gneiss. The summit of the Holy Cross is covered with fragments of banded gneiss. The amphibolites on all sides have been gradually excavated, and the more or less vertical sides show the intermediate steps very clearly.

The characteristic feature of the Mount of the Holy Cross, as shown in the engraving, is the vertical face, nearly 3,000 feet on the side, with a crose of snow, which may be seen at a distance of fifty or eighty miles, from other mountain peaks. This is formed by a vertical fissure about 1,500 feet high, with a sort of horizontal steps, produced by the breaking down of the side of the mountain, on which the snow is lodged and remains more or less all the year. Late in the summer the crevices are very much diminished in size by the melting of the snow which has accumulated in the fissures. A beautiful green lake lies at the base of the peak, almost up to the timber line, which forms a reservoir for the waters from the melting snow of the high peaks. From this, one of the main branches of the Roaches Moutonnes creek flows down the mountain side, forming several charming cascades in its way. The worn out rocks or "sheep-backs," in the valley of the creek, display most remarkable examples of the curious workings on the surface of the gneiss produced by the separation of the different constituents of the rocks.

ENGINEERING.

The Removal of Noonday Rock.

The U. S. Engineers stationed in this city have their hands pretty full this year with engineering work of interest to the general public, as well as the usual routine work on fortifications, etc. Among them may be mentioned the improvement of the Sacramento river, Oakland harbor improvement, San Diego harbor improvement, removal of Rincon rock in San Francisco bay, and removal of Noonday rock, outside the entrance to this port.

This latter piece of work was accomplished on the 7th inst., by Mr. Edward Moore, of Portland, Maine, the contractor. Noonday rock is in the open sea, about three nautical miles to the northward and westward from the North Farallone, and about thirty-three miles to the southward of west from Fort Point, in the open ocean. Directly over the rock at mean low water, there were twenty-one feet of water, although the water close around it, according to the U. S. Coast Survey, is from twenty to thirty fathoms deep. The rock was in the form of an irregular dome with steep sides. The extreme dimensions at different depths below the plane of mean low water, were, before the blast, as follows: At twenty-one feet (the top) five feet three inches by three feet six inches; at forty-one feet, twenty-three feet eight inches by eleven feet eight inches; at forty-seven feet, twenty-six feet ten inches by twenty feet eight inches. From this it will be seen that the contents above the depth of forty-one feet were about 125 yards, and that the cubic contents above the depth of forty-seven feet were about 200 yards.

The contract for blowing up the rock was taken by Mr. Moore, for the sum of \$20,000, and he came on from the East, bringing with him his own divers and foremen. Considerable delay was occasioned by a series of accidents to the machinery of the steamer *Fideler* which was employed in the work, and by the fact that three different times the booms, rope and all were stolen by coasters, necessitating delay in again finding the rock. About sixteen different trips were made to the rock before the work was accomplished, most of them, however, from San Francisco bay, where the *Fideler* anchored at night.

When it is remembered that the rock lay out in the open Pacific, on a very windy and rough part of the coast, where there is always a heavy swell, the difficulty of the task will be understood. The contractor at first intended to place his nitro-glycerine on the side of the rock, trusting to the weight of water for tamping. Noticing, however, that most of the large rocks on the coast have in them natural cavities and sometimes arches, he thought there might probably be one in Noonday. On examination the divers found a cavity at a depth of fifty feet from the surface, which exactly suited the purpose.

As it was at such a depth below the surface, and in such an advantageous position, 800 instead of 3,000 pounds of nitro-glycerine were used, being fired by electricity from a boat about 600 feet distant, the steamer lying about half a mile away. In conversation with Mr. Moore, he stated to the writer that the eight was a most magnificent one. When the explosion occurred a solid body of water in the shape of a cone went up into the air about 600 feet, the spray and debris going up about 1,000 feet. One very large piece of the rock, apparently weighing about 150 tons, was thrown up at least 500 feet, striking the water with immense force and noise. The explosion calmed the sea down within a radius of half a mile, it being covered with sea weed, sponge, etc., and thousands of fish. Several seals were killed, as were several tons of fish. A hasty examination after the blast showed nine fathoms of water on top of the rock, although only eight fathoms were called for. An official examination has been made by Lieut. John H. Weeden, of the Corps of Engineers, and a report made on the result of the blast. This work was done under the direction of Lieut. Col. C. Seaforth Stewart, of the Board of Engineers of the Pacific coast. This formidable obstruction to navigation has been successfully removed, but unfortunately there are many others in the same locality some of which are perhaps more dangerous than Noonday, and being larger, much more difficult and expensive to remove.

The yield of bullion of the Consolidated Virginia mine for this month will not be quite so great as last, owing to the shutting down of the Occidental mill for repairs. However, the yield will amount to something over \$1,500,000. The ore stops on all of the ore-producing levels are not only holding out finely, but promise a rich yield for months to come. The mine is now yielding the extraordinary amount of 560 tons of ore, the milling value of which is about \$100 per ton. A few dozen mines like this belonging to the community might pay the national debt in a little while.

At the Utah mine, Washoe, a large force of men are constantly employed laying the heavy stone foundations, and in getting the mill timbers, the pumping machinery and engines ready to place in position at the very earliest moment possible.

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Has been reduced from seven cents to six cents per pound for grains in kegs, flour and fine flour remaining at four cents per pound, as heretofore. Important discounts to the trade. Send for circulars.

E. V. HAUGHWOUT & CO.,
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FOR PURIFYING THE BLOOD.

This compound of the vegetable alteratives, Sarsaparilla, Dock, Stillingia and Mandrake with the Iodides of Potassium and Iron makes a most effectual cure of a series of complaints which are very prevalent and afflicting. It purifies the blood, purges out the

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Chemical Apparatus,

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Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merit. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Millmen are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

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Ores worked by any process.
Ores sampled.
Assaying in all its branches.
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Plans furnished for the most suitable process for working Ores.
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On all kinds of Ores, and particular attention

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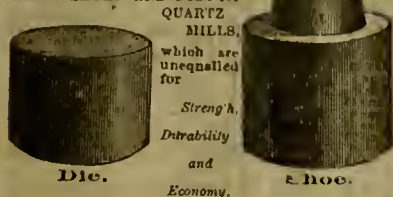
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STEEL SHOES AND DIES
FOR QUARTZ MILLS.

Made by our improved process. After many years of patient research and experiment we have succeeded in producing STEEL SHOES AND DIES for QUARTZ MILLS, which are unequalled for



Strength, Durability and Economy.
Will wear three times longer than any iron shoes.
BUILDERS AND CONTRACTORS
Of Quartz Mills, Pans, Separators, Concentrators, Jigs, Hydraulic Rock Breakers, Furnaces, Engines, Boilers and Shalters, and General Mining Machinery in all its details, and Furnishers of Mining Supplies.
All orders promptly filled.

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Examination solicited.

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Quicksilver Strainer.

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For description see MINING AND SCIENTIFIC PRESS, March 6, 1875.

For Cleaning Quicksilver Before Using it for Amalgamation.

Mill-men are invited to examine the Patent Quicksilver Strainer at the office of the Agents,

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TRIP HAMMER QUARTZ BATTERY.

This machine, complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 2,000 blows per minute, in a mortar provided with screens on both sides, and crushes FINE 500 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$300.

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Machinery.

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Manufacturers of ENGINE LATHES, 48 inches swing and smaller; VERTICAL BORING MACHINES, suitable for jobbing and boring Car Wheels; UPRIGHT DRILLS, 36 inches and smaller, and other Machinists' Tools.

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Send stamp for circular.

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CRANK PLANERS.

Superior Design and Workmanship, Extra Heavy (4000 lb.)
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EXTRA HEAVY AND IMPROVED PATTERNS.
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LATHES, PLANERS, BORING MILLS, DRILLS,
BOLT CUTTERS, DOUBLE NOT TAPPING
MACHINES, SLOTTING AND SHAPING
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Kipp's Upright Engine

Has decided merits. Its Beauty, Compactness, Strength, Durability, Economy in FUEL, Ease in Handling, and Small Space required attract the Buyer, and the Price readily commends the Sale.
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From 3 to 75-horse power. Shafting, Pulleys, Hoist Gears, Quartz Mills, Water Tanks, Spanish Arasas, Pumps and Pipes, Hephurn and Belden Pans, and all kinds of Machinery for sale at lowest prices by

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STRIKES BLOW HEAVY OR LIGHT, FAST OR SLOW.
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Orders by mail will receive prompt attention
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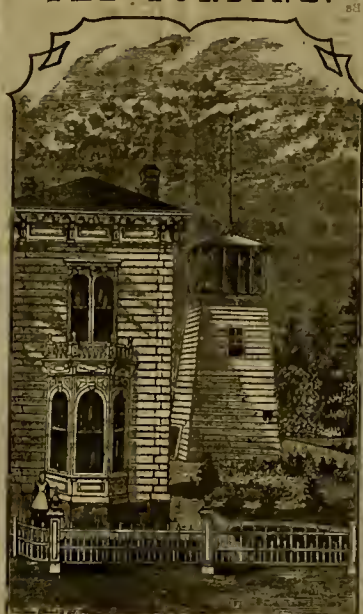
Working Plans and Estimates for Mines and Improvements furnished; will superintend the establishment and working of Mines.

The Concentration of Ores a Specialty.
Agent for the Humboldt Company, Manufacturers of Mining and Concentrating Machinery.

For Plans and Information apply at my Office, No. 12 Kimball Block.
I am prepared to take contracts on Tunnels and the Sinking of shafts.

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Simplest, Cheapest,
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THE INVENTOR OF THE

DEXTER WINDMILL

Has made new and useful improvements in Windmills, and now feels confident of having the SIMPLEST, CHEAPEST, MOST DURABLE, and

ONLY PERMANENT WINDMILL
IN THE WORLD.

SIMPLEST, because it is less complicated; CHEAPEST, because it never needs repair, standing on a firm foundation; MOST DURABLE, because it is all under cover, and has less rigging to get out of order; ONLY PERMANENT, because the only Windmill in the world that has never been injured by storms. Hundreds of people, who have thought the Dexter perfect, will be glad to observe the SUPERIORITY OF THE TURBINE over all predecessors. Although much improved, the price of mills remain the same as formerly. Persons who study their own interest will investigate the TURBINE before purchasing any other.

Territory for sale outside of California, at reasonable rates and easy terms.

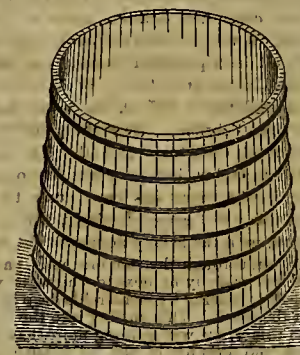
Mills Built to Order of the Best Material, and at the Shortest Notice.

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WATER TANKS of any capacity, made entirely by machinery. Material the best in use; construction not excelled. Attention, dispatch, satisfaction. Cost less than elsewhere.

WELLS, RUSSELL & CO.,

Mechanics' Mills, Cor. Mission & Fremont Streets,
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THE DR. BLY ARTIFICIAL LIMBS

166 Tehama Street,

COR. OF THIRD, BETWEEN HOWARD & FOLSOM

References to parties wearing these Limbs given when applied for.

The best Artificial Limbs made. Send for descriptive circular.

THE "ANATOMICAL LEG" WITH A UNIVERSAL ankle motion; the above cut is its illustration. This artificial leg approaches so much nearer an imitation of the functions of nature than any other, that it stands without a rival among all the inventions in artificial legs, old or new. (The very latest announced new inventions duly considered.)

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166 Tehama street, S. F., Cal.

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THE PACIFIC COAST
12 Per Cent.
CONSOLS.

Interest Payable Monthly, in Gold and Silver.

A MINING, REAL ESTATE AND LAND
COMPANY.

Incorporated February 12th, 1875.

Capital Stock, --- \$27,000,000,

IN CONSOL SHARES OF \$1 EACH,

Of which 13,500,000 shares constitute the Sinking and Investment Fund. Interest payable monthly at the rate of 12 per cent. per annum. Certificates of CONSOLS share receivable at their par value in exchange for any Mining, Real Estate or Landed Property of the Company.

Directors:

T. PHELPS, **W. S. REYNOLDS,**
B. M. FETTER, **L. K. GOODMAN,**
J. H. BATES.

Certificates of CONSOLS only issued at the rate and proportion of 50 per cent. of the cash valuation of property to be represented in CONSOLS shares. Dividend paid from profits and sales of property, and only on shares of CONSOLS that have been issued for property valued and entered on the books of the Company.

Principal Office, 526 Kearny Street.

Principal Depository Agency, Greenbaum's Bank, 306 Montgomery street. After May 1st, office removed to 306 Montgomery street.

Depository Agencies for payment of interest on CONSOLS will be established in the principal cities in the United States and Canada, and in London, as when required.

Interest payable on the 5th of each month at any Depository Agency of the Company.

Certificates of interest-bearing CONSOLS, Class A, First Series, issued for Mining Property in Washoe, Storey and Lyon counties and on the Comstock Lode, in Nevada, will be ready for delivery to subscribers and purchasers on or before April 10th 1875.

Orders for not less than one hundred shares of CONSOLS, with the purchase money required (\$1 per share), may be sent through Wells, Fargo & Co., at our expense. No certificate of stock issued for less than twenty shares. All orders must be addressed, "Office of the CONSOLS M. R. E. and L. Company, 526 Kearny street, San Francisco."

T. PHELPS, President
W. S. REYNOLDS, Secretary.

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This is a Sure Cure for Screw Worm, Scab and Foot Rot in Sheep. It also kills Ticks, Lice, and all Parasites that infest Sheep.

Prevents scratching and greatly improves the quality of the wool. One gallon of the Dip properly diluted with water will be sufficient to dip one hundred sheep, so that the cost of dipping is a mere trifle, and sheep owners will find that they are amply repaid by the improved health of their flocks.

This Dip is guaranteed to cure when used according to directions, and to be vastly superior to Corrosive Sublimates, Sulphur, Tobacco, and other remedies which have heretofore been used by farmers.

Circulars sent, post paid, upon application, giving full directions for its use, also certificates of prominent sheep growers who have used large quantities of the Dip, and pronounce it the most effective and reliable known Cure and Preventive of Scab and other kindred diseases in Sheep.

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MANUFACTURED BY THE

Cal. Chemical Paint Co.

PURE WHITE, AND ANY SHADE OR COLOR.

This Paint is prepared in liquid form, READY FOR APPLICATION—requiring no thinner or dryer, and will not spoil by standing any length of time.

It is Cheaper; more durable, more Elastic, and produces a finish more Beautiful than the best of any other Paint.

It will not Fade, Chalk, Crack, or Peel off, and will last twice as long as any other Paint.

In ordering White, state whether for Outside or Inside use, as we manufacture an Inside White (Flat) for inside use, which will not turn yellow, and produces a finish superior to any other White known.

Put up in 4, 8, 12 and 6 gallon packages, and in Barrels. Sold by the Gallon.

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Bootmakers, Furniture Dealers,
Hatters, Jewelers,
Hotels, Piano Fortes,
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PURCHASERS please say advertised in Scientific Press.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

FRIDAY, M. MAY 7.	200	do.	h. 5. 12
255 Alpha.	21.2	92	92
185 Belcher.	32.34	92	92
390 Best & Belcher.	52.23	93	93
150	do.	b. 5. 52	52
20	do.	b. 10. 54	54
60	Confidence.		
1885 California.	60.26	61	61
185 Chollar.	b. 32.34	92	92
227 Chollar.	72.73	92	92
185 Con Virginia.	452.24	93	93
865 Crown Point.	34.52	92	92
30	do.	b. 10. 54	54
30	do.	b. 10. 54	54
30	Confidence.		
10	Empire Mill.		
395 Gould & Curry.	22.24	92	92
185 Imperial.	81.63	92	92
105 Justice.	1.120		
125 Kentuck.	120.21	93	93
2240	do.	b. 5. 24	24
30	do.	b. 5. 24	24
3125 Ophir.	73.26	92	92
50	do.	b. 30. 75	75
975 Overman.	70.66	92	92
385 Succor.	15.61	92	92
125	do.	120.21	21
75	Silver Nevada.	124.11	11
1455 Union.	1.120		
445 Yellow Jacket.	12.11		
AFTERNOON SESSION.			
260 American Flat.	9.93		
590 Andes.	4.24	93	93
125	do.	120.21	21
315 Baltimore Con.	8.24	93	93
300 Buckeye.	1.150		
30	Caledonia.		
30	do.	1.14	14
11	Challenge.		
20	Cosmopolitan.		
26	do.		
30	do.		
105	do.		
635 Gila.	3.63	93	93
615	do.		
50	Ida Ellmore.		
350	Jefferson.		
10	do.	1.14	14
10	K. K. Con.		
200	Knickerbocker.	3.12	12
55	Lady Bryan.	5.44	44
51	do.		
80	Lady Wash.	1.13	13
210	Leo.		
250	Meadow Valley.	1.12	12
10	do.		
50	Mides.		
10	New York.	2.13	13
360	N. Carson.		
10	North Hill.		
200	Occidental.	3.13	13
300	Pioche.	3.12	12
300	Prussian.	1.14	14
420	do.	1.14	14
420	Poorman.	1.13	13
50	Phil Sheridan.		
50	Pioneer.		
6	do.		
361	Raymond & Ely.	3.13	13
265	Ree Patch.	2.14	14
265	do.	2.14	14
300	South Charlot.	3.13	13
360	S. Hill.	10.10	10
100	Senator.		
100	S. Hill.	10.10	10
190	Utah.	2.13	13
425	Woodville.	2.12	12
150	War Eagle.		
SATURDAY, A. M., MAY 8.			
155 Alpha.	22.22	92	92
155	do.	b. 30. 24	24
195	Belcher.	3.32	32
290	Best & Belcher.	53.24	24
50	Buckeye.		
1065	do.		
40	Bal Con.	5.62	62
325	Crown Point.	3.13	13
1215	California.	12.57	57
10	do.	12.57	57
215	Caledonia.	18.10	10
120	Confidence.		
120	do.		
110	Eureka Con.	3.13	13
80	Empire Mill.		
275	Globe.		
210	do.		
555	Ida & Norcross.	4.10	10
180	Julia.		
170	do.		
170	Kentuck.	15.14	14
100	Lady Bryan.		
100	Meadow Valley.		
3035	Ophir.	18.15	15
275	Overman.	8.16	16
50	do.	b. 30. 52	52
305	Raymond & Ely.	3.13	13
50	do.		
12	Savage.	11.11	11
270	Silver Nevada.	12.12	12
300	Succor.		
115	Union.	14.17	17
20	do.	30. 81	81
MONDAY, A. M., MAY 10.			
40	Alpha.	2.22	22
705	American Flat.	9.24	24
300	do.	b. 30. 94	94
200	Best & Belcher.		
70	do.	b. 10. 13.24	24
510	Ballion.	57.15	15
50	Buckeye.		
290	Ida & Norcross.	4.10	10
35	Bacon.		
305	Chollar.	14.67	67
305	do.	14.67	67
305	Confidence.		
80	Con Virginia.	452.24	24
85	California.	61.26	26
10	do.	b. 10. 11.11	11
115	Caledonia.	19.14	14
23	Dardanelles.		
500	Eclipse.		
10	Exchequer.	b. 30. 29	29
35	Empire Mill.	8.16	16
305	Exchequer.	12.12	12
20	Globe.		
170	Ida & Nor.	40.39	39
650	Imperial.		
60	Justice.	30.11	11
40	Julia.	8.16	16
115	Knickerbocker.	3.12	12
1145	Knickerbocker.	3.12	12
60	do.	b. 25. 24	24
60	do.	b. 25. 24	24
90	New York.	h. 30. 82	82
400	Occidental.	3.33	33
2335	Ophir.	18.15	15
275	Overman.	8.16	16
100	do.	b. 5. 63	63
100	do.	b. 30. 66	66
220	Rock Island.	57.25	25
165	Savage.	105.10	10
10	Silver Nevada.	12.12	12
35	Silver Hill.	11.11	11
40	Ut.	h. 30. 82	82
115	Yellow Jacket.	12.11	11
50	do.	b. 30. 82	82
AFTERNOON SESSION.			
525	American Flag.	9.24	24
390	Andes.	4.24	44
125	do.	120.21	21
125	Condor.	1.13	13
100	do.	b. 30. 13	13
100	do.	b. 30. 13	13
100	do.	b. 30. 13	13
100	do.	b. 30. 13	13
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AFTERNOON SESSION.		AFTERNOON SESSION.	
120 American Flag.	22@24	50 Maryland.	75
640 Andros.	42@44	150 Niagara.	20
380 Belmont.	56@58	125 Pig Gold Hill.	23
380 Belmont.	56@58	125 Pig Gold Hill.	23
250 Constitution.	57@60	25 Prussian.	17
5700 Cosmopolitan.	50@52	250 Panther.	17
400 Conder.	37@38	1540 Pooman.	21
400 Conder.	37@38	100 do.	81
400 Empire.	1.	100 do.	b30:81
420 Gila.	20@22	100 Prospect.	b 10
1120 G. B. Bank.	20@22	800 do.	h 5
380 Jefferson.	37@38	800 do.	h 5
150 Kossuth.	12	220 Raymond & Ely.	47@50
270 Leopard.	13	35 Rye Patch.	14@15
100 Levantian.	12@14	100 Rye Patch.	14@15
145 V. & V. Valley.	20@22	100 S. Island.	75
200 Mansfield.	6@6	355 S. G. Hill.	20@22
70 Mahogany.	30	300 Tiger.	75
565 Miami.	30	125 War Eagle.	44@44
565 Miami.	30	200 Wells-Fargo.	25@25
SALES OF LAST WEEK AND THIS COMPARED		THURSDAY, A.M., MAY 13	
THURSDAY, A.M., MAY 6		THURSDAY, A.M., MAY 13	
450 Alpha.	22@24	230 Alpb.	20@20
290 Am Flat.	22@24	235 Belmont Con.	60@60
600 Bullion.	56@57	420 Best & Belcher.	30
400 Best & Belcher.	22@24	430 Bisher.	30
170 Baltimore Con.	40@42	100 Bisher.	30
220 Belcher.	33@33	70 Caledonia.	10
300 Buckeye.	75@75	300 Crown Point.	22@24
300 Crown Point.	35@35	500 Chollar.	10
170 Baltimore Con.	40@42	500 Confidence.	10
220 Belcher.	33@33	210 Con Virginia.	42@42
300 Buckeye.	75@75	1248 California.	56@56
300 Crown Point.	35@35	200 Conquer.	2
170 Baltimore Con.	40@42	130 Hale & Norcross.	35@35
220 Belcher.	33@33	425 Hale & Norcross.	12@12
300 Buckeye.	75@75	400 Globe.	10
300 Crown Point.	35@35	355 Imperial.	10
170 Baltimore Con.	40@42	125 Justice.	110@110
220 Belcher.	33@33	160 Knicker.	13@13
300 Buckeye.	75@75	50 Knicker.	2
300 Crown Point.	35@35	240 Lady Bryan.	40@40
170 Baltimore Con.	40@42	300 Nevada.	60@60
220 Belcher.	33@33	2350 Ophir.	60@60
300 Buckeye.	75@75	415 Overman.	30@30
300 Crown Point.	35@35	145 Savage.	50@50
170 Baltimore Con.	40@42	700 Nevada.	60@60
220 Belcher.	33@33	185 Silver Hill.	10@10
300 Buckeye.	75@75	515 Silver Hill.	10@10
300 Crown Point.	35@35	533 Utah.	55@55
170 Baltimore Con.	40@42	55 Yellow Jacket.	20@20
220 Belcher.	33@33	AFTERNOON SESSION.	
300 Buckeye.	75@75	115 Andes.	30@30
300 Crown Point.	35@35	230 American Flag.	20@20
170 Baltimore Con.	40@42	400 Belmont.	30@30
220 Belcher.	33@33	20 Challenge.	10
300 Buckeye.	75@75	2600 Cosmopolitan.	150@150
300 Crown Point.	35@35	100 Conder.	10
170 Baltimore Con.	40@42	250 Dayton.	10
220 Belcher.	33@33	1040 Enreka Con.	33@33
300 Buckeye.	75@75	300 Empire.	2
300 Crown Point.	35@35	200 Klippe.	2
170 Baltimore Con.	40@42	335 Golden Chariot.	80@80
220 Belcher.	33@33	700 Jefferson.	80@80
300 Buckeye.	75@75	300 Kossuth.	30
300 Crown Point.	35@35	300 K. K. Con.	24@24
170 Baltimore Con.	40@42	300 Leopard.	14@14
220 Belcher.	33@33	300 Mint.	20@20
300 Buckeye.	75@75	20 Mahogany.	20@20
300 Crown Point.	35@35	200 Mansfield.	14@14
170 Baltimore Con.	40@42	230 Nevada.	60@60
220 Belcher.	33@33	50 North Carson.	10
300 Buckeye.	75@75	49 Niagara.	10@10
300 Crown Point.	35@35	570 New Gold Hill.	14@14
170 Baltimore Con.	40@42	100 Ory Gold Hill.	20@20
220 Belcher.	33@33	490 Occidental.	20
300 Buckeye.	75@75	160 Pioneer.	14@14
300 Crown Point.	35@35	400 Prospect.	10@10
170 Baltimore Con.	40@42	600 Panther.	10@10
220 Belcher.	33@33	605 Ray & Ely.	44@44
300 Buckeye.	75@75	300 S. G. Hill.	20@20
300 Crown Point.	35@35	1350 S. G. Hill.	10
170 Baltimore Con.	40@42	100 Tiger.	10
220 Belcher.	33@33	110 Woodville.	20@20
300 Buckeye.	75@75	600 War Eagle.	20@20

The Mining Stock Market.

Mining stocks, instead of having recovered from their continued dullness, seem to have got worse. A very marked decline is apparent in nearly all descriptions of stock, as our table shows. Ophir, the great leader of the market has tumbled down to \$65.50, the lowest figure reached since February. Everything else is on the same level, Comstocks and all. The cause of the fall in Ophir last week was that on the 1600-foot level a winze has been sunk to the depth of thirty feet perpendicularly, which, at that depth, with the ledge pitching to the east, naturally cut through the rich ore and passed into the low grade lying next to the west side of the ledge, causing a considerable drop in the price of the stock. This cutting into the poor ore with this winze was nothing more than was expected, and does not in the least affect the intrinsic value of the mine; still, the ways of the stock market are past finding out, and it is difficult to tell why the decline has occurred. The Gold Hill News states that the truth of the matter is that no large and extensive body of rich paying ore has yet been developed in the Ophir mine. Some tolerably wide seams of it, however, are met with, and this one at the 1600-foot level is one of the most promising, but it is not so extensive in any direction that drifts, cross-cuts or winzes cannot run off through it. The dip east allows the winze to run through it into low grade ore next to the west wall.

For dividends this month so far we have the big one of the Consolidated Virginia, of \$1 per share, aggregating \$1,040,000; the dividend of the Empire (Grass Valley) mine of fifty cents per share; the Jefferson (No. 2) of fifty cents per share; and the Manhattan (No. 1) of \$1 per share. How long the present depression in stocks will last of course no one can tell, but it seems to be getting worse and worse.

The Overman new pumping machinery is working very well, the water being drained from the shaft. There is no doubt but that the present powerful machinery will be amply sufficient to not only keep down the water, but to drain any body that may be tapped while prosecuting the work of sinking.

THOUGHTLESSNESS.—Persons sometimes return the paper, marked "stop this paper." Their name being pasted on the sheet they think that is all we need to do to cancel their names off. Now that is thoughtless. Your P. O. address is not such a very common name. We have thousands of names arranged out according to locality. Our mailing clerk does not know where everybody lives.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No.	Amt.	Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
American Flag M & M Co	Washoe	7	50	Mar 26	May	May 28	Geo R. Scinney	320 California st.
Albambra Q M Co	Washoe	1	10	Apr 10	May	May 28	G A R. Sney	331 Montgomery st.
Baltimore Cons M Co	Washoe	8	100	Apr 12	May 19	June 7	C A Sankley	331 Montgomery st.
Belmont M Co	Nye Co Nevada	5	100	May 10	June 14	July 6	O H Bogart	402 Montgomery st.
Booth G M Co	Cal	1	15	Mar 31	May 3	May 25	Geo R. Scinney	320 California st.
Cedeno & Hunt S M Co	Ely Washoe	12	300	May 12	June 12	June 12	J T Knebel	414 California st.
Chas. & Mill & M Co	San Diego Co Cal	3	25	Apr 17	May 22	June 14	F Swift	419 California st.
Chief of the Hill M Co	Washoe	6	25	Mar 26	May 21	May 27	Charles S. Neal	419 California st.
Obollar-Potosi M Co	Washoe	6	600	Apr 14	May 18	June 8	W E Dean	419 California st.
Edwards & S M Co	Washoe	3	50	Apr 23	May 28	June 18	G E R. Scinney	320 California st.
Eurona M Co	Washoe	3	25	Apr 14	May 20	June 8	R B Noyce	419 California st.
Gold Mt G M Co	Bees Valley Cal	5	50	May 1	June 5	July 1	J P Oavallier	513 California st.
Hale & McCrossen S M Co	Washoe	46	50	Apr 13	May 18	June 9	J F Lightner	438 California st.
Harlow & S M Co	Ely Washoe	12	300	May 7	June 15	June 15	T B Wilder	414 California st.
Ida Ellmore S M Co	Idaho	17	100	Apr 29	June 4	June 25	C B Higgins	402 Montgomery st.
Julia G & S M Co	Washoe	22	20	May 12	June 15	July 3	A Noel	419 California st.
Justice Co M Co	Washoe	14	300	Mar 18	Apr 20	May 20	J S Kennedy	Merchants' E.
Kellogg-Hunter M Co	Washoe	12	150	Apr 27	May 23	June 18	J H Sney	Stevensons' Bldg.
Ledy Bryan M Co	Washoe	7	100	May 10	June 10	June 29	F Swift	419 California st.
Ledy Washington M Co	Washoe	3	50	Apr 17	May 21	June 8	H O Kibbe	419 California st.
Minty G & S M Co	Washoe	10	20	May 12	June 16	July 9	D A Jennings	401 California st.
Monitor Belmont M Co	Washoe	10	20	Mar 18	Apr 19	May 17	W W Hopkins	414 California st.
New York Cons M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
New York N Co	Washoe	4	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Niagara Oak S M Co	Washoe	4	50	Apr 15	May 19	June 8	R W Townsend	330 Pine st.
Stapleland & S M Co	Ely District	9	100	Apr 11	May 3	June 10	O E Elias	419 California st.
Prussian G & S M Co	Washoe	4	50	Mar 24	May 3	May 22	R H Brown	402 Montgomery st.
Raymond & Ely M Co	Pioche	4	500	Apr 1	May 10	June 5	J W Colburn	418 California st.
Savage M Co	Washoe	8	500	Apr 27	May 10	June 19	E B Holmes	419 California st.
Stapleland & S M Co	Washoe	41	Washoe	41	May 3	June 18	R W Townsend	330 Pine st.
Silver Chari M Co	Idaho	9	100	Apr 24	May 31	June 21	O B Higgins	402 Montgomery st.
South Coriol M Co	Idaho	13	50	Mar 30	May 4	May 25	O B Bogart	402 Montgomery st.
South Comstock G & S M Co	Washoe	2	25	Apr 9	May 12	May 31	J M McPherson	Merchants' E.
Stapleland & S M Co	Washoe	12	300	Apr 18	May 13	June 18	J W Tripp	302 Montgomery st.
Woodville Cons S M Co	Washoe	1	100	Mar 25	Apr 28	May 17	W M Helman	401 California st.
Yellow Jacket S M Co	Washoe	20	50	Apr 7	May 11	June 11	G W Hopkins	Cold Hill Nevada

OTHER COMPANIES.—NOT ON THE LIST OF THE BOARDS.

Albambra Q M Co	Sonoma Co Cal	1	5	May 10	June 10	June 16	R Von Pfister	Merchants' E.
Albambra Q M Co	Cal	1	5	Mar 24	Apr 16	May 15	R Von Pfister	Merchants' E.
Annie Belcher Quicksilver M Co	Cal	1	20	Apr 10	May 12	May 31	J M Buffington	Merchants' E.
Benjamin M & M Co	Lyon Co Nevada	2	10	Apr 14	May 22	June 14	L Leavitt	401 California st.
Booth G M Co	Placer Co Cal	1	15	Mar 31	May 3	May 25	G R Scinney	320 California st.
California Cons M Co	Cal	1	10	Apr 11	May 3	May 25	J W Tripp	408 California st.
Cherokee Flat Blue Gravel M Co	Cal	34	6	Apr 23	May 29	June 19	O H Bogart	402 Montgomery st.
Chicoag Quicksilver M Co	Cal	1	10	Apr 9	May 10	May 31	G R Cottrell	330 Kearny st.
Chrysolofia G & S M Co	Washoe	10	10	May 7	June 10	June 23	A Noel	419 California st.
Coe & S M Co	Grass Valley Cal	1	40	Apr 23	May 28	June 16	A Treadwell	531 California st.
Combination G & S M Co	Inyo Co Cal	6	10	Apr 22	May 27	June 18	D Wilder	Merchants' E.
El Dorado State Co	Cal	2	25	Apr 28	May 27	June 11	Hugh Elias	416 Montgomery st.
Enterprise Cons M Co	Cal	1	25	Mar 5	Apr 24	May 18	F J Hermann	418 Kearny st.
Excelsior Q M Co	Cal	1	25	Mar 20	Apr 26	May 15	R Von Pfister	Merchants' E.
Geeva Cone S M Co	Nevada	1	25	Mar 13	June 14	June 30	I T Milliken	302 Montgomery st.
Golden Crown M Co	Cal	1	30	Mar 3	Apr 23	May 18	E B Holmes	419 California st.
Golden Crown M Co	Cal	2	5	Mar 30	May 1	May 20	Daniel Buck	14 Stevensons' Bldg.
Gold Ran M Co	Nevada Co Cal	11	15	Apr 17	May 10	June 4	O Palmer	41 Markets st.
Illinois Central M Co	Idaho	2	50	Mar 22	Apr 27	May 20	R H Brown	402 Montgomery st.
Illinois Central M Co	Cal	2	50	Mar 22	Apr 27	May 20	W S Belton	402 Montgomery st.
Kentucky G & S M Co	Washoe	8	20	Mar 18	Apr 18	May 22	R Goldsmith	10 Sansome st.
Magenta S M Co	Grass Valley Cal	2	50	Apr 9	May 13	June 1	L Kaplan	Merchants' E.
Mariposa L & M Co	Cal	1	100	Mar 10	May 13	June 7	L Leavitt	401 California st.
Mariposa L & M Co	Cal	1	100	Mar 10	May 13	June 7	L Leavitt	401 California st.
Mesouri Q M Co	Sonoma Co Cal	1	25	Apr 16	May 17	June 7	F H Rogers	330 Pine st.
Monumental M Co	Washoe	1	25	Apr 17	May 19	June 8	W R Townsend	330 Pine st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr 22	May 25	June 12	H O Kibbe	419 California st.
Monumental M Co	Washoe	13	100	Apr				

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., May 11, 1875.

FOR WEEK ENDING APRIL 27, 1875.

POTATO DIGGER.—James J. McKeunor, S. F., Cal.

COMBINED BLOTTER, PAPER CUTTER AND RULER.—Frank R. Angell, Los Angeles, Cal.

WAGON-JACK.—Wm. Henry Horn, Santa Cruz, Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's Office at San Francisco:

REBROGATED OPTIC M. Co.—May 7. Location: Wathoe, Trustee.—Wm. Sherman, J. F. Nesmith, J. P. Canton, P. Malloy and G. W. Gordon.

ALMADEN CO. M. Co.—May 8. Location: Salinas District, San Luis Obispo county, Cal. Trustees.—John F. Money, Wm. J. Ford, W. G. Jones, J. Dennis, Cullen and Eustace Neale. Capital, \$10,000,000.

BUCKEY WATER & HYDRAULIC M. Co.—May 8. Location: Trinity county, Cal. Trustees.—R. R. Craig, A. L. Warner, W. H. Lowden, J. Craig and S. H. Atkins. Capital, \$1,500,000.

SOUTH CAPITAL M. Co.—May 10. Location: Storey county, Nevada. Trustees.—F. G. Smith, J. W. Moyle, O. M. Peck, W. F. Meyers and E. Wheaton. Capital, \$6,000,000.

NORTH MEXICAN G. & S. M. Co.—May 10. Location: Virginia City, Nevada. Trustees.—O. Denerwald, J. B. Treadwell, Marshall Hubbard, J. P. Moore and H. E. Greene. Capital, \$10,000,000.

CARLISLE G. & S. M. Co.—May 10. Location: Meadow Valley Mining District, Nevada county, Cal. Trustees.—Wm. H. Brockman, Samuel Green, Henry Levy, Jacob Zobel and Chas. H. Dewey. Capital, \$1,000,000.

General News Items.

Vice President Wilson has been traveling through the South and expresses himself so much gratified at the true Union sentiment manifested by the people. He has faith in this future of the whole country. Such utterances as these of the Vice President do a great deal of good.

AND now Stockton wants an Elains sensation. A copy from the original was hung up in a billiard saloon of that city. Last Saturday night it was out from the frame, a la San Francisco, and carried off. A Captain Lees is wanted in Stockton.

WILBUR H. STORAY, proprietor of the Chicago Times, has been convicted of libeling the character of a young lady of Rockford, and \$25,000 is the sum the jury think he ought to pay as a salve to heal her injured reputation.

ANOTHER OCEAN HORROR.—This steamship Schiller was wrecked on the Scilly Islands, English channel, on the 7th inst. Three hundred and forty lives are reported lost and only fifteen are known to have been saved.

DOO fanciers may be interested in learning that the Treasury Department acquiesces in the judicial decision that German sausages are exempt from duty under this special provision for Bologna sausages.

A BANK under the control of Flood & O'Brien is to be started in their new building, corner of Montgomery and Pine streets. The capital of the institution will be \$10,000,000.

LEE AR CHU, convicted of the murder of this boy Axtel in this city, has been sentenced to be hanged on Friday, July 2, between the hours of 12 noon and 3 p. m.

THE American rifle team have accepted the tender of a free passage from the Inman company, and will sail for Ireland on the City of Chester early in June.

A COLLISION occurred between two freight trains on this C. P. R. R. last week, by which a brakeman was killed and a conductor severely injured.

HENRY RHODES & Co., of Victoria, have been awarded the contract for carrying the mails between British Columbia and this city.

A PLANING mill and saw mill on the corner of Fourth and Berry streets were destroyed by fire last Sunday afternoon. Loss, \$50,000.

A DISEASE of the eye has broken out among the Nevada Pines, which threatens to destroy the eyesight of the whole tribe.

A JEWELRY store in Albany was entered by burglars last Sunday afternoon and \$15,000 worth of goods stolen from the safe.

GENERAL Phil Sheridan is to be married to Miss Rucker, daughter of General Rucker of his staff, in June.

OVER \$100,000 worth of dogs, mostly pointers and setters, have been imported from Europe during the past two years.

OLD John Bender, the Kansas murderer, has escaped from the custody of this Arizona officers.

JOHN H. BURKE, a resident of this city, dropped dead in an Oakland car last Sunday.

SENATOR Booth has returned home.

The C & C shaft, for the Consolidated Virginia and California mines, on this Comstock, is down 450 feet, the bottom in fine sinking ground, the rock blasting out finely and no water whatever to interfere. Laying this foundation and making preparation for the erection of the splendid powerful hoisting and pumping machinery, which we recently described, is making rapid progress. One set of the boilers are already in position, and all the men are employed at this work that there is room for.

At the Sierra Nevada mine, on the Comstock, a new and powerful air compressor is being erected, with which to run a set of Burleigh drills at the bottom of this shaft. As soon as finished, these drills will add greatly to the speed of the sinking.

The clipper ship Three Brothers has beaten the British King to Liverpool.

BLEEDING FROM LUNGS, CATARRH, BRONCHITIS, CONSUMPTION. A WONDERFUL CURE.

ROCHESTER, N. Y., Jan. 13th, 1874.

R. V. PIERCE, M. D., Buffalo, N. Y.:

Dear Sir:—I had suffered from Catarrh in an aggravated form for about twelve years and for several years from Bronchial trouble. Tried many doctors and things with no lasting benefit. In May, 1872, becoming nearly worn out with excessive editorial labors on a paper in New York City, I was attacked with Bronchitis in a severe form, suffering almost a total loss of voice. I returned home here, but had been home only two weeks when I was completely prostrated with Hemorrhage from the Lungs, having four severe bleeding spells within two weeks, and first three inside of nine days. In the September following, I improved sufficiently to be able to be about, though in a very feeble state. My Bronchial troubles remained and the Catarrh was tenfold worse than before. Every effort for relief seemed fruitless. I seemed to be losing ground daily. I continued in this feeble state, raising blood almost daily until about the first of March, 1873, when I became so bad as to be entirely confined to the house. A friend suggested your remedies. But I was extremely skeptical that they would do me good, as I had lost all heart in remedies, and began to look upon medicines and doctors with disgust. However, I obtained one of your circulars, and read it carefully, from which I came to the conclusion that you understood your business, at least. I finally obtained a quantity of Dr. Sage's Catarrh Remedy, your Golden Medical Discovery and Pellets, and commenced their vigorous use according to directions. To my surprise, I soon began to improve. The Discovery and Pellets, in a short time, brought out a severe eruption, which continued for several weeks. I felt much better, my appetites improved, and I gained in strength and flesh. In three months every vestige of the Catarrh was gone, the Bronchitis had nearly disappeared, had no cough whatever, and I had entirely ceased to raise blood; and, contrary to the expectation of some of my friends, this cure has remained permanent. I have had no more Hemorrhages from the Lungs, and am entirely free from Catarrh, from which I had suffered so much and so long. The debt of gratitude I owe for the blessing I have received at your hands, knows no bounds. I am thoroughly satisfied, from my experience, that your medicines will master the worst forms of that odious disease Catarrh, as well as Throat and Lung Diseases. I have recommended them to very many, and shall ever speak in their praise. Gratefully yours,

WM. H. SPENCER.

P. O. Box 507, Rochester, N. Y.

THE OTHER SIDE.

TURBINE vs. DEXTER.

TO WHOM IT MAY CONCERN.

Whereas, the "Dexter Windmill Company" (composed of two individuals), have published a statement that the so-called Turbine Windmill is an infringement on the Dexter Windmill, and that said Dexter Windmill Company will prosecute any one who purchases the Turbine, I am called upon in the name of Truth and Justice to contradict their statement. The Turbine is no infringement on the patent held by Dexter Windmill Company. Read what Gov. H. H. Haight says on the subject:

SAN FRANCISCO, Esq.—Dear Sir: From an examination of the patent now held by the Dexter Windmill Company, and your patent dated March 16th, 1875, it seems clear to me that your right to manufacture and sell under your patent is unquestionable, without any license from the Dexter Windmill Company. If there were any room for question it would be disposed of by the fact, which I understood to be conceded, that the novelty of the invention patented to you first and transferred to the Dexter Company, consists in the combination with the Governor, and this is dispensed with in your patent of March 16th, 1875.

Respectfully yours, H. H. HAIGHT. Now, for two months or more I was Superintendent of the Dexter Windmill Company, and owned one-third of the stock of said company. I worked early and late in the interests of the company. I had to perform many duties not properly my own, while the Secretary, who was receiving the same salary as myself, seemed entirely careless about his duties. Finally it was told me by one and another that there was to be an effort made to oust me out of my position. I did not believe the statement, but subsequent events have proved the truth of it. I was ruthlessly thrown from my position, and I asked in vain for an excuse for the act. I was answered with insults. My position and salary were given to the President, who did not devote one-fourth

of the time and attention to the business that I had done.

One officer who was incapacitated by a falling, and whose salary was the same as mine, was retained, and seemed to be the moving spirit in getting me out, and afterward made boast of it. "We went to work systematically to get Southwick out, and we succeeded." Then an assessment of one dollar per share was levied on the stock, as I now believe, for the express purpose of freeing me out, and the stock was bought in by the parties now owning it for the assessment and cost of advertising. I then became discouraged and thought of leaving the State. But I had been writing a convenient time to apply for a patent on some very important improvements which I had made, and several of which the D. W. Co. were using. I then found that the improvements would insure me an opportunity to again engage in the Windmill business in California. I have secured the patent which covers the metal binding or shoe on the end of the shutters, and the pivot by which it is secured to the platform, the overlapping shutter having its inner edge bent for the purpose of regulating the amount of wind admitted to the wheel. This takes the place of the governor in the other patent. Also, the lever above the wheel, pivoted in the center and connected by rods, cranks and gudgeons to the shutter in such a manner as to be easily worked by cord and pulleys to open and close the shutter. These improvements are owned only by the Dexter Windmill Company, which will furnish the mills and guarantee protection to the purchaser. Parties having mills of the Dexter Windmill Company, manufactured after this date, are warned to be sure that said mills are free from said improvements, otherwise they will lay themselves liable to the law.

Any one wishing to see either or both of my patents can have an opportunity by applying to me anywhere, as I carry them always with me.

Respectfully,

A. H. SOUTHWICK.

Patentee Dexter and Turbine Windmills

THE PEOPLE'S COMMON SENSE MEDICAL ADVISER.—This work, edited and published by R. V. Pierce, M. D., of Buffalo, N. Y., has been received. It contains 886 pages, with numerous illustrations. Price, post paid, \$1.50. We shall review it at leisure for information for ourselves and readers.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

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REVOLVING FURNACE

For Chloridizing, Deasphurizing and Roasting Ores. Steam Engines and Mining Machinery. Send for our illustrated catalogue.

Mining and Other Companies.

Benjamin Mill and Mining Company—Location of principal place of business, San Francisco, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of April, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Burke, T.	33	100	\$ 50 00
Burke, T.	34	50	25 00
Burke, T.	35	50	25 00
Handy, Joshua.	84	70	35 00
Handy, Joshua, Trustee.	78	24,550	12,275 00
Handy, Joshua, Trustee.	78	2,116	1,058 00
Reardon, John.	80	50	25 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of April, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the company, 408 California street, room 16, on the 15th day of May, 1875, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary.

Office, Room 16, No. 408 California street, San Francisco, Cal.

California Consolidated Mill and Mining Company. Location of principal place of business, San Francisco, Cal.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of April, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Burke, T.	33	100	\$ 50 00
Burke, T.	34	50	25 00
Burke, T.	35	50	25 00
Handy, Joshua.	84	70	35 00
Handy, Joshua, Trustee.	78	24,550	12,275 00
Handy, Joshua, Trustee.	78	2,116	1,058 00
Reardon, John.	80	50	25 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of April, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the company, 408 California street, room 16, on the 15th day of May, 1875, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary.

Office, Room 16, No. 408 California street, San Francisco, Cal.

Carbon Coal Company—Principal place of business, San Francisco, California. Location of works, Contra Costa County, California.

NOTICE.—There is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1875, an assessment of \$1.25 per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, N. C. Fasset, No. 220 Clay street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 22nd day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

N. C. FASSETT, Secretary.

Office, No. 220 Clay street, San Francisco, California.

Cincinnati Gold and Silver Mining Company—Location of principal place of business, San Francisco, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 17th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Cuthbert, Wm.	12	100	\$10 00
Cuthbert, Wm.	38	200	20 00
Cuthbert, Wm.	108	100	10 00
Pilcher, W. J.	80	100	10 00
Pilcher, W. J.	82	100	10 00
Pilcher, W. J.	111	100	10 00
Dorman, S. M.	99	60	6 00
Dorman, S. M.	120	20	2 00
Follingsby, T. H.	100	40	4 00

Names.	No. Certificate.	No. Shares.	Amount.
Follingsby, T. H.	121	19	1 30
Woods, Mrs. A.	44	1,000	100 00
Woods, Mrs. A.	71	500	50 00
Woods, Mrs. A.	115	500	50 00
Woods, S. D.	83	5	50
Woods, S. D.	107	201	20 10

And in accordance with law, and an order of the Board of Directors, made on the 17th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the company, Room 1, No. 531 California street, San Francisco, on the 17th day of May, 1875, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale. WM. SMALL, Sec'y.

Office, Room 1, No. 531 California street, San Francisco, California.

Geneva Consolidated Silver Mining Company.

—Principal place of business, City and County of San Francisco, California. Location of works, Contra Costa Mining District, White Pine County, State of Nevada.

NOTICE.—There is hereby given, that at a meeting of the Board of Directors, held on the 13th day of May, 1875, an assessment of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, Room 14, 302 Montgomery street, San Francisco.

Any stock upon which this assessment shall remain unpaid on the 14th day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 30th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

L. T. MILLIKEN, Secretary.

Office, Room 14, 302 Montgomery street, San Francisco, Cal.

Gold Mountain Mining Company—Location of principal place of business, City and County of San Francisco.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 25th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
W A Knapp, Trustee.	18	100	\$25 00
W A Knapp, Trustee.	19	100	25 00
W A Knapp, Trustee.	78	100	25 00
J D Woodman.	29	500	500 00
G F Woodman.	50	100	25 00
D M Hosmer, Trustee.	49	400	100 00
W A Knapp.	35	500	125 00
W A Knapp.	75	200	50 00
T B Kent.	44	4,125	1,031 25

And in accordance with law, and an order of the Board of Directors, made on the 25th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the office of the Secretary, No. 118 Leidesdorf street, on Monday, the 17th day of May, 1875, at the hour of 1 o'clock p. m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

W. AUGS. KNAPP, Sec'y.

Office, 116 Leidesdorf street, corner of Halleck, San Francisco, California.

Manhattan Marble Company of California

—Location of principal place of business, San Francisco, California. Location of works, Oakland, Alameda county, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 30th day of March, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
S. G. Betty.	25	10	\$50 00
S. G. Betty.	30	10	50 00
S. G. Betty.	34	10	50 00
John Curlew.	305	119	595 00
Chas Barlow.	94	60	300 00
Chas Barlow.	95	58	295 00
O Beach.	75	25	125 00
O Beach.	76	25	125 00
O Beach.	78	25	125 00
O Beach.	79	19	95 00
O W Howard.	126	119	595 00
T J Arnold.	133	59	295 00
D M Boke, Trustee.	259	7	35 00
D M Boke, Trustee.	260	20	100 00
Alphonso Damm.	231	20	100 00

And in accordance with law, and an order of the Board of Directors, made on the 30th day of March, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at the office of the company, 13 and 15 Fremont street, San Francisco, on Monday, the 17th day of May, 1875, at 12 o'clock p. m., of said day, to pay the delinquent assessment thereon, together with cost of advertising and expenses of sale.

L. L. ALEXANDER, Sec'y.

Office, Nos. 13 and 15 Fremont street, San Francisco, California.

Martin & Walling M. & Co.—Principal place of business, San Francisco, California. Location of works, Contra Costa County, California.

NOTICE.—There is hereby given, that at a meeting of the Board of Directors, held on the 24th day of April, 1875, an assessment of fifty (50) cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, 408 California street, room 16, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of May, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 15th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

B. F. HICKOX, Secretary.

Office—408 California street, room 16, San Francisco, Cal.

Orleans Mining Company.—Location of principal place of business, San Francisco, California. Location of works, Contra Costa County, California.

NOTICE.—There is hereby given, that at a meeting of the Board of Trustees of said corporation, held on the 27th day of April, 1875, an assessment (No. 4) of one dollar per share was levied upon the capital stock of the corporation, payable immediately, in gold coin of the United States of America, to the Secretary, at the office of the company, Room 8, No. 315 California street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of May, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 22nd day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. P. THURGOOD, Secretary.

Office—Room 8, No. 315 California street, San Francisco, Cal.

Virginia Consolidated M. Co.—Principal place of business, San Francisco, California. Location of works, Kearsarge Mining District, Inyo county, State of California.

NOTICE.—There is hereby given, that at a meeting of the Board of Directors, held on the 21st day of April, 1875, an assessment of ten cents per share was levied upon the capital stock of

Iron and Machine Works.

San Francisco Boiler Works,

(Will Remove about June 1st, to N. W. Cor.
Harrison and Main.)

123 and 125 Beale Street.....SAN FRANCISCO

F. I. CURRY,

Late Foreman of the Vulcan Iron Works, Proprietor

High and Low Pressure Boilers of all
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SOLE MANUFACTURERS OF THE CELEBRATED

SPIRAL BOILER.

SHEET IRON WORK of every description done
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All kinds of JOBBING and REPAIRING promptly
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INCORPORATED.....APRIL 30, 1868.
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Manufacturers of Steam Engines, Quartz and Flour
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Dunbar's Patent Self-Adjusting Steam Piston

PAOKING, for new and old Cylinders.

And all kinds of Mining Machinery.

Front Street, between N and O streets,
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PIPE, of any size and for any pressure, and contract to
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fitted up with the improved axle and box—introduced by
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wheels made in this State.

All kinds of Machinery made and repaired.

24v22-3m JOSEPH MOORE, Superintendent.

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Manufacturers of Quartz and Amalgamating Machinery.

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For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

PATENTED NOVEMBER 25th, 1873.

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MADE OF WOOD AND GLASS.

Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

FIEDLER'S QUICKSILVER CONDENSERS,

MADE OF IRON.

Patented February 24th, 1874. See MINING AND SCIENTIFIC PRESS, November 15th, 1873.

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SAN FRANCISCO.

ALL KINDS OF BRASS, Composition, Zinc, and Babbitt Meta
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Gears of superior quality. All kinds of Cocks and Valves, Hy-
draulic Pipes and Nozzles, and Hose Couplings and Con-
nections of all sizes and patterns, furnished with dispatch
at PRICES MODERATE. 2v

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McAFEE, SPIERS & CO.,

BOILER MAKERS

AND GENERAL MACHINISTS,

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Having much experience in the business of the Re-
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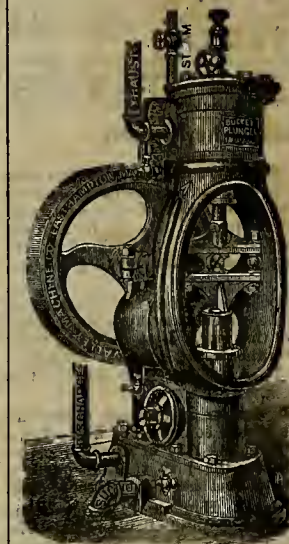
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Of all sizes—from 2 to 60-Horse power. Also, Quartz
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ALWAYS RELIABLE.

FRANCIS SMITH & CO.,

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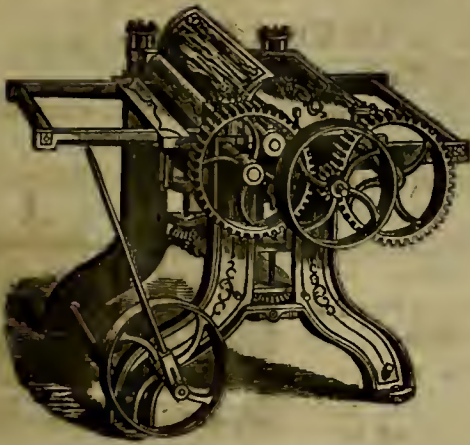
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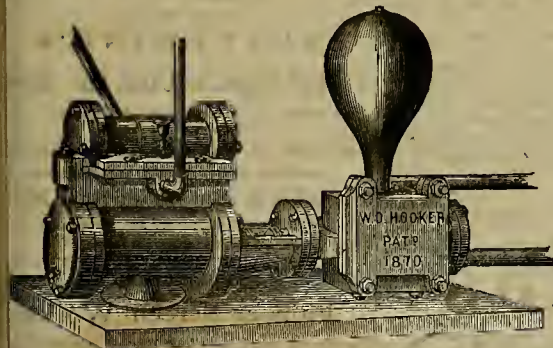
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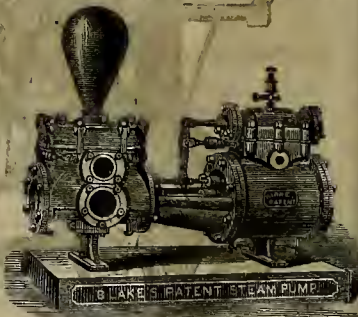
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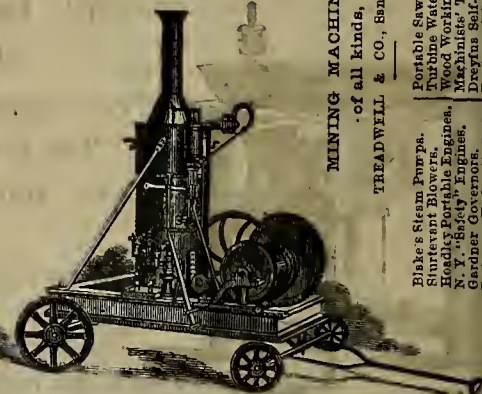
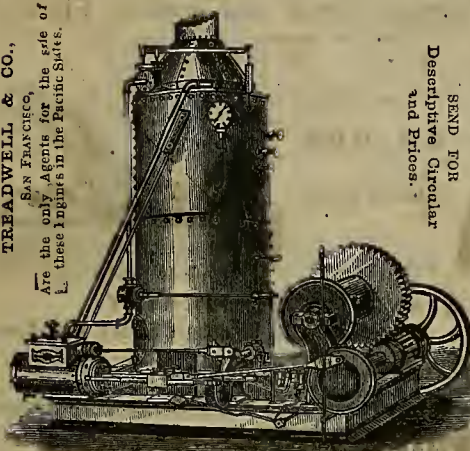
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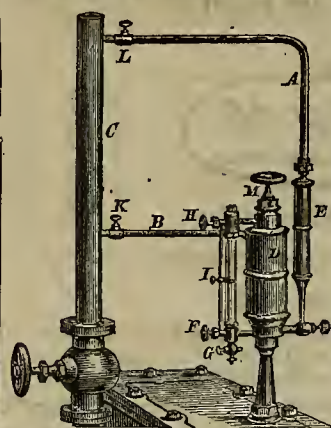
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SAN FRANCISCO, SATURDAY, MAY 22, 1875.

VOLUME XXX
Number 21.

Rae's System of Amalgamation.

One of our Eastern correspondents, Mr. W. C. Quimby, sends us a description of a matter of interest to many of our readers, which has recently been attracting considerable attention in the Eastern States. It is an electrical process of extracting precious metals from ore. The method is called "Rae's System of Amalgamation." The following extract from an article in the New York Sun contains a correct description of this system and its mode of operation, and the engraving on this and page 337 will show the reader the mechanical arrangements:

This process, which has been used for more than a year in the mill attached to a gold mine, with the most positive success, is the invention of Dr. Julio H. Rae, who for many years made electricity a special study, then rendered himself practically familiar with the methods and principles of gold and silver amalgamation, as used in mining, and finally applied electricity in a way to effect an amalgamation so perfect as to

Save From Eighty to Ninety-Five Per Cent. Of the precious metals contained in the ores, uncombined with refractory salts. That his process does achieve this result is attested by men of science and practical miners, who, incredulous at first, visited the mill where the method was in full operation, applied the severest tests, examined thoroughly the facts, in one case at least, took absolute charge of the mill, to make any deception impossible even were it contemplated. One after another they became fully convinced that the process would actually, did actually, accomplish all that was asserted in its favor by the inventor.

Having watched all the work done in extracting the gold contained in a ton of ore, from the time when the rock was placed in the mortars to be pulverized till the amalgam was ready for the retort, the writer can describe

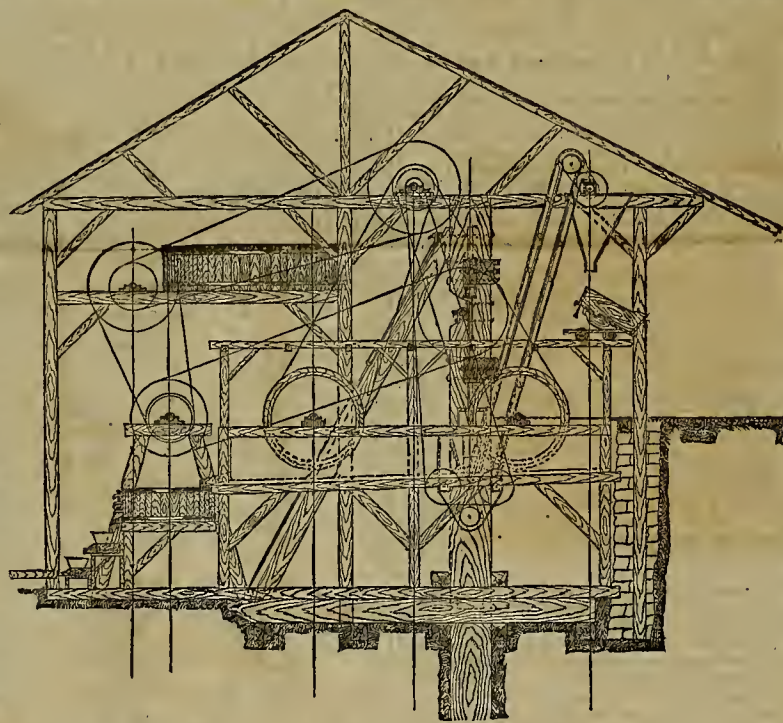
The Process From Personal Knowledge. In this process no water is introduced in the mortars and the rock to be crushed must be perfectly dry. In all mills the degree of fineness to which the rock is powdered is regulated by a screen, through which alone the pulverized ore finds egress from the mortars.

In Rae's method very fine screens are used, so that the rock is reduced to a very minute powder before it escapes from the batteries. It is then carried by an elevating belt to a platform above the battery, where it is emptied into a car large enough to hold one ton of crushed rock. When this amount is received, the car is removed and another placed in its stead. The car already charged with the ton of powdered rock is rolled forward till it is above the amalgamating machinery. This consists of a large tank, so inclined that fluids will readily flow from it through a vent in the lower end. Across this tank, their axes resting on journals supported by its sides, are two cylinders, each seven feet long and four feet eight inches in diameter. On one side of each cylinder, half way between the ends, is a large opening called a manhole; on the other side, opposite, is a large faucet. By an ingenious contrivance the manhole can be closed with absolute tightness. Inside, upon the axis of each cylinder, is a voltaic pile. Below the vent of the tank is a circular cistern, five feet in diameter and one foot six inches high, called a dolly or agitating tub. An upright shaft, standing on the center of the bottom of this tub, is made slowly to revolve. From a horizontal cross-piece, placed on this shaft a little above the level of the tub, iron teeth one foot six inches long descend. On the side of this tub opposite the vent of the tank are four holes, one above the other, through which fluid may pass into an amalgamated copper vessel, in shape an inverted hollow truncated cone. In the center of this copper vessel, called a washer, is a hollow sphere pierced with small holes. In this sphere terminates a water pipe connected with a reservoir above, and provided with a stopcock to regulate the flow and pressure of the water. Below this washer is another, smaller, but in every other respect similar in shape and arrangement. Such is the amalgamating machinery. The amalgamation is effected as follows:

From the car above the machinery the pulverized ore is, by a chute, emptied into one of the cylinders through the manhole. Water is then introduced till the cylinder is two-thirds full. Any necessary chemicals, and from fifty to 100 pounds of quicksilver, according to the richness of the ore, are added at the same time. The manhole is then closed so tight that nothing can escape, and the cylinder is revolved during from three to four hours. Then the faucet is opened, and ninety to ninety-five per cent of the quicksilver runs into a vessel ready to receive it. Another vessel is substituted for this, and receives a large portion of the amalgam. The remaining contents of the cylinder are then allowed to flow out into the tank and are washed down into the dolly-tub where they are constantly agitated by the teeth on the cross-piece before mentioned. From this tub they pass into the washer, in which the jets of water from the holes in the hollow sphere keep the mass constantly in movement, so that any amalgam quicksilver or gold which shall

equipoise necessary to accept or reject theories or parts of theories, according as they should stand the list of scientific examination, he first proceeded to make himself familiar with all the known facts of amalgamation, then to develop and apply his theory. He frankly admits that many times his attempts to accomplish what he has now achieved seemed to result only in failures. But having assured himself that he was following the lead of a settled principle, he was certain that apparent failures were but so many processes of elimination, and he did not hesitate to invest his time and money in the work of bringing into actual and manifest operation what he was satisfied must be a latent fact.

He appears very positive as to what his system can do, and very careful not to claim for it anything that its actual performances will not warrant. So scrupulous was he in this respect that he refused to sell or permit his system to be used by any one else till he had put it to the practical and satisfactory test of a



Elevation—Perspective View of Complete Mill in Running Order.

have escaped from the cylinder and the dolly-tub sinks to the bottom of the first, or, at any rate, of the second washer.

Before seeing the demonstration of actual experiment, expert miners refused to believe that the efficiency of quicksilver, for the purpose involved, would not be destroyed by the treatment it receives in this process. As a matter of fact, conceded and asserted unanimously, the mercury comes from the cylinders bright, lively, and in the best possible condition to seize the particles of gold.

Instead of the car by which the crushed ore is moved, carrying belts or screws, and a hopper over the cylinder, are sometimes used. This indeed is the most advantageous arrangement, as it saves man power. Our correspondent writes that he has had several interviews with the inventor. He says he is companionable, ready, keen, and seems to be dogmatic, only as to the merits of his invention, which he has proved by long, patient and thoroughly conclusive experiments. Our correspondent says: Years ago, while a practicing physician, his attention was particularly turned to the study of electricity, more especially its medicinal and mechanical effects. In the course of time, the imperfections and waste of the common methods of amalgamation were brought incidentally to his notice. He conceived the theory that by the use of electricity better results could be obtained. A practical man, with the energy, the brains and the mental

year's constant use in a quartz mill. This test was triumphantly sustained. Eminent experts who had come to have a very strong prejudice against every kind of new "process," and were utterly skeptical as to the merits of this system, visited the mill, took charge of it, examined the ore and the tailings, in short applied the severest scrutiny, and came away thoroughly convinced, and to-day this system could have no stronger endorsers than are these very experts. The special merits and advantages claimed for this method are:

1. Preservation of quicksilver from loss, and always in a clear, bright and healthy condition, while its activity is increased.
2. Ease of manipulation.
3. Economy in construction of, and in working the mill.
4. Simplicity of the entire work; no mystery involved; no superior scientific skill required.
5. Close approximation of metal extracted from all milling ore to full value of such ores, as shown by fire assay.
6. Certainty that by the use of this method low grade ores may become valuable, and many mines now abandoned may be rendered profitable.

Another great advantage is that any man of ordinary intelligence may be taught to run this system in a few days, and that the mill will not be stopped to "clean up," as it is done with every ton of ore amalgamated.

It is a well proven fact that mines which

before this method was used were unable to pay working expenses, by its use have been made to yield a good profit. It is alike adapted to the working of high or low grade ores.

What I have said may appear like very positive and high praise, but I believe that facts will show that it is in no respect exaggerated. Dr. Rae will probably be in California some time in June, when he will make a practical demonstration of the working of his process before those interested.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last, Vice-President Henry Edwards in the chair. Gustave Mahe and Ernest L. Hneher were elected resident members, and Jas. L. King and Pembroke Murray were proposed as candidates. The donations to the museum were as follows:

Collection of tertiary fossils, collected north of San Francisco, from Dr. Henry Hemphill.

Fragmente of wood from an artesian well 180 feet deep, presented by John Hall, Alvarado.

Specimen of Ahies Douglasii, from Mr. Henry Edwards.

Indian mortar, presented by Mr. Amos Bowman.

Mounted peacock (a very handsome specimen), from Mr. James Lick.

Portion of a skull, presented by Mr. M. O'Hara, of Jacksonville, Oregon.

Small and peculiarly colored snake, found by Master Willie Lockington, in the hills back of Oakland.

Mr. Wm. Guerin read an exhaustive paper on the "Sewerage System of San Francisco." Mr. Guerin's idea is to divide the area of the city into three districts, and he described the form, pitch, and several distributory laws applicable. He thought flushing the sewers of little value, but advocated an arrangement of grade so that sewers along streets having a great elevation should be discharged into those having less, and thus the velocity of flow in one system made to contribute to wash out and keep free those necessarily more level. The paper included many minute details, and was mathematically illustrated by drawings upon the blackboard. This was one of the most valuable engineering papers that have been read before the Academy for some time.

An interesting paper by J. E. Clayton, of Salt Lake City, on "The Glacial Period—its Origin and Development," was read. This is referred to elsewhere in this issue.

The Secretary then read an extract from a letter by A. W. Keddle, County Surveyor of Plumas county, confirming the claim of Dr. Harkness as the rightful discoverer of Lake Harkness. It was asserted by some of the papers that this lake was perfectly well known, and that the Doctor was not the discoverer; Mr. Keddle, however, made the official map of the county, and he did not know of its existence. It is probable that those doubting the statements of Dr. Harkness confounded two lakes in the same vicinity.

The Trustees of the Academy have authorized W. N. Lockington to solicit subscriptions to procure the necessary books of reference to assist the curators in arranging and cataloguing the museum.

The California State Dental Association will hold its sixth annual session in this city on June 8th. The object of this association is to elevate the character and dignity of the profession, to establish uniformity in practice upon scientific principles, and to develop that desire for mutual cultivation, literary research and scientific investigation so much needed in all professions.

HEAVY MELT.—One day last week in the melter and refiner's department of the U. S. Mint in this city, 70,000 ounces of gold were melted and run into \$20 ingots. This is over two and a quarter tons of gold melted in one day. Who says the mines are giving out? This melt is said to be the largest quantity of gold ever melted in one day in any mint.

Home Industries.

The Bag Factories of San Francisco.

Among the important industries of San Francisco the manufacture of bags must not be overlooked. When we consider that the immense wheat crop of California exported, last year exceeding 8,000,000 cents, is packed into bags and so loaded aboard ships, it will be seen that the supply of bags must be proportionately large. To meet this demand the bag factories of San Francisco were called into existence.

Amount of Capital Employed.

It is difficult to arrive at the exact amount of capital employed in this business, but it is safe to say that \$500,000 would not be an excessive figure.

Number of Bags Used.

The number of grain bags used during the year 1873, was, in round numbers, 10,000,000. In 1874 the number was increased to 15,000,000 and it is estimated by a gentleman well qualified to judge that 12,000,000 will be needed for the grain crop the present season. Of course much the greater portion of these were imported, but there were manufactured over 2,000,000 grain bags in this city the last year, while a company in Oakland manufactured from the raw material as many more. In addition to those designed for grain 2,500,000 flour bags were manufactured here in 1874, and 2,000,000 small bags for salt, etc. In making these bags, 1,000,000 pounds of flax twine is used, besides a large quantity of cotton twine.

The Factories

Are all located quite near to each other, three being on Clay and one on Davis street, and competition is quite sharp between them. The uncertainty of the grain crop this year has had rather a distressing influence on the business, though in the past week it has rallied somewhat, as the prospects for a better harvest have brightened.

Neville & Co.,

At No. 113 Clay street, have forty sewing machines, twenty-one of which are in use. They now employ forty-eight hands, all men. A skilful workman will turn out in a day of ten hours, 1,000 grain bags, with a machine. This firm manufactures entirely by machine, and claim their goods equal to any hand sewed bags in the market. No. 105 Clay street is occupied by Neville & Co. for storing second hand bags, and manufacturing tents, a branch of the business in which they are largely engaged. At No. 115 Drumm street they also have a force of men employed in repairing bags. They import their own material and at present have several large invoices stored in the Bay Warehouse.

Detrick & Co.

This firm, located at No. 123 Clay street, have seventy sewing machines of the Grover & Bakern pattern, but in the present dull season only run fifty. They employ about 125 hands, mostly girls and boys. The machines are run by girls, and the boys cut the material into proper size, turn the bags after they are finished and pile them in stacks ready for compression by the haling press, which is worked on the hydraulic principle and is a model of its kind. The girls work entirely by the piece, and earn from \$5 to \$8 per week. The boys, some of them, make \$8 per week turning bags. Three examiners are constantly at work in the manufactory on the lookout to detect any imperfection in the sewing or the material of the bag; as an incentive to report anything like a flaw in the work, the boys receive a cent apiece for each defective bag reported. Connected with the manufactory is a printing press where all bags receive the firm trade mark or are labeled as desired. A machine shop and a skilful mechanic afford means for repairing any break in the sewing machines. This firm has sold since January 1, 1875, 1,080,000 bags of different kinds. Their manufacturing capacity is 30,000 a day.

The California Standard Sack Company,

Located at 36 Clay street, is a new organization formed for the purpose of manufacturing sacks of all descriptions, using for that work the Garland needle. This ingenious contrivance, the invention of Mr. H. P. Garland, is deserving of notice. The needle has all the appearance of a spiral spring, is about three feet in length and an inch in diameter. One end of this needle is sharply pointed, and in a groove along the whole length is laid the twine to be used for sewing. Three rubber cylinders of a length equal to the needle are provided. Two of these below form a bed on which the needle rests; the other is placed on top of it and as they revolve the needle is put in rapid motion. The material is fed to it. As it comes within range of the needle the point enters, carrying the twine through and pushing it along, repeating the movement until the end of the cloth is reached. The twine now appears in loops where each entry by the needle was made; but as the end approaches, by an ingenious device the bights of twine along the whole face of the material are gradually tightened until, as it drops from the machine, a close and even stitch is seen. The inventor feels confident that this needle will effect a revolution in bag making—it certainly works well thus far. The company have eight machines in operation, each of which will sew 1,000 sacks per day of ten hours. The best flax twine is used in sewing, and it is claimed the bags already offered in the market have been received with approval. The machines are driven by an engine of eight

horse power. Girls are employed to work the machines, and the sacks are turned by boys. The wages paid range from fifty cents to one dollar and a half per day. A machine is also in use for hemming the material ready for making into sacks. Mr. A. J. Gove is the manager, and evidently the right man in the right place.

J. & P. N. Hanna.

This firm, who are located at Nos. 308 and 310 Davis street, are largely engaged in the manufacture of sacks of all descriptions. They confine themselves, however, entirely to hand sewed work. The making of ore bags is a specialty with them. Coal sacks are also manufactured. They make at least 100,000 a year of the latter. Grain, wool, bean and potato sacks are also made, all sewed by hand. The manufactures of the Messrs. Hanna stand deservedly high in the market, and they are determined to maintain their excellent reputation.

Conclusions.

From the facts given above it will be seen that the manufacturing of bags is entitled to a place among our greatest industries. But what this business now is bears little semblance to what it may become in the future if the experiment, already ventured in a small way, of growing jute and flax within the borders of our State should prove successful. Where now hundreds of hands are employed thousands would then be necessary, and where we estimate the capital used by thousands it would be reckoned in millions.

HURDY GURDY.—We visited last week the Oneida mill, and observed the working of the machinery as now driven by the hurdy gurdy wheel as improved and patented by Mr. Knight of Sutter Creek. The wheel is of cast iron, eight feet in diameter, with peculiar shaped iron buckets attached. The whole space occupied by the wheel does not exceed four feet front by about twelve in height. The water is let on to the wheel through a three-inch nozzle. The fall from the reservoir to the wheel is 230 feet. About 200 inches of water is employed, and with that amount sixty heavy stamps are driven at a speed of eighty drops per minute, and this speed kept steadily up, without any variation. We never saw more perfect work or steadier power. In fact, from the rapid and uniform drop of the stamps, more rock can be crushed in a given time than by any other motive power we are acquainted with. With clear water there is no perceptible wear of either wheel or buckets, and in the course of twelve months running but very little cost for repairs would be incurred. It is astonishing to contemplate the amount of machinery that can be driven by so small a wheel and so small a quantity of water. These wheels are being generally adopted in all the mills in the county where water can be had, and will prove an immense saving over steam.—*Amador Ledger.*

SLICES.—What a terrible gauntlet of conditions—past, present and to come—the silver from our mines is compelled to run if, after once awakened from its bed in the shining depths where nature has built its home, it succeeds in making its escape. Six-mile canon is filled with dams and sluices for the collection of tailings, from beginning to end. The mills for their reduction are kept busy, and then half is not worked up. Thousands of tons are lying waiting to be run over and yield the glittering wealth which has escaped from the mills. The Consolidated Virginia are sluicing for a mile or so below their mill, and doing the thing systematically. Some of the tailings from this mill look like rich black sulphur ore, and yield \$80 per ton. Under the system of sluicing which has been inaugurated by them, there is but little of valuation which in the end escapes them. Gold Hill is also sluiced from the upper to the lower end, and then Silver takes it up and sluices on again. And now Charley Rooke is putting up four strings of sluices at the lower end of Silver City, opposite the bridge, which are to be one hundred and fifty to two hundred feet in length.—*Virginia Enterprise.*

SENSELESS OPPOSITION TO SCIENTIFIC EXPLORATION.—In an address recently delivered before the National Academy of Sciences, at New York, Professor J. P. Lesley, in describing the work done in connection with the second geological survey of Pennsylvania, said that operations were proceeding now in three districts or sections, one having its headquarters at Easton, and extending into Bucks county; another operating in the vicinity of York; and another in the Juniata valley. He said that one section of the state could not possibly be surveyed, and that was the oil region. The moment an assent was put into the oil region the oil men objected, more petroleum being now produced than the market would bear, and the party did not dare go there in order to make measurements on account of the fear of further discovery of oil-producing strata. Among the coal men also a like opposition to the operations of surveying parties was found, so that in those sections of the State nothing of importance could be done.

DISCOVERY OF VALUABLE IRON ORE IN NORWAY.—A large deposit of hematite has been discovered in Nordland, a district of Norway, about twenty miles from Bodo, and ten or twelve miles from a port entirely free from ice. It proves, on analysis, to contain between fifty-four and sixty-seven per cent. of iron, with only a very small percentage of phosphates.

"Petering Out"—California Mines.

The *Foothill Tidings*, published in Grass Valley, Nevada county, California, a short time since received a letter from a California street (San Francisco) stock operator, making inquiry about a Grass Valley mine. It was suggested in the answer to this letter that there were in Grass Valley mines not now working, which might be obtained on reasonable terms, and which were well worth the attention of capitalists. To this the "operator" replied that the Comstock was all the rage, and that people preferred to operate in stocks rather than work even a promising quartz mine. He said:

"The example of Allison Ranch, Empire and Eureka at Grass Valley, all very rich mines at one time, are not very encouraging, to say the least, and unless this mine can be easily and cheaply worked, and the vein promises good width and character, it would not pay to bother with it, as, without exception, so far as I know, the Grass Valley mines have 'petered out,' although very promising at times, and are very irregular in yield.

"I have some idea that the Washington and Eureka districts may turn out larger and better mines, but so far, even in those districts, the mines have not been very satisfactory. Failures have been the rule—some from one cause and some from another—and I believe that not one important mine is now being worked there.

"This aspect of the case goes to show that parties should 'go slow' in putting money into quartz mines in Nevada county. One here and there may be worked at a profit for a few years, but in the end they 'peter out.'"

To this the *Tidings* replies: "Making all due allowance for this letter as a 'bear' movement, without which it would be impossible for a California street operator to negotiate for mines, and still it is apparent that this opinion of Grass Valley mines prevails among capitalists to an alarming extent. Is there any foundation in fact for such an opinion? Let us see.

"Allison Ranch—to begin with those cited by our San Francisco operator—which during its day turned out a round two and a half millions in gold, was worked to a depth of only three hundred and forty feet—475 feet on the incline—and all miners who know anything about this mine and about its shutting down, unite in saying that there are many millions of profit in the old mine yet, with present modes and facilities for mining and milling. Empire, the old Ophir mine, has never failed of paying a profit to good management since its opening in 1851 to the present day, though under a cloud from bad management at several times. Eureka "petered out" the same as all the more prominent mines on the Comstock have at various times; the ore chute, which at one time made the Eureka known as the best mine in California, pitched and went off upon the ground of the Idaho. The same chute continues in depth and extends easterly upon the Idaho ground without limit, so far as is now known. Did Massachusetts Hill "peter out," after running two miles or more of tunnels, working two or three hundred men for several years and taking out several millions in gold? By no means. Square locations was the difficulty with this great mine. Three hundred feet is the greatest perpendicular depth reached and the ledge was left rich and capable of turning out its millions yet at great profit, because its pitch took it off the ground owned by the company having the works. The adjoining ground will sometime, it is hoped, consolidate and work the mine, showing California street sharps that a "peter out" here is not so very different from "one on the Comstock." The Gold Hill mine, which, up to 1865, turned out not less than four millions in gold, beside untold amount in the shape of "specimens" stolen by the miners, is anything but a "petered out" mine in the opinion of men who worked in it last. Skill and good judgment in the early working of this mine would have made it a paying mine to-day, and when capital gets enough of gambling in Washoe stocks some of it will go into Gold Hill and take out many millions more. New York Hill, after yielding half a million or over, "petered out," that is, it cost too much with the machinery then in use and under the then management, to keep the mine clear of water and raise and work the ore. All the miners who then worked in it said the mine was yet a good one and after several years of idleness is now proving that they were right. We might go on and enumerate a score or more mines that to a superficial observer look "petered out," but the phrase is not truly applicable to any mine hereabouts that ever made itself a reputation as a mine. Say if you please that some of our mines have disappointed the over sanguine expectations of such men as make haste to be rich, but not that they "peter out."

ZENGER has succeeded in obtaining photographic proofs of the sun and moon no less than nine feet two inches in diameter. He used a concave mirror instead of the ordinary object glass.

THIRTEEN thousand passengers arrived in San Francisco by steamer and rail during April. This is the largest number arriving in any one month during the history of the city.

Hydraulic Elevators.

The height to which buildings have now to be erected, owing to the concentration of business and the consequent increase in the price of real estate, has necessitated the employment of elevators to make the accommodation of the higher floors available. At first steam elevators came into use in the larger hotels and in buildings provided with a steam engine and shafting. The cost of operating them in establishments not already similarly provided acted, however, as a bar to their general use. This preventive to their extensive introduction has been done away with by substituting hydraulic for steam power. The great diminution in the cost and expense of operating an elevator arising from the utilization of the power furnished by the city water mains, places the convenience of one within the reach of all hotels, warehouses, stores and manufactories.

The manufacture of hydraulic as well as steam elevators has now become quite a business in all large cities, and a large number of patents have been issued for the various devices by which they are operated. There are a large number of elevators in use in this city, and the ordinary "hoisting apparatus" heretofore so generally employed in warehouses is fast disappearing before the more modern and more generally useful elevator.

Five elevators for the Palace hotel are in process of construction at the Risdon iron and locomotive works, which will be capable of lifting 100 persons from the ground floor to the upper seventh story in thirty seconds. They will be worked by hydraulic pressure. The great convenience of an elevator is now within the reach of all establishments of any importance.

DANGEROUS SOPHISTICATION OF SILK.—Silks are being adulterated with a material more dangerous to the wearer than the flour paste and China clay by means of which Manchester men improve the appearance of their calicoes. The French in this case are the offenders, but the fashion they have thus set is one which our textile manufacturers are never slow to follow. By treatment with salts of iron and astringents, and with salts of tin and cyanides, the weight of the fabrics has been raised in some cases by 300 per cent.; and, besides, the silk is rendered highly inflammable, burning like tinder if touched with flame, and liable, besides, under certain circumstances, to spontaneous combustion.—*Iron.*

THE effect of extreme cold upon the human body, according to Lieutenant Weyprecht, the leader of the second Austro-Hungarian North Pole expedition, has been greatly exaggerated. He says that it does not produce difficulties of breathing, pain in the chest, etc., as has been frequently stated. The officers and crew of his expedition bore the cold easily, though most of them were born in a foreign climate. Some of the sailors never once wore a fur coat. Even at the lowest temperature the officers were able to smoke their cigars in the open air, except when the wind supplemented the cold, when the latter became insupportable. The effect of the cold varies according to the quantity of moisture in the air and the state of the personal health; a degree of cold which at one time may be very disagreeable may be endured with perfect indifference at another.

FAST RAILROAD TIME.—The following telegram to the Chicago *Evening Journal*, in reference to the Chicago, Burlington and Quincy Railroad, reports the fastest time on record made with a full express train—other faster time, however, having been made in England, never in the United States, with a locomotive and single car: "Ancona, Illinois, April 29th. The Atlantic Express, conductor Howland and engineer Nixon, has made Mendota to Ancona, fifty-six miles in the unprecedented time of fifty-six minutes. Of the time lost (four hours) by a wash-out at Atlanta City, Iowa, last night, three hours and forty-five minutes were gained between Galesburg and this place, a distance of 126 miles. The run, so far, subtracting stops for dinner, watering and passengers, averages a mile in less than a minute and a half."

THE study of a mineral field progresses by a collection of facts from observation. These form a continual meditation with the mind, the process being, first a positive, then a negative and mediation, which is a starting point for a higher unity; and, when the necessary stadia have been passed, the mind going inductively from elements to principles, rises from the material to ideal, and strata and vein system of the mineral field are reflected or seen in the mind, as they existed before the ores were filled in the iron mountains or lead or copper veins.

PREHISTORIC RELICS.—In the coal shale at Wezikon, according to a Swiss paper, a series of pointed fire-poles covered with wicker-work have been found. These are referred to as being the most ancient evidence yet known of the existence of man, and belonging to the period intervening between the two glacial epochs.

EBULLITION OF SULPHURIC ACID.—According to M. Bobierre, sulphuric acid may be caused to undergo regular ebullition by the addition of thin plates of platinum in the proportion of 180 grains of metal to 32 quarts of acid. The whole is to be treated in a vessel of 55 quarts capacity.

SCIENTIFIC PROGRESS.

The Transit and its Probable Results.

The full result of the patient watchings by the various parties of the late transit of Venus, will not be fully worked up by the scientists for several months. The first proximate determination of the distance of the sun from the earth, hastily computed, comes from a French source, in the form of a letter addressed to the English astronomer royal, Professor Airy, and has been published by the latter. The computations are made by M. Paiseux, an astronomer of the Paris observatory, from eye observations at Peking, Chiao, and the island of St. Paul in the Indian ocean. The result announced for the solar parallax is 8.879 seconds. This is a somewhat larger parallax than the favorite figures now in use among astronomers, though not as high as some estimates that have been made. If correct it will reduce the distance of the sun to about 91,900,000 miles. Professor Newcomb's studies, in advance of the transit, led him to the belief that the distance would ultimately be determined between 92,200,000 and 92,700,000.

Soma of the Difficulties

To be met with in adjusting and comparing the observations taken at the various points were alluded to as follows by Mr. E. Colbert, at a late meeting of the Chicago Academy of Sciences: "I have called your attention at former meetings to the difficulties which will be encountered in the attempt to reconcile these observations—difficulties arising from, first, the irregular shape of the earth, which is not a true oblate spheroid; second, the irregular contour of the sun, its surface being in a state of perpetual commotion; and, third, the errors of observation, which may be regarded as an external kind of 'personal equation.' Summing the probable average of these three factors of error, I conclude that the astronomical world will be fortunate if it is able to reconcile all the observations so as to make it certain that the accepted average is not more than 100,000 miles in error, or one part in 900 of the whole distance.

"There is no reason to doubt that we already know the distance of the sun to within 300,000 miles. This is about one part in 300 of the whole distance; hence the probability is that observations of the transit of Venus in 1874, on which more than \$1,000,000 have been expended, and involving the equivalent of not less than two hundred years of labor on the part of one man, will only reduce the uncertainty to about one-third of its present magnitude; but this will be no mean achievement. It is not saying too much to claim that this result will be worth at least ten times the money and labor expended in obtaining it."

What Cheap Electricity is Expected to Do.

The recent improvements in magneto-electric apparatus, in which, as is well known, all expensive batteries are discarded, being driven by steam power alone, at an expense of five cents per horse power per day, have given such encouraging results that it is anticipated that by further perfection powerful electric currents may be produced cheap enough to perform the operations of manufacturing chemistry, thus far performed by batteries, the hydro-oxygen blow-pipe, by furnaces or expensive chemical reaction, as acids, alkalis, etc.

An inventor in London, (not named in the report from which we borrow the following details,) after having perfected a machine of the kind mentioned, driven by two and a half horse power and equivalent to 500 Bunsen cells, but costing only from twelve to fifteen cents per day to run it, is now making one equal to 1,000 such cells, by which he proposes to produce chemically pure copper, which is now worth from three to four shillings per pound, at the cost of ordinary commercial copper; potassium and soda at less than half their present price; aluminium, now at seventy-five shillings per pound, at thirty or thirty-five shillings, and magnesium, calcium, and other rare metals at prices which will bring them into commercial use. The inventor of this machine has even the courage to declare that he will purify two tons of pig iron from phosphorus, sulphur, carbon and silica in eighteen or twenty minutes, at a saving of two-thirds of the cost. This latter point may be very doubtful, but everything certainly tends to the probability of a glorious triumph in store for practical electrical science.

CURIOUS WATER FORMATION.—We were yesterday presented with a curious specimen of water formation found in the penstock of the Mountain mine, Silver mountain, Alpine Co. The penstock was sixteen feet long, and the water flowing into it formed four slabs, each sixteen feet long, one foot wide and an inch thick, with one side smooth and the other crystallized, the edges being beveled. The formation was deposited within four years. A large specimen is to be donated to the State library and another to the Agassiz institute.—*Sacramento Record, March 12th.*

SIZE OF A MOLECULE.—No person ever saw one, but Sir William Thompson thinks that if a drop of water could be magnified to the size of this earth the molecules would be as large as a shot, or possibly as large as a cricket ball.

Electricity—Interesting Observations.

M. Vikjander, during one of the recent Swedish expeditions to the arctic regions, made extended investigations into the electrical condition of the air there existing. All his observations agree, says the *Scientific American*, in showing that the atmosphere conducts electricity at temperatures relatively high, a circumstance to which may be attributed the absence of thunder and the presence of the aurora borealis. It has been suggested that this is due to the great humidity of the air in such regions; but it is evident that the phenomenon must be ascribed to other causes, since the same temperature and the same degree of humidity do not produce a like effect in lower latitudes. At less temperatures,—four degrees and thirteen degrees Fah., and below—the air isolates better. Generally the arctic atmosphere appears to be positively electrified, and the earth negatively. In several instances the air was effectively electric of itself, and this not due to terrestrial induction. During certain periods of the spring, at a time when the air isolated relatively well, both ground and air were charged with negative electricity. This change of the electrical state of the atmosphere was not a constant consequence of greater cold; but when the temperature had been lowered for some time the air had an evident tendency toward a negative condition.

There seems to be a natural connection between these facts and the aurora. During the months of January and February, the latter phenomenon appeared daily, and was especially noticeable on the 19th and 26th days of the latter month. It then disappeared, to reappear, however, on the 2d of March. At the same time changes in the electricity of the air were observed, suggesting the theory that the negative electricity, deprived of the possibility of discharging itself into the aurora, was obliged to accumulate in the lower atmospheric strata, which isolated relatively well. From the 2d to the 11th of March the aurora returned, and during this period the air was in a good conducting condition, or else, when effecting isolation, was positively charged. Subsequent to the latter date, the auroras ceased entirely, and an interval supervened, of low temperature with negatively electrified air, which lasted until the increasing light of the season of the year precluded further auroral observations.

CURIOUS EFFECT OF GAS FLAME.—Mr. S. J. Mixer notices a curious effect of a gas flame on the current of a Holtz machine. The jet consisted of a glass tube drawn out to a point, and the flame had a length of about an inch, and a diameter of only an eighth of an inch. Inserting this between the two terminals of the machine, the length of spark obtainable was increased from less than ten inches to over twelve inches, the full distance to which the balls could be separated. The same increase was not obtained on simply inserting a conductor between the two terminals, a ball an inch in diameter only lengthening the spark about an inch.

CURIOUS PHENOMENON.—A curious phenomenon was noticed during a recent balloon ascent by two experienced French aeronauts of thorough scientific attainments, M. Tissandier and M. de Fonvielle. They were able to hear voices from below, and remarks which indicated that the persons in the balloon were visible to the speakers, although at the time a cloud obscured the surface of the earth from the view of the aeronauts themselves. This occurrence is explained by the hypothesis that a cloud may be transparent and opaque at the same time, according as it may be viewed in different directions.

A NEW WHITE ALLOY.—The name "neogene" is given by M. Sauvage to a new white alloy composed of copper, 57 parts; zinc, 27 parts; nickel, 12 parts; tin, 2 parts; aluminium, 0.5 part; and bismuth, 0.5 part. It has a silvery appearance, is sonorous, tenacious, malleable and ductile, and is recommended for jewelry, as a substitute for silver in plate, and for low coinage. The new elements in the combination are those of the bismuth and aluminium. The alloy is very homogeneous, and is susceptible of a high polish.

OZONE.—According to Schoene, ozone is partly destroyed by passing through water. The extent of this action depends on the length of time the gas is in contact with the water and the surface exposed. Ozone is dissolved by water in small quantity. The quantity of ozone destroyed by the water is far greater than the quantity absorbed. Ozone does not oxidize water to hydric peroxide. Ozonized oxygen standing over water is converted into ordinary oxygen in about fifteen days, with change of volume.

AN EARTHQUAKE RECORD.—In examining some large saltpetre caves in Franklia county, Mo., the columns of spar that had been formed by the dripping of water, and reached from the roof to the clay in the bottom of the caves, had been fractured horizontally, each at the same level. Here was the record of an earthquake, probably that of New Madrid in 1811.

FORCE OF THE WIND.—During the tornado of March 4th, the vibration of the Cape May light-house was so great that the oil in the lamps spilled out of the bowls. A bucket of water had frequently spilled over during some of the gales which howl along the coast.

MECHANICAL PROGRESS.

Metallic Belts and Band Saws.

Metal bands can never be employed successfully for the transmission of power. A soft steel band one-twenty-fourth of an inch thick, running over a drum thirty-six inches in diameter, the latter revolving 350 times per minute, will last from 80 to 100 days, when it will break. After splicing it will run from about five to eight days, when it will break again; but at this time it will show several more cracks, and perhaps be found to be already breaking in two or three places. The metal band will not last one-fiftieth part as long as the leather band under these conditions. On smaller or larger drums the band will last a correspondingly longer or shorter period.

Band saw-blades also act in the same manner. Many an apparently sound saw-blade from one-fourth to one-half inch in width breaks every day or oftener, which it did not do when first put on. It has become brittle on account of the great number of times it has been bent. It is, in fact, what we call worn out. By using a band-saw when new, the blade being from one-fourth to one-half inch in width, it can be used up to one-eighth or within one-sixteenth of an inch without breaking.

According to a statement from a good author, metal bands also stretch—and very much too. Some were well tried about twelve years ago. Another objection, in many if not all cases, is the expansion and contraction resulting from differences in temperature, the band being at one time so tight that it would break, and at other times so long as to slip. This, however, could probably be obviated by a tightening pulley; but the use of this pulley would in many cases be inconvenient.—*Scientific American.*

Internal Grooving in Steam Boilers.

In the last annual report of the Hartford steam boiler insurance company we find, among many other not generally suspected causes of boiler weakening and consequent explosions, the following: This defect (internal grooving) arises from similar causes in the use of impure water. In a former report it was stated that internal grooving was caused principally by a disturbance of the fiber of the iron, caused by the effort of the boiler under heat to adjust itself to certain conditions. Thus a boiler, as is well known, is made of sheets or plates with the edges lapping one over the other. It will be readily seen that no matter how well a boiler is constructed its form can only approximate to a true cylinder. Hence, under internal pressure, the effort to arrive at a perfect cylindrical form brings an undue strain to bear along the inner edge of the lap, which, by being varied from time to time under different degrees of pressure, is effected very much as a piece of iron would be by bending it back and forth many times, only in less degree. Now, this continued variation from day to day, year in and year out, disturbs the fiber of the iron along the edge of the lap, and renders it more liable to the attack of acids in the water. It will be seen in these cases that the groove is narrow, and looks as though it had been originally cut with a tool. The grooves along the girth-seams are caused in a similar way. The heat on the bottom of the boiler expands it more than the other portions, and there is a tendency to cause the boiler to bend back and forth at a point or at points at right angles to its length. These points are along the edge of the inner lap of the girth-seam. The fiber becomes disturbed and loosened, and is consequently readily attacked by the acids in the water. Fretting of the boiler in its setting doubtless aggravates the difficulty. This defect has been attributed by some to galvanic action. One obstacle to this theory, however, would seem to be the fact that the corrosion is confined to such narrow limits.

BESSEMER STEEL WORKS IN SWEDEN.—According to the latest accounts, there are now thirteen Bessemer steel works in operation in Sweden. In most of these works great attention is being paid to the production of extremely soft steel, or rather what should be termed Bessemer iron, as when of the desired quality it only contains from 0.1 to 0.15 per cent. carbon, and at most should not exceed 0.2 per cent. carbon, in order to qualify it for making the soft steel plates, for which there is so great a demand. The Swedish steel makers have, however, found very considerable difficulty in keeping up a uniform production of this quality from the Bessemer converters, which are usually in Sweden fed direct from the blast furnace, not only because such almost pure metallic iron requires so high a temperature to keep it in perfect fusion, that it is much disposed to solidify and form sculls or crusts in the pouring ladles, but also because the metal thus nearly free from carbon is more apt to take up oxygen and become redshort, which can only be corrected by the addition of spiegeleisen, which in its turn is apt to introduce too much carbon as to elevate the percentage of carbon in the product above what was intended. These circumstances are now combining to make the Swedish Bessemer steel manufacturer very cautious as to taking contracts for large quantities of such soft steel, except at sufficiently high prices to cover all risks.

Progress of the Arts.

A most noteworthy illustration of the progress of some of our arts is this, that those who practice them are daily becoming not only more willing to lay by their older machinery but with haste and energy are throwing it out and bringing in a new.

It is hardly longer ago than yesterday that watches began to be made by cunningly devised machinery, which in nearly all of its details is less liable to error than the bands that made it, and yet this very perfect machinery has entirely supplanted and driven out of use, or at least out of a very wide market, the primitive hand fixtures by which the same work was done before.

Some of our iron mills have before now been spoken of, not with literal truth to be sure, but yet with a handsome margin in favor of the statement, as using acres of cog-wheels and similar fixtures in doing their work, and the too with each piece running into or against its neighbor with a rattle and a roar that needs to be seen and heard to be appreciated. Strange to say there are still those who retain in use these antique relics, but their balance-sheet will nevertheless rule them out before long, or else it will order a halt, more ruinous perhaps than an entire transformation would be.

Our technical schools, and the societies which are in a large measure their outgrowth, have done great things for our metallurgical enterprises, most of all, it is quite safe to say, in pointing out the way in which has lain the possibility of improvement, leaving those whose hands perform the actual labor of manufacture to draw in closely to the path thus shown and to bring up every detail that may be thus found to be in arrears.

One of England's best writers has said that there are rarely more than a very few in each generation who really take the great steps of industrial progress, by which their contemporaries and their successors find themselves advancing, so that the great majority of the rank and file can hope to do little more than to fill up as completely and richly as may be the great outlines thus sketched.

Five Hundred Shots a Minute.

A machine gun was exhibited and tested a few days since in the Twenty-second regiment armory. Mr. William B. Farwell, the inventor, operated and explained his invention. Among those who saw the experiment were Col. John E. Gowan and Col. Knox of the Ordnance Bureau, Col. Porter and many other officers of the National Guard.

Mr. Farwell's invention consists of ten steel barrels of twenty-five calibre, arranged exactly parallel to each other in a metallic frame. From center to center of the outer barrels is three feet. Each barrel is charged separately from a magazine containing fifty rounds of ammunition. The charging, firing and extraction of exploded shells are all accomplished by the turning of one crank, at each revolution of which the whole ten barrels are discharged, emptied and reloaded.

With relays of magazines five hundred shots can be fired a minute. A system of cog wheels connects the firing crank with a traverse, and each turn of the crank traverses the exact width of the target. Thus the gun is automatic in this particular, designed to pick off a line of battle in regular detail.

Its points of difference from the Gatling gun are in the simultaneous loading and firing of ten barrels, the latter loading each barrel through the same magazine aperture and firing but one shot at a time.

Mr. Farwell had only one magazine at the trial yesterday, so the actual rapidity of fire attainable was not demonstrated. The fifty shots contained by that one magazine, however, were several times fired in six seconds. The appearance of the target after firing, all the shots having struck at about the height of a man's breast, showed how irresistibly destructive such a weapon would be in a street fight or in resisting a charging enemy.—*N. Y. Sun.*

AN IMPROVED BLOWER.—Mr. D. P. Morrison, of Newcastle-on-Tyne, civil and mining engineer, has patented an invention which refers to ventilators, fans, and blowing machines, and consists of a casing having one or more inlets and outlets, and of blades made to revolve in the casing, so as to draw in air at one part and discharge it at another part. The provisional specification describes the construction of blades so that they widen out towards their periphery, and are slightly curved in a forward direction; also the making of the inlet or inlets of funnel shape or conical; also where there are inlets on both sides of the casing, the employment of a disc in the middle of the fan to prevent the opposite currents interfering with each other.

A NEW PROCESS FOR ORNAMENTING METAL SURFACES.—has been recently invented in this country. It consists in plating, electro-plating, or otherwise covering a plate, bar, or ingot of soft metal, and then rolling out or pressing the ingot into a sheet; whereby the coating is broken into irregular forms, and a marbled appearance produced on the surface of the sheet.

A KENTUCKIAN has invented a street car, the motive power of which is compressed air, effecting the same as steam upon an ordinary engine. The seats of the car are the air reservoirs.

Sales at S. F. Stock Exchange.

FRIDAY, A. M., MAY 14.

150 Alpha.	20.01/2
150 Belcher.	20.01/2
100 Best & Bel.	47.01/2
420 Bullion.	18.01/2
17 Bacon.	18.01/2
420 Baltimore Con.	4.01/2
35 California.	17.01/2
1615 California.	36.01/2
520 Chollar.	31.01/2
30 do.	31.01/2
120 Con Virginia.	41.01/2
795 Crown Point.	21.01/2
50 do.	21.01/2
50 Empire Mill.	1.01/2
425 Gould & Curry.	17.01/2
700 Globe.	14.01/2
105 Hale & Norcross.	33.01/2
180 Imperial.	1.01/2
115 Justice.	30.01/2
675 Julia.	7.01/2
220 Knickerbocker.	13.01/2
60 Lady Bryan.	4.01/2
1745 Mexican.	15.01/2
2380 Ophir.	39.01/2
10 do.	39.01/2
285 Overman.	5.01/2
63 Seg Belcher.	8.01/2
60 Success.	1.01/2
30 do.	1.01/2
170 do.	5.10/2
135 Savage.	9.01/2
190 Sierra Nevada.	10.01/2
315 Union.	3.01/2
200 do.	3.01/2
175 Yellow Jacket.	16.01/2

AFTERNOON SESSION.

125 American Flag.	2.01/2
850 American Flat.	2.01/2
655 Andes.	3.01/2
30 do.	3.01/2
50 do.	3.01/2
275 Belmont.	2.01/2
1000 Calistoga.	1.01/2
1000 Concord.	1.01/2
200 Constitution.	3.01/2
2545 Coenopoliten.	5.01/2
445 Dayton.	1.01/2
600 Eureka Con.	41.01/2
600 El Dorado South.	7.01/2
570 Eclipse.	1.01/2
25 Empire L.	1.01/2
20 Erie.	1.01/2
200 Gila.	1.01/2
1380 Golden Chariot.	5.01/2
10 do.	5.01/2
10 do.	1.10/2
550 Jefferson.	3.01/2
40 K & Con.	2.01/2
40 Kosuth.	1.01/2
50 Levathan.	1.01/2
160 Leopard.	1.01/2
170 Lady Wash.	1.01/2
155 Meadow Valley.	1.01/2
600 Mansfield.	4.01/2
100 Mmt.	2.01/2
305 New York.	1.01/2
100 Niagara.	1.01/2
300 New Carson.	1.01/2
640 Orig Gold Hill.	2.01/2
80 Occidental.	1.01/2
50 Piche.	1.01/2
100 Prusean.	1.01/2
475 Panther.	1.01/2
200 Poorman.	1.01/2
350 Prospect.	1.01/2
235 Raymond & Ely.	4.01/2
30 Rock Island.	1.01/2
50 South Chariot.	1.01/2
100 S Hill.	1.01/2
40 Tyler.	1.01/2
895 Woodville.	2.01/2
100 War Eagle.	1.01/2
200 Well Fargo.	1.01/2

SATURDAY, A. M., MAY 15.

200 Alpha.	20.01/2
300 Belcher.	20.01/2
620 Best & Bel.	48.01/2
925 Bullion.	18.01/2
35 Cal Con.	17.01/2
100 do.	17.01/2
280 Crown Point.	21.01/2
3120 California.	36.01/2
100 do.	36.01/2
270 Chollar.	31.01/2
100 California.	16.01/2
100 Confidence.	1.01/2
100 Con Virginia.	41.01/2
610 Eureka Con.	41.01/2
155 Empire Mill.	1.01/2
575 Globe.	14.01/2
325 Gould & Curry.	17.01/2
115 Hale & Nor.	33.01/2
20 do.	33.01/2
230 Imperial.	1.01/2
35 Justice.	30.01/2
60 do.	30.01/2
120 Knickerbocker.	13.01/2
100 Lady Bryan.	4.01/2
90 Meadow Valley.	1.01/2
645 Mexican.	15.01/2
2305 Ophir.	39.01/2
30 do.	39.01/2
50 do.	39.01/2
50 do.	39.01/2
200 Overman.	5.01/2
30 Raymond & Ely.	4.01/2
140 Savage.	9.01/2
125 Sierra Nevada.	10.01/2
30 Seg Belcher.	8.01/2
50 Success.	1.01/2
120 Silver Hill.	9.01/2
450 Union.	3.01/2
100 do.	3.01/2
165 Utah.	1.01/2
155 Yellow Jacket.	16.01/2

MONDAY, A. M., MAY 17.

315 American Flat.	2.01/2
85 Alpha.	19.01/2
765 Best & Bel.	49.01/2
235 Baltimore Con.	4.01/2
695 Bullion.	18.01/2
5 Bacon.	17.01/2
245 Chollar.	31.01/2
225 Crown Point.	21.01/2
70 Con Virginia.	41.01/2
140 California.	17.01/2
100 Challenge.	1.01/2
600 California.	36.01/2
100 Dancy.	1.01/2
830 Eureka Con.	41.01/2
400 Globe.	14.01/2
385 Gould & Curry.	17.01/2
120 Hale & Nor.	33.01/2
60 Imperial.	1.01/2
110 Justice.	30.01/2
180 Knickerbocker.	13.01/2
200 Knickerbocker.	13.01/2
175 Lady Bryan.	4.01/2
1365 Mexican.	15.01/2
500 M Valley.	1.01/2
555 New York.	1.01/2
285 Ophir.	39.01/2
110 Overman.	5.01/2
30 Rock Island.	1.01/2
125 Ray & Ely.	4.01/2
85 Savage.	9.01/2
95 S Belcher.	8.01/2
20 Success.	1.01/2
70 Silver Hill.	9.01/2
20 Trench.	1.01/2
125 Union.	3.01/2
225 Woodville.	2.01/2
155 Yellow Jacket.	16.01/2

SALES OF LAST WEEK AND THIS COMPARED.

THURSDAY, A. M., MAY 14.	THURSDAY, A. M., MAY 20.
230 Alpha.	20.01/2
235 Baltimore Con.	4.01/2
420 Best & Bel.	49.01/2
240 Belcher.	20.01/2

TUESDAY, A. M., MAY 18.

10 Alpha.	18.01/2
150 American Flat.	2.01/2
150 Belcher.	20.01/2
100 do.	20.01/2
765 Best & Bel.	49.01/2
235 Baltimore Con.	4.01/2
50 Bullion.	18.01/2
150 Chollar.	31.01/2
550 Crown Point.	21.01/2
50 Challenge.	1.01/2
1710 California.	36.01/2
300 do.	36.01/2
170 Cal Con.	17.01/2
340 Dayton.	1.01/2
40 Empire Mill.	1.01/2
600 Gould & Curry.	17.01/2
400 Globe.	14.01/2
50 Hale & Norcross.	33.01/2
330 Imperial.	1.01/2
120 Julia.	7.01/2
130 Knickerbocker.	13.01/2
30 do.	13.01/2
30 do.	13.01/2
940 Lady Bryan.	4.01/2
940 Mansfield.	4.01/2
1350 New York.	1.01/2
45 Overman.	5.01/2
600 S Hill.	9.01/2
300 Rock Island.	1.01/2
120 Savage.	9.01/2
10 Sierra Nevada.	10.01/2
315 Union.	3.01/2
10 do.	3.01/2
130 Seg Belcher.	8.01/2
40 Success.	1.01/2
115 S Hill.	9.01/2
470 Utah.	1.01/2
130 Woodville.	2.01/2
65 Y Jacket.	16.01/2

AFTERNOON SESSION.

200 American Flag.	2.01/2
100 Alpha.	18.01/2
150 Belcher.	20.01/2
50 do.	20.01/2
765 Best & Bel.	49.01/2
235 Baltimore Con.	4.01/2
50 Bullion.	18.01/2
150 Chollar.	31.01/2
550 Crown Point.	21.01/2
50 Challenge.	1.01/2
1710 California.	36.01/2
300 do.	36.01/2
170 Cal Con.	17.01/2
340 Dayton.	1.01/2
40 Empire Mill.	1.01/2
600 Gould & Curry.	17.01/2
400 Globe.	14.01/2
50 Hale & Norcross.	33.01/2
330 Imperial.	1.01/2
120 Julia.	7.01/2
130 Knickerbocker.	13.01/2
30 do.	13.01/2
30 do.	13.01/2
940 Lady Bryan.	4.01/2
940 Mansfield.	4.01/2
1350 New York.	1.01/2
45 Overman.	5.01/2
600 S Hill.	9.01/2
300 Rock Island.	1.01/2
120 Savage.	9.01/2
10 Sierra Nevada.	10.01/2
315 Union.	3.01/2
10 do.	3.01/2
130 Seg Belcher.	8.01/2
40 Success.	1.01/2
115 S Hill.	9.01/2
470 Utah.	1.01/2
130 Woodville.	2.01/2
65 Y Jacket.	16.01/2

AFTERNOON SESSION.

200 American Flag.	2.01/2
100 Alpha.	18.01/2
150 Belcher.	20.01/2
50 do.	20.01/2
765 Best & Bel.	49.01/2
235 Baltimore Con.	4.01/2
50 Bullion.	18.01/2
150 Chollar.	31.01/2
550 Crown Point.	21.01/2
50 Challenge.	1.01/2
1710 California.	36.01/2
300 do.	36.01/2
170 Cal Con.	17.01/2
340 Dayton.	1.01/2
40 Empire Mill.	1.01/2
600 Gould & Curry.	17.01/2
400 Globe.	14.01/2
50 Hale & Norcross.	33.01/2
330 Imperial.	1.01/2
120 Julia.	7.01/2
130 Knickerbocker.	13.01/2
30 do.	13.01/2
30 do.	13.01/2
940 Lady Bryan.	4.01/2
940 Mansfield.	4.01/2
1350 New York.	1.01/2
45 Overman.	5.01/2
600 S Hill.	9.01/2
300 Rock Island.	1.01/2
120 Savage.	9.01/2
10 Sierra Nevada.	10.01/2
315 Union.	3.01/2
10 do.	3.01/2
130 Seg Belcher.	8.01/2
40 Success.	1.01/2
115 S Hill.	9.01/2
470 Utah.	1.01/2
130 Woodville.	2.01/2
65 Y Jacket.	16.01/2

WEDNESDAY, A. M., MAY 19.

260 Alpha.	17.01/2
1465 Best & Bel.	42.01/2
500 Belcher.	20.01/2
100 Bacon.	17.01/2
130 Baltimore Con.	4.01/2
370 Chollar.	31.01/2
100 California.	16.01/2
335 Crown Point.	20.01/2
10 do.	20.01/2
10 do.	20.01/2
275 Con Virginia.	40.01/2
50 do.	40.01/2
10 do.	40.01/2
10 do.	40.01/2
270 Chollar.	31.01/2
100 California.	16.01/2
100 Confidence.	1.01/2
100 Con Virginia.	41.01/2
610 Eureka Con.	41.01/2
155 Empire Mill.	1.01/2
575 Globe.	14.01/2
325 Gould & Curry.	17.01/2
115 Hale & Nor.	33.01/2
20 do.	33.01/2
230 Imperial.	1.01/2
35 Justice.	30.01/2
60 do.	30.01/2
120 Knickerbocker.	13.01/2
100 Lady Bryan.	4.01/2
90 Meadow Valley.	1.01/2
645 Mexican.	15.01/2
2305 Ophir.	39.01/2
30 do.	39.01/2
50 do.	39.01/2
50 do.	39.01/2
200 Overman.	5.01/2
30 Raymond & Ely.	4.01/2
140 Savage.	9.01/2
125 Sierra Nevada.	10.01/2
30 Seg Belcher.	8.01/2
50 Success.	1.01/2
120 Silver Hill.	9.01/2
450 Union.	3.01/2
100 do.	3.01/2
165 Utah.	1.01/2
155 Yellow Jacket.	16.01/2

THURSDAY, A. M., MAY 20.

230 Alpha.	20.01/2
235 Baltimore Con.	4.01/2
420 Best & Bel.	49.01/2
240 Belcher.	20.01/2

1375 Bullion.	17.01/2
70 California.	17.01/2
530 Crown Point.	21.01/2
845 Chollar.	31.01/2
100 Confidence.	1.01/2
210 Con Virginia.	41.01/2
1245 California.	36.01/2
40 Dancy.	1.01/2
35 Empire Mill.	1.01/2
20 Exchequer.	1.01/2
10 Hale & Norcross.	33.01/2
425 Gould & Curry.	17.01/2
375 Globe.	14.01/2
355 Imperial.	1.01/2
115 Justice.	30.01/2
480 Julia.	7.01/2
160 Kentucky.	13.01/2
50 Knickerbocker.	1.01/2
50 Lady Bryan.	4.01/2
840 Mexican.	15.01/2
2350 Ophir.	39.01/2
415 Overman.	5.01/2
235 Nevada.	10.01/2
135 Silver Hill.	9.01/2
315 Union Con.	3.01/2
635 Utah M Co.	1.01/2
85 Yellow Jacket.	16.01/2

AFTERNOON SESSION.

1175 Andes.	3.01/2
30 American Flag.	2.01/2
30 Belmont.	2.01/2
200 Challenges.	1.01/2
2600 Coenopoliten.	5.01/2
700 Cornucopia.	1.01/2
100 Concord.	1.01/2
235 Dayton.	1.01/2
1000 Eureka Con.	41.01/2
100 El Dorado S.	7.01/2
30 Empire.	1.01/2
20 Eclipse.	1.01/2
310 Jefferson.	3.01/2
300 Kosuth.	1.01/2
300 K & Con.	2.01/2
300 Leopold.	1.01/2
300 Maryland.	1.01/2
700 Mint.	2.01/2
1000 Mahogany.	1.01/2
1000 Mansfield.	4.01/2
235 Meadow Valley.	1.01/2
30 North Carson.	1.01/2
570 New York.	1.01/2
1000 Orig Gold Hill.	2.01/2
450 Occidental.	1.01/2
400 Prospect.	1.01/2
880 Prospect.	1.01/2
500 Panther.	1.01/2
200 Piche.	1.01/2
240 S Chariot.	1.01/2
1350 S Hill.	9.01/2
100 Tiger.	1.01/2
1310 Union.	3.01/2
600 War Eagle.	1.01/2

AFTERNOON SESSION.

The Mining Stock Market.

The prices of mining stocks this week have been even lower than they were during last week. In fact the bottom seems to have dropped out of the market altogether. Ophir, the great leader of the market, touched \$35 on Wednesday, the lowest price for many months. The transactions in this stock, however, are very large, as they are in California at this present prices. All other descriptions of stock sympathize with the leaders and the prices of all are "off." There is no more reason for this sudden depression than there was for the recent rise. There is no use, however, in trying to account for the depression. It is evident, however, that the market is very much "off." The price of the Ophir stock has fallen from the 1600-foot level of the Ophir shaft and run perpendicularly through the ore to the west wall, owing to the regular easterly dip of the ledge; but since then it has been following the ledge itself in the form of an incline, and at the bottom of this incline was, at last account, ore assaying over \$300 to the ton. This would indicate that the ore vein is all right.

Chronicle, May 15: The Zacatero is about to resume operations under a new firm. Ore at the Josephine continues to be excellent. The company have leased the Zacatero mill for four months, for prospecting purposes. Mina Rica, sinking.

COLUSA.
QUICKSILVER.—Colusa Sun, May 15: The Abbott mine is taking out about three flasks a day, and now has on hand about 130 flasks, and 65 cents is the best price the company has been offered for any now on hand. An assessment of \$3 a share has been levied on the capital stock of the mine. This will pay up the entire indebtedness of the company and leave it with some \$40,000 worth of improvements on hand, and it is believed that the mine can be run with some profit at 50 cents a pound. The Buckeye is taking out plenty of ore, but we are not advised of their exact operations. The Messrs. Rethburn have opened a very rich mine, on a line between the Buckeye and the Turner, and will put up retorts. They have the best looking ore we have seen.

CONTRA COSTA.
IMPORTANT QUICKSILVER DISCOVERIES.—Contra Costa Gazette, May 15: Mr. J. F. Carey, Mr. A. S. Howard and others, within the past two weeks have discovered rich quicksilver ore in large quantities on the respective quarter sections owned by them in the Marsh creek canon, and last Sunday a party from Clayton, E. O. Chapman, Mr. Ryan and others, prospecting in that vicinity, struck an outcropping vein of cinnabar rock which they traced distinctly for several miles across the hills in a southeasterly direction until it was lost in the San Joaquin plain. Mr. Chapman, on Monday, left with a number of pieces broken from various portions of the ledge outcrop, and several experts who have examined them declare them altogether the best surface specimens they have seen from any of the quicksilver districts. There is little room to doubt that this is one of the most important and valuable quicksilver discoveries that has yet been made in this State; and we congratulate our readers who have located claims on their cheering prospects.

MARIPOSA.
QUARTZ SPECIMENS.—Gazette, May 15: Mr. George Boswell, of the firm of Landrum, Boswell & Allen, who are associated together for the purpose of developing the quartz veins which together they have located on Italian ditch, Chowchilla, brought into our office and presented us with several specimens of ore which he had taken from the croppings of what is known as the Boswell lead. The specimens are pregnant with free, coarse gold, and we have no doubt that this section of country, which is only about ten miles in a southeasterly direction from the town of Mariposa, will prove valuable mining district. Mr. Landrum, who the principal discoverer of the veins in this district, has, for the past year, been engaged in searching for veins and placer mines, and has been conclusively that gold in sufficient quantities exists to justify working. We shall turn our attention to this locality, and anything worthy of note we shall give our readers. At the same time we would suggest at this mining section, which promises to be of importance, be styled the "Landrum district."

APA.
LOCATIONS.—Calistoga Free Press, May 15: Out two miles in a southerly direction from Calistoga, ten quicksilver mining locations have been made. Four tunnels have been run from twenty to thirty ft. There is a marked resemblance in formation of surface rock to that of the Sulphur Banks Q. V. mine, Colusa county. The ore has been advanced and found to yield well. Surface rock averages one and one-half per cent., and will pay to work. Good road leads to the mine, and there is abundance of wood and water in the immediate vicinity.

NEVADA.
RICH MINE.—San Juan Times, May 15: The North Bloomfield gravel mining company have recently struck a bed of fine gravel which is lying immensely. This strata was struck near the of their numerous tunnel shafts and only a few ft below the surface gravel, and about sixty or eighty ft above bedrock. It extends to Brock and grows richer as they go down. The company is now washing through two monitors, using 3,000 inches daily. Their dam Bowman's is filled with water, and if no accident occurs they will have a sufficient supply of water to keep the two monitors at work until the fall rains set in. The company now employ about fifty laborers, half of whom probably are Chinamen.

NEW YORK HILL MINE.—Foothill Tidings, May 15: We learn from Mr. J. D. Meek that the new hoisting works were started on Thursday and that everything worked smooth. The machinery consists of two tubular boilers and engines. The pumping engine is of twelve inch cylinder and thirty inch stroke, and that of hoisting is a ten inch cylinder with thirty inch stroke. All the necessary accompanying gear is in perfect running order and the works can be placed on the list as first-class—among the best of the mine improvements of Nevada county.

The incline is now completed and the cars making their regular trips, loaded with quartz that shows the yellow metal quite clearly. New York hill, with the first level below the tunnel and large "hacks" above ready stopping, all yielding number one milling may be considered as having bright prospects before it. We understand that the mill

now being used by the company is about to be enlarged and improved to meet the requirements of the mine.

YUBA MINE.—A letter from Superintendent F. A. S. Jones, of the Yuba mill and mining company, above Washington, in this county, gives the following intelligence concerning this valuable property: Work is being prosecuted with energy on both ledges, and both are turning out splendid quartz, which shows well in free gold and rich galena sulphurets. He expects to have his mill ready for work about the 17th inst., and as he has a large amount of ore on the dump we may look for good reports from the Yuba soon.

GASTON RIDGE MINE.—This mine, which we have heretofore noticed as being again in course of development, after having laid idle for a number of years, is making a splendid showing. The drifts being run on the ledge from the new tunnel have exposed a vein two ft in thickness, which shows well in free gold throughout. Experienced miners who have recently examined the mine say that it is a remarkably rich development, and that the Gaston Ridge gives every promise of proving a great mine. The ground now being prospected is much deeper than any previous workings, and the new tunnel gives several hundred ft of backs, which will enable the company to take out rock easily and cheaply. They have also a good ten-stamp mill on the mine, with power sufficient to increase the stamps to thirty if required.

PLACER.
TUNNELING.—Placer Argus, May 15: From Mr. Joseph Price, one of the engineers of the Gold Run ditch and mining company, we learn that the work of tunneling for the Cedar mining company is being rapidly pushed to completion, and he thinks that the flumes will be put down in about two months. The former company is also extending their own tunnels, but to what extent they expect to run them we are not advised. There is no doubt but the companies which have expended immense sums of money to dig these tunnels will be amply rewarded for their outlay as soon as they can get to work, as there is no doubt that there is yet millions of dollars of hidden treasures, and the work of getting it may be said to be only commenced.

CHROME.—Placer Herald, May 15: The chrome discovery recently made a few miles from Auburn is a perfect success. An agent, representing the Chrome reduction works of Baltimore, Md., has recently visited the mine, and pronounces the ore fine in quality; and by way of backing his judgment, has contracted for all the parties can take out, agreeing to pay therefor \$11 per ton, delivered in San Francisco. One of the owners, Mr. Aubrey, told us that he thinks the ore can be mined, hauled to the depot and freighted to San Francisco at a cost of about \$5 per ton, thus leaving them \$6 clear on each ton. The extent of the deposit is, of course, not yet fully known, but \$6 per ton, of all in eight, will amount to no small sum. The prospects are at present that this will prove to be better property than the best gold mine in the country.

SOLD.—The ditch supplying the mines at the Bluff has recently been purchased by Breece and Wheller, for \$30,000, who propose to expend as much more this coming summer in enlarging and improving it. They expect to increase the capacity of the ditch from about 500 to 1,000 inches; shorten the route about four miles, by cutting a tunnel 1800 ft long, and extend it to Bath, which latter project, it is supposed, will greatly stimulate the mining interests at the last named place. This, in connection with other enterprises now in contemplation for that section, will undoubtedly make things lively there for some time to come.

PLUMAS.
HALLSTED CO.—Plumas National, May 15: The works of this new company are just above 12-Mile Bar, or at what is known as Kingsbury's. The Hallsted Bros. have entered into a contract with the new company to bring 800 inches of water from Kingsbury's creek to the claims. The water will be conveyed in a ditch to the East Branch, and taken across the river in 15-inch iron pipe, it being necessary to have about 2,000 feet of pipe for the purpose. The water privilege is a good one, and will furnish all the water required by the company for at least eight months in the year. The claims are extensive, and there is no reason to doubt their proving valuable and remunerative. The gravel is from 125 to 150 feet deep, is easily washed, and shows no clay or large boulders as far as it has been worked. It also carries gold from the surface to the bedrock, and every indication is favorable for a regular paying gravel mine. We think the new company have made a fortunate investment of their money. Mr. A. D. Hallsted will have charge of fitting up the claim, and as he has had upwards of twenty years' experience in the mines—most of the time on the East Branch—there is no doubt but that he will have everything in apple-pie order when the work is done.

SAN MATEO.
SILVER.—Daily Alta, May 11: A specimen of silver, containing about 300 ounces of silver to the ton, according to report, was brought to the Alta office yesterday. A glance shows that it is rich in metal. It was taken from a lode on the land of Martin and Larco, near Seaverville, in San Mateo county. The miners are so sanguine that they have paid \$2,000 for the exclusive privilege of working the lode, and they agree also to deliver to the land-owners thirty per cent. of all the ore taken out. Ten men are now at work there.

SANTA BARBARA.
SANTA YNEZ DISTRICT.—Santa Barbara News, May 15: A vein of cinnabar passes through the Santa Ynez valley, running east and west, almost parallel with the river. For full six miles the ledge is distinct, and has a width of from 50 to 200 feet. There are three distinct mines now opened.

SONOMA.
MIXING ITEMS.—Russian River Flag, May 15: William H. Thompson, living seven miles east of Gnenoc, Lake county, has discovered on his place, what is pronounced by experts a very large ledge of copper.

Work has been suspended on the Rocky Bar, Inyo district, and also on the Annie Belcher, Cinnabar district.

The Oakland mine, Cinnabar district, has shipped to Healdsburg since last Thursday 51 flasks of quicksilver. In the lower tunnel they struck a splendid body of ore this week. That tunnel is now in 300 feet and the last 80 feet is in good retort ore, but the body reached this week is the best they have ever struck. They will erect a furnace at once. The retorts will soon be shut down.

The Geyser is taking out about 20 flasks a week.

The Battlesnake will start up next week.

The Sonoma, which has been stopped for a few weeks for repairs, will start its furnace again June 1.

The Blue Jacket will resume work next week.

The quicksilver outlook is brightening.

The Mt. Jackson, Guerneville district, struck rich ore in a new place last Tuesday. Col. Abbey brought up yesterday the best sample of ore from that mine ever found there. The company have discharged all their white men, and intend to employ Chinamen. Economy is now the watchword.

STANISLAUS.

QUICKSILVER.—Stanislaus News, May 15: Quite a lively quicksilver breeze has been raging for the past week at Grayson. The contagion is undoubtedly spreading to Modesto. The excitement has been occasioned by the discovery of cinnabar in the Coast Range, west of Grayson. In several claims the croppings of quicksilver, as well as other favorable indications, have been discovered. The claim of the Oristimba prospecting company is, it is believed, at present ahead in developments. It is situated at the head of the north fork of Oristimba creek, and though but little work has yet been done, a well defined vein or ledge has been discovered, containing a fair per cent. of quicksilver.

TRINITY.

PAYING BIG.—Trinity Journal, May 15: Trotter & Smiley, of Douglas City, made another clean-up this week, taking out \$4,200 for a run of sixty hours' water, including probably \$500 left in the flume from last clean-up. This mine is good for fifty dollars for every hour they have water.

J. A. LYTLE writes W. J. Tinning, that Lytle & Hawtack are producing seven tanks of quicksilver daily with their retorts.

RETURN.—The prospecting party we spoke of a couple of weeks since, which started with a view of prospecting the main South Fork and its tributaries, returned last week, after a general look at the section. They report a number of miners as already located there, most of the bars on the main stream and the water privileges which might be made available to work there are taken up.

TULARE.

MINING INTELLIGENCE.—Tulare Times, May 15: We have had the pleasure recently of gaining some interesting facts from Mr. Geo. W. Brown and Prof. E. G. Moss, of the proposed development of the Mineral King mines during the present season. The machinery for a saw-mill, to be built in the district by the company which Mr. Brown represents, is now being shipped to this place, and will be packed the remainder of the distance without delay. The company will establish a first-class assay office in a week or two, which will be conducted by Prof. Moss, a thorough and experienced assayer and metallurgist.

TUOLUMNE.

THE MARKS AND DABROW.—Tuolumne Independent, May 15: This mine is progressing rapidly. Their new hoisting shaft is within ten feet of the main vein and will cut through a solid body of quartz, not less than from eight to fifteen feet wide, and which has been proved to be very rich—both by mill process and assay—the sulphurets alone giving two thousand and thirteen dollars per ton, and is supposed to carry about one ton of sulphurets to eight tons of quartz. They are also prospecting with their little mill, and have proved beyond a doubt that their very poorest rock, will mill not less than ten dollars per ton; and their average rock not less than one hundred dollars per ton—some of it milling over two thousand dollars. We notice, also, in the vicinity of this mine, that there are other mines going ahead. We will mention the Parallel quartz mine owned by W. Martin and Captain Back. They are energetic men, and will make their mine a valuable one.

At the Soulehyville mine, rock is being taken out that is worth \$150 to the ton, and plenty of it, too.

Nevada.

WASHOE DISTRICT.
CALIFORNIA.—Gold Hill News, May 13: The ore developments on the 1400-ft level are of a much better character than was expected, and

the developments already made place the California, in point of bullion production, side by side with its twin sister, the Consolidated Virginia. Sinking the C & O shaft is making rapid progress, the rock in the bottom blasting out finely. The foundations for the new powerful machinery are rapidly approaching completion.

OPHIR.—Daily yield, 150 tons of ore, mostly from the 1465-ft level. The ore stopes and breasts are all yielding well, and look promising for the future. The northeast winze, 100 ft north of the north winze on the 1465-ft level, is down 100 ft, the bottom still in excellent ore. The winze below the 1600-ft level, after striking the west wall, was inclined with the ore vein, which at this point has an inclination of 46 degrees to the east and north, and is still being pushed downward with all the energy possible, the bottom still in rich ore. Assays from the bottom of this winze this morning exceeded \$300 per ton. The east drift from the main shaft on both the 1500 and 1600-ft levels are being pushed vigorously ahead, the faces of both showing a favorable change in the character of the material penetrated, with strong indications of soon reaching the main ledge. On the 1700-ft level cross-cuts Nos. 2 and 3 have again been started up. These cross-cuts are 100 ft apart, cross-cut No. 2 being 120 feet north of the south line. The erection of the new machinery is making steady progress. Three mills are now kept steadily crushing ore from the mine, and the prospects have not been brighter for months past than at the present time.

CONSOLIDATED VIRGINIA.—Daily yield, 450 tons of ore, keeping the mills all steadily running. The ore breasts on both the 1500 and 1400-ft levels are yielding finely, and show no signs whatever of a diminution of the amount. The yield for the past month, owing to the dropping off of the Occidental mill for repairs, was a little over \$1,500,000. The usual dividend of \$10 per share, aggregating \$1,080,000, was paid on the 11th.

SIERRA NEVADA.—The several prospecting drifts in the old upper workings of the mine are all being driven ahead, with some very favorable prospects of the development of ores that will pay well for milling.

BELOKER.—Daily yield, 500 tons of ore. The ore breasts and stopes show no change whatever. The up-raise from the 1100-ft level, to connect with the air shaft below the 1000-ft level, will complete the connection in about 10 days more, thus securing the thorough ventilation of the entire mine to that depth. The mills are all kept steadily running, and everything in and about the mine looks prosperous and bright.

CROWN POINT.—The average daily yield of this mine for the past year has been 550 tons of ore, and the production shows no evidence whatever of being yet exhausted. The ore breasts are all looking well and yielding finely as usual.

BULLION.—The extremely hot weather has added greatly to the discomfort of the men at work in the east cross-cut from the main north drift on the 1700-ft level during the past week.

ORIGINAL GOLD HILL.—Cross-onting and opening the ore body at the 340-ft level south progresses very satisfactorily. Cross-cut No. 2 south is going ahead and will also soon be into the main ore body. It already showed good milling ore.

OVERMAN.—Draining the water from the shaft is making steady progress. The prospects of this mine on the lower levels was very favorable at the time the heavy flow of water was struck, and considerable expectations are fixed upon the results when the mine is once more drained.

NAGARA.—Sinking the shaft is progressing finely, the bottom still in quartz and ore of a very encouraging character. Streaks and spots of the ore are of a high grade, with every indication of the development of large bodies of ore when a greater depth is attained.

BEST & BELCHER.—Driving the south drift from the bottom of the winze on the 1700-ft level, to connect with the north drift from the Gold & Curry shaft, is making steady and favorable progress, notwithstanding the extreme hardness of the rock penetrated.

PROSPECT.—The rock is softer in the face of the tunnel, and small quartz seams and other indications show that the main ledge is not far off. The new three-compartment working shaft is down 26 feet, and the work is going ahead lively.

FLORIDA.—The donkey engine placed at the east side of the shaft has hoisted all the water out, so that a station is being opened at the 430-ft level for a drift west to the ledge.

LADY BRYAN.—The cross-cuts on the 180 ft level are all looking more encouraging than at any time in the past. The south cross-cut on the 170-ft level is in a mixture of white quartz and red oxidized ore of a very promising character. On the 80-ft level preparations are being made to extract ore for milling.

BUCKEYE.—Driving the west cross-cut on the 550-ft station is still making good progress, not yet having reached the west wall. This drift has penetrated a body of ore 40 ft in width that gives average assays of over \$10 to \$20 per ton. The ledge at this point is over 85 ft in width, and is of a very promising character.

COAL ON THE COMSTOCK.—The Virginia City coal company will soon supply fuel to the Bullion hoisting works, from their mine in El Dorado canon. Several other hoisting works and mills in Gold canon are about adopting coal in place of wood, as it is much cheaper.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Fourteenth Lecture Delivered before the University of California College of Agriculture, on Monday, February 8th, by Prof. O. E. BESSEY.

Maples, the Grapevine Family, Mahogany Tree, Flax, Etc.

The first group we take up to-day is the group of the maples, now regarded as a sub-order, but, as the remainder of the order is of no importance, we can treat it by itself. The maple, *Aceraceae*, are usually as a sub-order of the soapberry family. As I said before, this is ranked as a sub-order as it stands, including only the maples. It is made up of less than one hundred species, all of them trees. Some of them are of very considerable magnitude.

First is sugar maple, it is commonly called in the East (*Acer saccharinum*), on account of the sweetness of its juice; starch and sugar are very largely made from it. The wood is light in color, of heavy weight and very firm. The wood being very hard, it gets the name, popularly, of hard maple. It is quite durable and when it takes on a peculiar wavy form known as curly maple, it is very highly prized. That is sugar maple.

Next is *Acer rubrum*, the red or soft maple found east of the mountains. The wood is generally lighter as to weight and is softer than sugar maple. Where moisture can attack it, it readily absorbs it, and if kept continuously moist, it very soon decays. It is, however, used largely for making chairs and the cheaper sort of furniture. As it is not very much inclined to split, almost all the cheap chairs brought from the East are made of this soft maple.

One or two others grow east of the mountains, but remember these two, *Saccharinum* and *Rubrum*, stand as the types of two groups. Now, on this coast, we have no hard maple at all.

Acer macrophyllum, a large tree, called also Oregon maple, is found in Oregon, and in the northern part of this State. It is a soft maple, so it can be used just where the red maple of the East is used, but if put out of doors and subjected to alterations of moisture and dryness, heat and cold, it very soon decays and becomes quite useless. This also now and then becomes somewhat curled, and is then called curly maple.

The striped leaf maple, (see Fig. 1), *Acer negundi variegata*, is a new variety of maple, being white and green. It is now seen in many American and English gardens. It grows to a height of fifty feet and has a most luxuriant and spreading foliage. The form of leaf is shown in the lower corner of the engraving.

The next one is box elder, coming under the genus *Negundo*, species *aceroides*. It now is found throughout almost all parts of the United States, east of the rocky mountains. It is a small sized tree with wood very much resembling the maples. It is usually ranked among the maples. Botanically, it is merely an ally. Sometimes it is called the ash-leaved maple. For all practical purposes it might just as well be considered a maple tree and used just as we use the soft maple. Its wood is not as hard as the hard maple of the East, and so cannot take its place. On this coast an allied species is found. I do not recollect its specific name. I don't know that it ever has been brought into specific use as yet. I have been told a little use has been made of this box elder for the blocks for wood cuts. When carefully prepared and dried, I think oiled, too, first—it takes on a texture which makes it valuable for wood cuts.

The next group is the vine family, or, as it might be called, the grape vine family, including all the grapes and nearly allied plants of the order *Vitaceae*. About three hundred species are known, found mostly in temperate climates, although somewhat inclined to run into the tropics. It cannot be considered a cold-blooded group by any means, as it always keeps pretty close to the warmer climates. It derives importance from one plant, the grape, and of this there are several species in cultivation. The first, and most

Important to the People of California.

Is *Vitis vinifera*, the so called European grape. It is a misnomer, however. It is no more European than the apple, peach, plum and those things are European. It has been cultivated from time immemorial. Its native countries, perhaps, are those bordering on the Mediterranean, especially the Eastern portions. It is said to have been introduced into England by the Romans. It is not a native there and since the time of its introduction it has been very considerably grown as an edible fruit, not for wine nor for raisins. In Southern Europe, as well as all the adjacent country lying east and

southeast, as the summers there are long enough and steady enough, that is, a long continued, hot season, this is favorable to the proper ripening of the grapes. As to uses, these may be divided as I have divided them here on the board. They are used either raw or manufactured. Are edible used as preserves and manufactured into raisins, wines, vinegar, etc. Now, east of the mountains we find that our grapes can only be used well in the first state; that is, as raw materials, raw products, while the grapes on this coast, very many of them, seem to be very well adapted to the manufacture of raisins and wines.

In Europe, as you pass southward, raisins which can be manufactured are largely grown. Northward, the varieties are grown which have to be used in the raw state. Those used raw are northern, those manufactured, southern ones. You will find this to run right through the whole world, if you take the matter up pretty carefully. Now, this is due to several things. In the first place, those grapes from which raisins can be made are mostly tender and are, therefore, grown in southern climates, and in the second place, generally in all the northern climates we do not have heat enough, long enough summers, for properly ripening up the grapes. So, if they do make any wine at

need not stop to discuss raisin making or wine making. You can get very much fuller information from little manuals that are published and from lectures that will be given here after a while on that subject. One thing may be mentioned as a key to the whole matter. In wine making, grapes

Must be Allowed to Become Fully Ripened.

In a great many instances the wine is sour because people are not willing to leave their grapes on the vine to become properly ripened, and gather them too soon for manufacturing.

I heard a gentleman upon this subject two or three years ago, who was fully posted on this matter. His advice for making good wine was, first to wait till the grapes were thoroughly ripe and then to allow them to stay two weeks longer on the vines and you may be sure that you can get pretty good wine from them. [Student.—"I should think they would dry up.""] Well, he said that they would begin drying. The way we usually do in the valley and the way it is done here in America is to wait until they are colored, wait until the color is pretty good. [Student.—"Here they wait until the grapes get exceedingly sweet and then they pick them.""] Something was said about the grapes from the same vine differing. Some may not be as sweet as others. Very few Cali-

northern portions and up in the northernmost part of the Eastern United States, is called the northern summer grape. From it we get good forms, as the Virginia seedling, Herbmont and many others. Some varieties only get about as far north as Cincinnati or Cleveland. The Northern fox grape, *V. labrusca*, is found growing all over the tallest trees and produces a large berry. From this is derived the Catawba, which is a wine grape of the East. All through the lake region you will find enormous vineyards of Catawba grapes, and also along the rivers.

Along the Ohio, Mississippi and Missouri rivers are vineyards of it. The Concord grape, from which a very red wine is made, is derived from the same one from which we get the Catawba.

The Isabella is from the same origin and the Hittford Prolific and perhaps a dozen or two more.

A few years ago one of our foremost growers in the East made some experiments with reference to improvement, so as to bring in the good taste of the European grape along with the hardness of our American variety. He hybridized this *Labrusca* with the European, and obtained a new sort, a fair grape with fruit resembling the berry of Europe, having much the same color and form and many of them very much the same taste, while many of them had the hardness of the original ones. I think the Black Prince is a foreign grape. I am not familiar with the varieties. You see these are split up into myriads. I have here only given the principal varieties.

I think, although it is a little outside of economic botany, I will call your attention to one insect that we have given a great deal of attention to in the Mississippi valley. It is

The Phylloxera.

Do you know it here? Is it a common name with you?

The *Phylloxera vastatrix* is a little root plant louse. It gets on the roots, stays there, sometimes two or three feet under ground, and wherever it stops it makes a little gouty swelling, so that you take up a root of a vine troubled with this, and instead of being elongated like that without any swellings, it will have little humpy swellings.

If you want to know whether your vines are troubled with this, just examine the roots affected with swelling. The particular fact that connects this to economic botany is this: From very careful examination for many years, investigators have, in the Mississippi valley, come to the conclusion that this insect is the cause, in a certain way, of grape mildew; that this insect, working upon the vine, weakens it so much that the grape mildew, *Erysiphe Tuckeri*, can take hold of it. This is not proved as yet, but it is so nearly proved that it perhaps may be given as almost demonstrated. Experiments to prove or disprove this will be finished in a year.

In very many cases these fungus plants do act in just this way. Now, as you have mildew here in the lower lands, I have no doubt there is *Phylloxera* there.

(Continued next week.)



Fig. 1. STRIPED LEAVED MAPLE.

all in the north, it is exceedingly harsh and sour and not at all fit for drinking, so that the world is necessarily divided into certain belts, as you may say.

Then another thing that comes in is this: Taking these grapes as they are brought into this country, into the United States, we find that this European grape, so called, having been cultivated for a very long time, has been in fact improved so that it has the proper qualities.

For Wine Making and Raisin Making.

While the American grapes, which are mostly grown eastward beyond the mountains, have not been sufficiently improved. Now, on this coast I find that the European grape is the one mostly grown and from it the wine and raisins made on this coast are mostly made. [Student.—"I don't understand how the European grape is better than the American.""] Well, it is just this, I will explain that more fully in a moment. The European grape has been grown probably three, four, or five thousand years. It has been cultivated, as you may see, moulded over from its former wild condition to a condition that is a considerable change from its original form, has very many of those stronger acids worked out of it, is considerably sweetened, its desirable products increased, the undesirable decreased, simply by long cultivation. Now, when we take this cultivated one and put it by the side of our American grapes which have been only in cultivation about two or three hundred years, you see here on one hand four or five thousand years of cultivation, and on the other comparatively a very short time. That has much to do with the matter. I suppose that a few thousand years hence our American will be as good as these, possibly. I

fornia wines can compete yet with European wines. Considerable influence or pressure must be brought to bear to make them compete. A good wine merchant behind a cargo of wines, of course, will make it compete.

That fact shows some mistake in the wine making. I suspect it to lie right here. I don't say it is in the climate. If anything, I should say California climate is better than the climate of many portions of France and Spain for the culture of grapes for wine. However, that is a topic that does not especially belong to economic botany.

The grape is known throughout the Eastern United States. When the people came across from Europe, of course they brought European grape vines. In a few years they found they could not grow them. They were naturally tender and killed down in the winter, and were subject also to a great many diseases which characterized them, and mildews and certain little insects that got on the roots of the vines, so that for a while they were compelled to fell back upon the wild grapes in the forests. They took these and have been cultivating them some 150 or 200 years and in this time have succeeded in getting some very fine grapes indeed. They are not the same we have here. There are in the East many species. Some of the varieties derived from these are brought over here. First, *Vitis riparia*, which we call the River Bank grape, a rather late growing grape, which has small berries. From it we have derived the Delaware, one of the most delicious of the table grapes. The Clinton, which is the opposite of that, sour as can be, very red however, is derived from the same original.

V. californica, which grows all through the

MINES ABANDONED IN MEXICO.—G. H. Howard, who has lately returned to Tucson, Arizona, from Sonora, reports depredations by the Chiricahua Apaches, in Sonora, of the grossest nature. Several bloody encounters have lately taken place between Mexicans and raiding Indians, the latter being driven off only after severe fighting, and afterward returning to the reservation. The whole of the Sonora frontier is in a state of constant alarm. Large portions of the cultivated lands are abandoned and mines unworked on account of the constant depredations of the Apaches.

THEY are having trouble on account of Chinese labor, at Bear valley, San Bernardino county. A number are employed there by the Gold Mountain company, and a few nights since a quantity of giant powder was exploded beneath the houses in which they sleep, knocking it to pieces, but strange to say not seriously injuring any of the inmates. This result was owing to the fact that the men who occupied the lower bunks were at work at the time. A reward of \$250 has been offered by the company for the arrest of the perpetrator.

FIRE CLAY.—R. V. Borden, of Reno, Nev., writes us that in his opinion there is as good an article of fire clay at that place as that mentioned by us as occurring in Cerro Gordo district, Inyo county, Cal. He states that he has seen common hand made brick in the same furnace with imported fire brick, and that they stood the heat just as well. This bed of fire clay is only about two miles from the railroad. Mr. Borden will take pleasure in sending some of this clay to any expert who may desire to examine it.

THE Dutch Hill mining company, Plumas county, cleaned up last week \$6,500 from the head of their sluice. They expect about \$20,000 from a twenty days' run. This company bring their water thirty-five miles in ditches and pipes.

At the Ophir mine laying the stone foundations for the new and powerful incline machinery is making steady and favorable progress.

GOOD HEALTH.

Necessity of Sleep.

There are thousands of busy people who die every year for want of sleep. Sleeplessness becomes a disease, and is the precursor of insanity. We speak of sleep as the image of death, and our waking hours as the image of life. Sleep is not like death; for it is the period in which the waste of the system ceases, or is reduced to its minimum. Sleep repairs the waste which waking hours have made. It rebuilds the system. The night is the repair-shop of the body. Every part of the system is silently overhauled, and all the organs, tissues, and substances are replenished. Waking consumes and exhausts; sleep replaces and repairs. A man who would be a good worker must be a good sleeper. A man has as much force in him as he has provided for in sleep. The quality of mental activity depends upon the quality of sleep. Men need, on an average, eight hours of sleep a day. A lymphatic temperament may require nine; a nervous temperament six or seven. A lymphatic man is sluggish, moves and sleeps slowly. But a nervous man acts quickly in everything. He does more in an hour than a sluggish man in two hours; and so in his sleep. Every man must sleep according to his temperament; but eight hours is the average. Whoever by work, pleasure, sorrow, or by any other cause, is regularly diminishing his sleep, is destroying his life. A man may hold out for a time, but the crash will come, and he will die. There is a great deal of intemperance besides that of tobacco, opium or brandy. Men are dissipated who overtax their systems all day, and undersleep every night. A man who dies of delirium tremens is no more a drunkard than a suicide, than the minister, the lawyer, the merchant, the editor, or the printer, that works excessively all day and sleeps but little all night.—*Henry Ward Beecher.*

HEALTH AND TALENT.—"It is no exaggeration to say that health is a large ingredient in what the world calls talent. A man without it may be a giant in intellect, but his deeds will be the deeds of a dwarf. On the contrary, let him have a quick circulation, a good digestion, the bulk, the sinews of a man, and the alacrity and unthinking confidence inspired by these, and, though having but a thimbleful of brains, he will either blunder upon success or set failures at defiance." So writes some one in the *Merchants' and Manufacturers' Bulletin*, but if he had a thimbleful of observation—he would have known that it takes a good deal more than a thimbleful of brains to drive such a carcass as he has described. Setting aside all questions of honesty and other qualities of a good character, the late James Fiske, Jr., was one of the most thoroughly energetic men this country has ever known, and after his death it was found that his brain weighed some four ounces more than the brain of Daniel Webster, and only about four ounces less than the brain of Cuvier, who is said to have had the largest brain ever weighed. It takes brains, as well as muscle, to drive the business of this busy world.

COUGHING AND COLDS.—The best method of easing a cough is to resist it with all the force of will possible, until this accumulation of phlegm becomes greater; then there is something to cough against, and it comes up very much easier and with half the coughing. A great deal of hacking and hemming and coughing in invalids is purely nervous, or the result of mere habit, as is shown by the frequency with which it occurs while the patient is thinking about it, and its comparative rarity when he is so much engaged that there is no time to think, or when the attention is impelled in another direction. Lemon juice, used as a gargle, is said by a French physician to be a specific against diphtheria and similar throat troubles, which he has successfully used for eighteen years. Another simple remedy, said to be quite as efficacious, is given as follows: Take onions, slices thin, and sprinkle loaf sugar thickly upon them; put in the oven and simmer until the juices are thoroughly mixed with the sugar. Give a teaspoonful four or five times a day.

TELEGRAPH MALADY.—Telegraph clerks will hear with alarm of telegraphic paralysis, a new malady reported by a French physician to the Académie des Sciences. An employee, who had been engaged in a telegraph office for nine years, found that he could not form clearly the letters U, represented by two dots and a stroke, I, by two dots, and S, by three dots. On trying to trace the letters his hand became stiff and cramped. He then endeavored to use his thumb alone, and this succeeded for two years, when his thumb was similarly attacked, and he subsequently tried the first and second fingers, but in two months these were also paralyzed. Finally, he had recourse to the wrist, which also shortly became disabled. He forced himself to use his hand, both and arm shook violently, and cerebral excitement ensued. It appears that this disorder is very common among telegraph clerks.

FOR FALLING HAIR.—Mrs. J. W. Cameron, of Vista, sends us the following recipe as something very effective for keeping the hair off, and to prevent it from falling out: 1 oz. nm camphor, ½ oz. pulverized borax; dissolve in 1 qt. boiling water.

EXTRACTING NEEDLES OR BITS OF IRON.—A simple and usually successful mode of extracting a needle or any piece of steel or iron broken off in the flesh is accomplished by the application of a simple pocket magnet. An acquaintance of ours had a little daughter who recently broke a needle off in her hand. A surgeon was called, who made several efforts to find the needle by probing and incision, but without success. After the surgeon had left, the mother conceived the idea of trying a magnet; one was procured, and after one or two applications of it, the broken fragment of needle was discovered attached to the magnet. This idea will be of especial utility to workers in iron. Machine shop surgery is not the most delicate or least painful, though men heroically undergo it rather than the loss of time due to an inflamed eye or festering finger. Iron filings have a way of imbedding themselves in the eyes, which defies almost every ordinary means of extraction. For their removal, a small blunt pointed bar of steel, well magnetized, will be found excellent, and we should recommend that workmen liable to such injuries keep such an instrument about them. It would be a good plan to insert such a bar in a penknife, in a manner similar to a blade.

EATING BEFORE RETIRING.—To take a hearty meal just before retiring, says a writer in *Scribner's*, is, of course, injurious, because it is very likely to disturb one's rest and produce nightmare. However, a little food at this time, if one is hungry, is decidedly beneficial; it prevents the gnawing of an empty stomach, with its attendant restlessness and unpleasant dreams, to say nothing of probable headache or of nervous or other derangements the next morning. One should no more lie down at night hungry than he should lie down after a very full dinner; the consequence of either being disturbing and harmful. A cracker or two, a bit of bread and butter, a cake, a little fruit—something to relieve the sense of vacuity, and so restore the tone of the system, is all that is necessary.

ALCOHOL VS. STRENGTH.—Training men for the prize ring, they are not allowed to touch spirits, tobacco or any other such stuff. Billiard players training for a match carefully avoid all such indulgences. When not training, these people are likely to indulge pretty freely in spirits and tobacco; but when seeking the highest health they are compelled to deny themselves. And yet we constantly hear the healthfulness of gin and the meerschaum seriously discussed. It is stated that no man that has graduated at the head of his class in Harvard College, within the last fifty-five years, has used spirits or tobacco in any form.

DISINFECTANT AND MOUTH-WASH.—A weak solution of permanganate of potash will destroy instantly any taint from discolored teeth or imperfectly cleaned plates, and should always be used to rinse spoons with in hot weather. It is cheap, satisfactory, almost tasteless, not poisonous, and quite free from smell. It may be satisfactory to some to know that this will remove the taint of smoking from the breath if used as a mouth-piece.

USEFUL INFORMATION.

Improvements in the Arts of Metallurgy.

It is well known that the difficulty of uniting iron to brass is created by the unequal rate of expansion in the two metals, which destroys the unity when the temperature is changed. To meet this difficulty, an English artisan has invented an alloy, the expansion of which by heat is claimed to be so similar to that of iron and steel that the surfaces may be regarded when joined, as permanently united for all practical purposes. It consists of three parts tin, thirty-nine and a half parts copper, seven and a half parts zinc.

The construction of bronzes has lately been much improved by the addition of a small amount of phosphorus. A special cause of the inferiority in bronze consists in the constant presence of traces of tin in the state of an oxide, which acts mechanically by separating the molecules of the composition, thus interposing a substance which in itself has no tenacity. Now, the addition of phosphorus is found to reduce this oxide, and renders the bronze much more perfect, improving its color, its tenacity, and its physical properties. Thus treated, the grain of the bronze, when fractured, resembles more that of steel, its elasticity is much augmented, and its resistance to pressure sometimes more than doubled.

TO TAKE OUT BRUISES AND TO REMOVE STAINS FROM FURNITURE.—To take out bruises, wet the part with warm water; double a piece of brown paper five or six times, soak it and lay it on the place; apply on that a hot iron till the moisture is evaporated; two or three applications will raise the dent or bruise level with the surface. If the bruise be small merely soak it with warm water and apply a red-hot iron very near the surface; keep it continually wet, and in a few minutes the bruise will disappear. To remove stains, wash the surface with stale beer or vinegar; the stains will be removed by rubbing them with a rag dipped in spirits of salt. Re-polish as you would new work. If the work be not stained, wash with clean spirits of turpentine and re-polish with furniture oil.

Economy in the Machine Shop.

In building machinery, no matter for what purpose it may be required, or to what uses applied, there is nothing in the experience of those who have devoted years to the business so prominent as their faith in good material. This faith never waxes; it grows steadily. This course of many an establishment is to be found in what is termed "cheap" material. Let any one contemplating an investment in a manufacturing business observe the advantages secured by the establishments that make it a point to employ the best material in the machinery, and contrast it with the result where the so-called "cheap" articles are used, and in setting out avail himself of the knowledge thus obtained, and he will have accomplished an immense step in advance; he will have reached a point that consumed years and many toilsome steps on the part of old manufacturers to achieve. There is no economy in substituting the cheap for the good. There is never anything gained by employing a cheap thing simply because it is cheap. For instance, never use brass in the erection of machinery when your judgment favors gun-metal (copper and tin). Whatever in your judgment is best, is the proper material.

Nothing is more common than to find brass substituted for gun-metal in heavy machinery. The result is that much vexation and trouble ensues. Never use wrought iron instead of steel, simply because it is more easily worked or cheaper than steel. Recently our attention was directed to an instance where a large lot of costly machinery was made and shipped a considerable distance, in which certain parts were made of steel and wrought iron, instead of wholly of steel. After running a short time, the entire establishment was forced to stop operations, when the proper material was placed where the judgment resulting from costly and vexatious experience required it. Of course the builder lost by the operation. This mistaken idea of economy frequently causes the annual stoppages of our large manufacturers, in order to make what are sometimes mis-called "repairs." If the rule were strictly followed, never to make of cast iron that which should be made of wrought iron, of wrought iron that which should be made of steel, of brass that which should be made of gun-metal, there would be less necessity for long stoppages.

Takes the question of foundations: Wooden foundations are no longer viewed with favor as a base for heavy machinery. The cost of removing machinery to replace the foundation is no inconsiderable item. Foundations of stone or something as durable, are growing into favor, because they outlast the heaviest machinery. Heavy screw boxes made of wrought iron are cheaper in the end than boxes made of metal. In fact, true economy always avails itself of the best material.—*Exchange.*

Paint as a Preservative.

Paint, in the view of utility, is employed as a protective covering to a body, against the injurious influences of the air, water and other destructive agencies. Wood and the common metals are especially attacked by oxygen, contained in our atmosphere, of which it constitutes about 21 per cent., being the 21-100th part of the whole atmosphere. It is also a component part of water, forming nearly 88-100ths of its whole weight. Although its presence is absolutely necessary to the continuance of animal life, yet metals exposed to the air are consumed by the oxygen as in a fire. This utility, therefore, of paint as a protector is so apparent that any study of its composition and properties, which will tend to improve it in any degree, is of great importance.

Paint is understood to be a mixture of a liquid and a solid, in powder. The desirable physical conditions of these are, that the liquid should have a certain amount of viscosity, in order to maintain the powder in suspension; and that the powder should be as fine as possible, and nearly of the same specific gravity as the liquid. Linseed oil is undoubtedly the best mixture for paints that are to be exposed to the weather. It absorbs oxygen and becomes solid and waterproof; and yet it always possesses some elasticity which prevents it from cracking. Theory, and the almost united voices of practical painters, after centuries of experience, have decided, that, in view of its inherent properties and its cost, nothing at present known can take its place. There may be special uses of paint, where some other article may be substituted with advantage, yet we cannot reasonably look beyond the class of substances known as drying oils for a substitute. Volatile oils, and such as resin oil, which oxidize into brittle resins, are altogether out of the question. Of the pigments used for preparing paint, we may mention lampblack, white lead, red lead, vermilion, verdigris, ochres, etc.

POLISHING VENEERS.—Get a little chromate of potash and put it in a 4-oz. bottle; add water. After cleaning off veneers, legs, etc., saturate a sponge with the above, and go over your work evenly. According to the strength, in a few minutes you may make lightest mahogany any color you require. When dry, polish. Corked up, it will keep any length of time, always ready for use, and you can repeat it either before or after oiling, if not dark enough. But if you get your work too dark, you will have a job to paper it off evenly, especially in turned work. It won't stain where there is polish or glue.

DOMESTIC ECONOMY.

The Art of Cooking—No. 1.

The science and art of cooking may be divided into a few principal parts; the rest is all fancy. These parts are baking, boiling, broiling, frying, roasting, seasoning, simmersing and stewing. Tasting is an adjunct to all.

BAKING.—In baking, as that the furnace or oven be properly heated; some dishes require more heat than others. Look at the object in process of baking from time to time, and especially at the beginning; turn it round, if necessary, in case it be heated more on one side than the other, to prevent burning. In baking meat and fish, besides keeping the bottom of the pan covered with broth or water, place a piece of buttered paper over the object in the pan. It not only prevents it from burning, but acts as a self-basting operation, and keeps the top moist and juicy. If the top of a cake bakes faster than the rest, place a piece of paper on it.

BOILING.—This is the most abused branch in cooking. We know that many good meaning housewives, and even professional cooks, boil things that ought to be prepared otherwise, with a view to economy; but a great many do it through laziness. Boiling requires as much care as any other branch, but they do not think so, and therefore indulge in it. Another abuse is to boil fast instead of slowly. Set a small ocean of water on a brisk fire and boil something in it as fast as you can; you make much steam but do not cook faster, the degree of heat being the same as if you were boiling slowly. If the object you boil, and especially boil fast, contains any flavor, you evaporate it, and cannot bring it back. Many things are spoiled or partly destroyed by boiling, such as meat, coffee, etc. Water that has been boiled is inferior for cooking purposes, its gases and alkali being evaporated.

BROILING.—Whatever you broil, grease the bars of the gridiron first. Broiling and roasting are the same thing; the object in process of cooking by either must be exposed to the heat on one side and the other side to the air. Bear in mind that no one can broil or roast in an oven, whatever be its construction, its process of heating, or its kind of heat. An object cooked in an oven is baked. It is better to broil before than over the fire. In broiling before the fire all the juices can be saved. In broiling by gas there is a great advantage. The meat is placed under the heat, and as the heat draws the juice of the meat, the consequence is that the juice being attracted upward it is retained in the meat. A gas broiler is a square flat drum, perforated on one side and placed over a frame. Broiling on live coals or on cinders without a gridiron is certainly not better than with one, as believed by many; on the contrary, besides not being very clean, it burns or chars part of the meat. That belief comes from the fact that when they partook of meat prepared that way, it was with a sauce that generally accompanies hunters, fishermen, etc., hunger, the most savory of all savory sauces.—*The Housekeeper.*

CLEANING SILK DRESSES.—Silk dresses may be cleaned by potato water in this way: Grate potatoes into clear, cold water—a large potato to every quart of water, of which five or six will do for a couple of dresses. If for very light silk, pare the potatoes, but in any case wash them clean. The pan of water must not be stirred in the least for forty-eight hours; then very slowly and steadily pour off the clear liquor, but not a particle of the sediment, into an open vessel, dip the pieces of silk into this liquid up and down a few times, without the least wringing them; then wipe them on a flat table with a clean towel, first one side then the other. It is good to hang each one as it is dipped upon a line, to allow the drops to drain off a little before wiping. Iron one way on the soiled sides.

RED MARKING INK FOR CLOTHING.—A red ink for marking clothes, which is not attacked by soap, alkalis, or acids, is prepared as follows: Enough finely pulverized cinnabar to form a moderately thick liquid is very intimately mixed with egg albumen previously diluted with an equal bulk of water, beaten to a froth, and filtered through fine lins. Marks formed on cloth with this liquid, by means of a quill, are fixed after they have become dry, by pressing the cloth on the other side with a hot iron. The ink will keep in well closed bottles for a long time without separation of the suspended cinnabar.

MUTTON STEW.—Take such scraps of mutton or lamb as are not fit for chops or cutlets. Just cover with water. Add a little onion and parsley, and season with salt and red and black pepper. Boil two eggs hard, or if making a good-sized stew use more. Mash or grate the yolks fine, and stir them into a tablespoonful of butter and the same amount of browned flour. Stir into the stew just before dishing. Let it boil up once after adding this, and serve as soon as it thickens.

COFFEE STARCH for black and dark brown calicoes, percale and muslin; also for grass clothes and Hollands. Mix two tablespoonsful of the best starch into a paste with cold water. Stir it into one pint of boiling coffee well settled. Boil ten minutes. Stir a few times with a spoon or wax candle. Strain through a cloth and use.

MINING SCIENTIFIC PRESS

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Improved Amalgamator and Separator.

John Rutherford, of this city, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an amalgamator and separator for precious metals, but more especially adapted for saving gold from auriferous and magnetic sands, and gold, silver and amalgam from the tailings or pulp of quartz mills. It consists of a series of steps or levels one below the other in an inclined frame, and the pulp or sand is made to pass from the upper level upon which it is fed, alternately through a series of screens which are provided with amalgamated balls or cylinders of copper or other metal, and from these screens over amalgamated plates until the mass reaches the lower end.

An alternate shaking and convulsive movement is given to the frame holding these screens and plates, by which the balls or cylinders are kept in motion all the time, and being amalgamated a thorough and complete separation of the precious metals is accomplished.

The inventor finds that the use of amalgamated balls in constant motion upon the surface below serves to stir up the sand and gold, and to wear "rusty gold" bright, so that it will all be amalgamated, while a certain electric action, consequent upon the use of the copper balls and iron screens will assist in saving the gold and any amalgam or quicksilver from the pulp of mills. It is, however, in working the magnetic or black gold sands that the invention is chiefly valuable, as those sands have already been naturally subjected to the action of water to such an extent that there is no appreciable difference in the specific gravities of the different constituents, and it is almost impossible to save the gold by any means known at present. By this machine such a thorough rubbing and separation of particles takes place that all the gold is brought into contact with quicksilver under such circumstances that it will be almost certain to amalgamate.

Water Balance for Hoisting.

In many of the open works on the northern side of the great coal basin of South Wales, water balance machines are used for hoisting purposes, for mines of no very great depth. In a district where there is a good supply of water and free drainage by means of adits, the system is economical and may be recommended. Sometimes water balance machines are used when there is no drainage, the water being pumped up from the bottom by an engine, but this is not an economical arrangement. In some cases the machines are placed at different levels, so that the same water is used five or six times over as many successive lifts.

The car, holding from one to two thousand pounds of ore or water is placed in a cage over an empty water bucket, and the empty car on a similar bucket on the top. Water is then made to flow into the upper bucket until its weight is great enough to make it descend, in this manner raising the loaded car on the other end of the rope. The buckets are made of half inch boiler plate, circular in form, and some hold more than two tons of water. The landing chain is balanced by a chain which hangs below each bucket, and guide chains are used to keep the buckets from striking each other when the shaft is not divided in two departments. A speed of 300 to 400 feet per minute is easily attained by the machine, and the total cost for raising stuff—in Wales—is one and one-half pence per ton per fifty fathoms. For great depths the weight of the machinery becomes so great that the economy disappears. Somewhat similar machines are used in some of the iron mines in both Lancashire and Cumberland.

Expeditions to Southern California.

It is understood that a portion of one division of Lieut. Wheeler's expedition will operate this year in Southern California, including portions of the coast range and the Sierra Nevada, extending westward as far as Death valley. In addition to general geographical pursuits by Lieut. Wheeler during the last five years, he has been directed to make a special examination and survey with a view to determining the practicability of diverting the water of the Colorado of the West for irrigating and other purposes. He will also send a small party to co-operate with a similar one sent out by the Smithsonian Institute to make archaeological researches and collections in Santa Catalina islands.

A party will also leave the University of California about the tenth of June on an exploring expedition to Yosemite, Death valley, Mt. Whitney, etc. Prof. Joseph Le Conte will head the party, which will consist of five or six of the Professors and students. The party will go on horseback, and will be provided with arms, pack horses and complete outfits. The collections made in the different departments will be sent to the University museum. The interior of the State, and especially the higher mountainous regions, possesses features of great interest to the scientific student. To geologists, perhaps no place in the United States offers greater inducements for research and examinations; and to collectors of objects of scientific interest there is a magnificent field open.

We are certain that many interesting facts will be developed by the parties about to start out, and trust that every facility will be offered to them by the people among whom they sojourn.

THE MARIPOSA COMPANY'S TROUBLES.—A history of the Mariposa company's troubles was related in the Superior Court in the opening by James H. Choate, in the suit brought by the secretary of the company against Eugene Kelly. When the old Mariposa company dissolved, the property went into the hands of Mark Brummagin and other trustees, who were to work it up in the best way they could, and in so endeavoring they issued certificates, on which speculations were made. At this time Kelly says the company became indebted to him for some \$300,000 advanced, while plaintiff holds that the whole affair was privately arranged between Kelly and Brummagin, and the company cannot be held responsible for anything due Kelly by the trustees in his individual capacity. The trustees ordered the property to be sold for taxes, and an agreement was made that Kelly should buy in the property. Kelly now claims that the expenses connected with retaining possession of the property from squatters, and the sale purchases, amounted to \$126,000. Pending the settlement of the question, a company has been formed in California with the same name, and a deed has been made of the New Jersey company's stock to it. Kelly, in a suit in the Supreme Court, has enjoined any further proceedings to consummate the transfer, and has had a receiver appointed of the property in this.

STEAMER JAMES M. DONAHUE.—The trial trip of this new steamer, built in San Francisco, for the San Francisco and North Pacific railroad company, takes place May 22d. We shall have more to say of it hereafter.

A NUMBER of parties have arrived at Cheyenne who intend going to the Black hills as soon as the Government permits.

Short Lectures on Patents.

No. 5.—By JNO. L. BOONE, of Dewey & Co's MINING AND SCIENTIFIC PRESS Patent Agency.

The Specification.

In order to obtain a patent the inventor is required to file a description of his invention, and this description is called the specification. Upon the preparation of this document depends the strength and validity of the patent when it is issued. The invention must not only be described, but it must be described intelligibly so that others can understand it. Its object is not only to define what the inventor has discovered and accomplished in order to protect him during the existence of the patent, but also to teach the public how to construct and use the invention successfully when the patent expires. Everything that is necessary to the successful operation of the invention must be disclosed, no secrets are tolerated. If it can be shown that the inventor withheld an important or necessary element or part of the invention the patent can be defeated. The specification is the foundation upon which the patent is based. If it is weak the patent can be easily overthrown. It is the inventor's statement of his invention. He describes it in his own words, and the officers of the Patent Office have no right to change its meaning or phraseology. They may reject it for want of formality, or because its construction is such that it is liable to deceive or mislead the public, and they will require the inventor to amend and correct it before they will allow it, but the manner of describing the invention and the phraseology are left to the inventor or his agent.

A rambling, incoherent specification will invariably defeat the patent, and even an erroneous statement if it effects the essence of the invention, will defeat it. There is something pleasing and satisfactory in a crisp and plainly worded specification. It gives the reader a more exalted idea of the invention, and is evidence that the invention was not guessed at or only half digested before the patent was applied for. It presents no cause for quibbling, and gives no occasion for explanations. A large proportion of the trouble and annoyance to which inventors are subjected by infringers and improvers is occasioned by imperfectly prepared specifications.

A patent does not necessarily cover all that is described in the specification. If the invention is an improvement upon an old machine it is generally necessary to describe either the whole or a part of the old machine, in order to show the connection and operation of the invented part. Whatever the specification may describe, the patent only covers what is stated in the claims. The specification is only a description by which the claims are to be interpreted and defined. It is often the case that patents are bought and sold on the strength of what is described in the specification, without reference to what is claimed. The person who thus purchases a patent is almost sure to get into trouble.

The Claims.

After describing his invention the inventor sets forth what he claims and desires to secure by the patent. The claims cover only that portion of what is described in the specification that is new, and the patent covers only what is claimed, so that if we would learn what the patent secures to the inventor we must examine the claims, and to interpret them we must refer to the specification. To properly set forth the claims to an invention, so that the inventor will be fully protected, requires the greatest skill of the patent solicitor. If they are improperly stated the patent is inoperative.

A claim is either broadly for a new device or for a combination of several devices which act together to produce a new result. In the first instance the device which is claimed broadly must be new and it must produce an independent result or be a complete thing without the assistance of the other parts of mechanism. In the latter case the parts combined must act together to produce a result.

Some inventors entertain the opinion that a combination claim is of no value. This is a false idea. A combination claim is just as strong in law as any other if it is properly constructed. Where the combination is legitimate and the parts absolutely necessary to produce a result a combination claim is just as good, and just as strong as a claim for each individual part, and in most cases it is the only way that the inventor can be protected. The great difficulty is to correctly state the combination, so that nothing that is useless or not necessary is incorporated in it, and to do this not only requires legal but mechanical skill. One machine may contain several legitimate combinations of parts, each of which may be claimed, and it often requires the nicest discrimination and the profoundest patent judgment to combine and arrange these parts properly in the claims. By far the greatest number of patents issued from the Patent Office are for the combination of two or more mechanical parts, and in patents for improvements on existing machines this is almost always the case, because the new is combined with the old. A combination claim must cover those parts which are necessarily parts of the same movement, or in other words, which co-act to produce a result. To combine the hands of a watch with a watch chain, even if the chain is new in its construction, would not be a legitimate claim, because the one is entirely

separate and distinct from the other, and no connection or co-action exists between them. Each performs a separate duty and can in no way aid the other; but to combine the hands with the movement or internal mechanism of the watch would be legitimate if the mechanism made the hands perform a new duty; but there must be some new action between the parts to render even this combination patentable. In a combination claim nothing short of all the parts which act together to produce a result is legitimate. If a device or single piece of mechanism is new entirely and complete in itself, independent of the surrounding devices or parts, it can be claimed separately, but if it is only new in part, the new must be claimed in combination with the old, because it requires the whole to perform a duty.

A claim cannot be for a result, nor for a mechanical principle; but when an inventor has discovered a new result or principle, together with the machinery which produces it, and secures a patent for this machine or device, he is entitled to cover all equivalents, which is virtually covering the principle. All claims cover equivalents without the words "or their equivalents" being stated. The examiners in the Patent Office will even reject a claim which contains these words, because the law provides for covering equivalents, and their presence in a claim would be useless.

The wording of a claim is all-important. Many patentees are content if the device or part which they think most, is mentioned anywhere in the claims, whether it be combined with one or a dozen other parts, and often claims are so blindly worded that it takes a keen patent lawyer to find out the patented point, if, indeed, the claims cover any point at all. There is no remedy for this as long as inventors will persist in placing their applications in the hands of cheap patent agents. Fortunately the law has provided a remedy in case the patent has not been taken out properly, and this remedy will be the subject of my next lecture.

Post Pliocene Fossils.

Rev. Stephen Bowers, of Santa Barbara, has collected the following post pliocene fossils near that city:

Amphissa corrugata, *Amycla tuberosa*, *Amycla gausapata*, *Acmaea spectrum*, *Barnacle*, *Barnacle attachment*, *Bithium quadrifidulum*, *Carochardone rectus* (shark's tooth); *Cariophyllia*, *Cancellaria gracilior*, *Calliostoma canaliculatum*, *Cancer* (crab's fingers), *Cerithiopsis* —? *Chama eclogra*, *Chione fluctifraga* (?) *Chrysodomus tabulatus*, *Chione succinea*, *Chrysodomus dirus*, *Chrysodomus byratus*, *Chlorostoma aureolinum*, *Calliostoma costatum*, *Cardium corbis*, *Conus Californicus*, *Clathurella Conradiana*, *Crepidula adunca*, *Crepidula excavata*, *Crepidula navicelliformis*, *Cryptomya Californica*, *Cumingia Californica*, *Dentalium hexagonum*, *Dentalium Indianorum*, *Diala acuta*, *Drillia inermis*, *Drillia meisa*, *Drillia moesia*, *Drillia torosa*, *Echinus* —? *Erato columbella*, *Eubina micaris*, *Fusus ambustus*, *Fissurella volcano*, *Galerus contortus* (?) *Glyptis aspera*, *Glycimeris tenera* (?) *Hinnites giganteus*, *Hippocypris cranioides*, *Hippocypris* —? *Ichnochelone Magdalensis*, *Jamburella*, *Lacuna solidula*, *Lacsea rubra*, *Lazaria subquadrata*, *Leda* —? *Leptothyra sanguinea*, *Leptothyra bacula*, *Leptothyra acuticostata*, *Liocardium substriatum*, *Lucina* —? *Lucina Californica*, *Lumata Lewisii*, *Macoma edulis*, *Macoma inquinata*, *Macoma nasuta*, *Margarita pupilla*, *Martesia intercalata*, *Mangelia*, (two species), *Mitra maura*, *Mitromorpha aspera*, *Modiola capax*, *Muricea Barbarensis*, *Mytilus Californianus*, *Nassa Cooperi*, *Nassa fossata*, *Nassa perpinguis*, *Neverita Reclusiana*, *Nitidella crysoloides*, *Nulipora* —? *Ocenebra aspera*, *Ocenebra lurida*, *Ocenebra interfossa*, *Ocenebra* —? *Olivella biplicata*, *Opalia borealis*, *Ostrea conchaphila* var. *expansa*, *Ostrea Taylorana*, *Pachypoma gibberosum*, *Pecten cerroensis* (?) *Pecten hastatus* (?) *Pecten Islandicus*, *Pecten latirhinus*, *Pecten moniliformis*, *Pholidadia ovoidea*, *Parapholas Californica*, *Placunomia macrochisma*, *Pleurotoma perversa*, *Phorcus pulgino*, *Porites*, *Polyspora*, *Pomaxia undosus*, *Priene* —? *Priene Oregonensis*, *Psephus Lordi*, *Psephus jantella*, *Pisania fortis*, *Pteronotus festinus*, *Purpura* —? *Purpura crispata*, *Puncturella cucullata*, *Rupellaria lamellifera*, *Saxidomus* —? *Saxidomus Nuttalli*, *Scalaria Indianorum*, *Scalaria Indianorum* var. *tinda*, *Scurria mitra*, *Schizothaerus Nuttalli*, *Septifer bifurcatus*, *Serpulorbis squamigerous*, *Solen* —? *Solecurtus Californianus*, *Subtricola alba*, *Surcula "Carpenteriana"*, *Tapes staminea*, *Tapes diversa*, *Tornatina cerealis*, *Tornatina cucullata*, *Trophon Orpheus* (?) *Trophon triangularis*, *Turritella Cooperia*, *Venericardia borealis*, *Waldheimia* —? *Zirphaea crispata* (?)

The above list comprises one hundred and thirty-three species and varieties. Mr. Bowers has a number not yet identified, and he is continually adding others, and hopes soon to swell the list to two hundred, or more, species.

REVISED STATUTES.—Walter A. Skidmore, of this city, has issued a work containing the revised statutes of the United States relating to mineral lands, with the circular instructions of the general land office, a digest of the decisions of the Department of the Interior, together with an appendix of special statutes relating to mining, with a collection of forms and a very complete index. The publication contains a table of reference showing the corresponding sections of the mining laws of 1866, 1870 and 1872, and the revised statutes. Published by Sumner, Whitney & Co., San Francisco.

The Glacial Period—Its Origin and Development.

At the last meeting of the California Academy of Sciences, a paper was submitted by J. E. Clayton, of Salt Lake City, on the "Glacial Period—Its Origin and Development." We give below an abstract of this interesting paper furnished us by the Secretary. Mr. Clayton, who has been a careful student of the glacial phenomena presented on the western slope of North America, discovered, in 1860, the marking and terminal moraines of the glacial system of the Sierra Nevada Mountains, at the head waters of the Merced and Tuolumne rivers.

Many theories have been advanced to account for the sudden change of climates of our planet at the close of the Tertiary age, from temperate and tropical heat to that of Arctic cold. Many such theories are based on assumptions of conditions and causes, untenable by logical deductions from general laws governing the progressive development of our planet.

Mr. Clayton then reviewed some of the theories of eminent scientists attempting to account for the great climatic changes at the close of the Tertiary period.

First Theory.

The writer cited the theory of a great upheaval of land in the Northern Hemisphere, by which the currents of the ocean and atmosphere were greatly changed, and consequent changes of temperature resulted.

While he admitted a possible modifying influence from this cause, he argued that as the thermal effect of the sun's rays upon the land surface is much greater than upon water, and the average land altitude of the North American continent would not exceed 2,000 feet, such a change, instead of precipitating a glacial period, would, in all probability cause an increase of atmospheric temperature.

As an elevation of the continent would largely increase the land area, and consequently the thermal effect of the sun, such a change would not supply the conditions for a continental glacial system. Hence he argued the elevation of land surfaces in the Northern Hemisphere was not a primary or adequate cause of the ice period.

Second Theory.

Some investigators argue a change in the relative position of the earth's poles, thus changing frozen zones into temperate and tropical latitudes. He argued that a self-balanced rotating globe could not change the position of its mass without changing the line of its rotation; and unless the cause of such a change could be shown, which had never yet been done, the theory must be untenable.

If the general proposition is true that the earth, originally incandescent, has been slowly cooling by radiation, the conditions for even tropical life must have begun at the pole and progressed toward the tropical zones in harmony with the cooling climate. Violent disturbances of the earth's level have taken place; without these, the changes of life creeping toward the equator as the earth's crust thickened, and consequently cooled, would have been slow and almost imperceptible. He therefore rejected the theory of a change of poles as incapable of proof.

Third Theory.

Some think the solar system, sweeping through space, may have encountered frigid zones, capable of reducing, by contact, the earth's atmospheric temperature sufficiently to cause an ice period.

If this were true, the waters of the globe would have frozen universally over its whole surface, and the extinction of life would have been a slow starving or "freezing out" process, incapable of accounting for the facts of glacial times. He therefore concluded that cosmic influences had no direct agency in producing the glacial epoch at the close of the Tertiary age.

Necessary Conditions for a Glacial Period.

Facts point to the geological disturbances and volcanic eruptions, which occurred at the close of the Tertiary age, acting upon the upper currents of returning trade winds as the only causes sufficient to produce the glacial phenomena as now indicated by geology.

These conditions were first a folding and dislocating of the earth's great longitudinal lines, north and south, along the western borders of one or more continents; followed by great outflows of lava and great issues of interior heat along such lines of fracture; then the local vaporization of the surface waters by contact with lava overflows; the ascent of vapors to a height sufficient to penetrate the return trade winds, when blowing as an upper current of the atmosphere, together with the general depression of the ocean beds and corresponding elevation of continents and development of great mountain chains.

That such conditions and facts did occur at the close of the Tertiary age substantially in the order named, is generally admitted by practical geologists. He argued that these conditions, in conjunction with the upper currents of the atmosphere, were ample, and would of necessity produce the glacial epoch.

Continents of the Tertiary Age.

In the beginning of this age the largest areas

of continents consisted of low undulating surfaces slightly above the ocean level. Large districts were covered by fresh water lakes and inland seas, whose ancient beds alternately present forms of life peculiar to marine, brackish and fresh water, showing that slight oscillations of the earth's surface were sufficient to cause interior continental basins to be filled with salt water. Great changes of level were successively produced in this age, over large areas, until the continents became mostly dry land. In later Tertiary periods marine deposits were gradually confined to the low borders of continents, and interior basins were filled exclusively with fresh water drainage.

The Climate in the Tertiary Age

Fluctuated from a tropical warmth, at first universal, to a temperate, and later to an Arctic cold, in higher altitudes, where great mountain chains were elevated. At the close of the Ter-

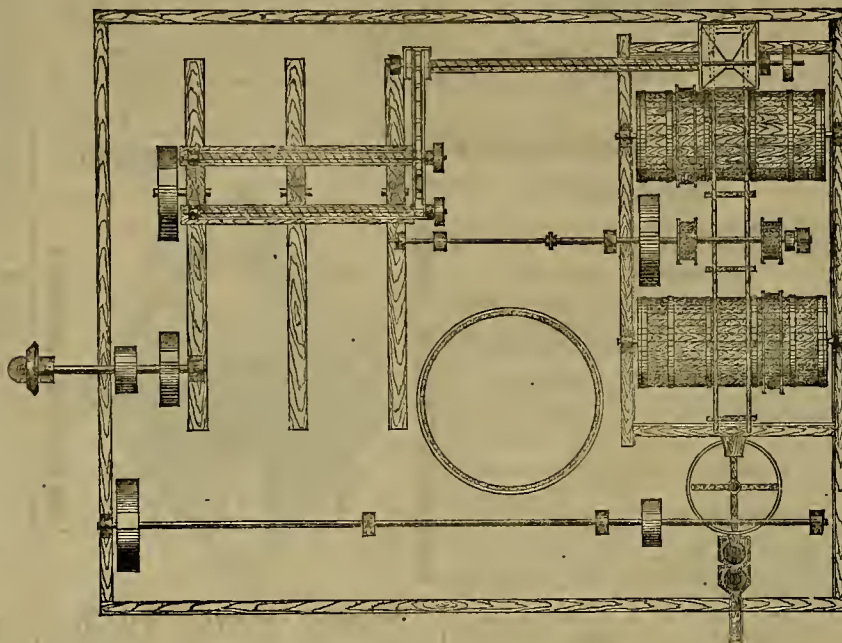
the greatest lava outflows being along the lower flanks and plateaux of continents.

The lecturer then reviewed the wind currents, demonstrating the freezing of vapors and their distribution over portions of continents remote from active igneous disturbances. If the earth was a perfectly smooth sphere, atmospheric currents would move with mathematical accuracy. Their thermal modifications were then explained, especially along the west coast of North America, where the polar current swings far westward over the Pacific, and dry winds sweep over it in a northeasterly direction.

At the close of the Tertiary age, the western slope of this continent was the principal scene of volcanic action. Districts as large as some of the smaller States were buried to unknown depths with lava and ash, while rivers and lakes were deflected and swept out of existence.

Mr. Clayton's Theory.

The vapors of rivers turned upon hot lava beds

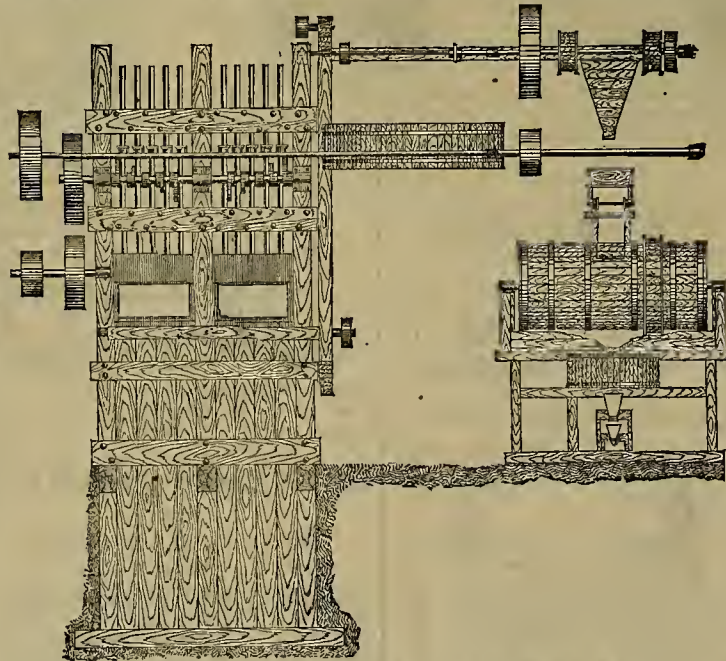


Ground Plan of Rae's Amalgamating Mill.

tiary age the disturbances of the solid crust of the earth were enormous. Great mountain chains were elevated, accompanied by a corresponding depression of ocean beds, thus increasing the land and reducing the ocean to narrow limits. These occurred mainly by sudden convulsions and readjustments of the crust.

Continued radiation of heat from the fluid nucleus of the globe caused its continued shrinkage. The consolidated crust conformed to its continued shrinkage by corrugations and oscillations of level, until the lateral pressure of the crust became so great as to culminate in a series of dislocations and uplifts over all the continents of the globe, and resulting in the settling down of the broken, folded and dislocated crust with nearly its full weight upon the molten interior mass.

This gravitating pressure would cause outflows of lava through ruptured crevices, until the fluid and solid portions of the globe were balanced according to their relative weight and density, as water ascends in fissures of broken ice to a point of equal weight. The greatest outflow of lava occurred where the greatest downward folding took place, and is shown by islands in oceans being of volcanic origin, and



Elevation or Front View of Rae's Amalgamating Mill.

overwhelmed and buried by sudden falls of snow, consequent upon the overwhelming effects of a great geological change. Buried mestodous were found with stomachs full of food, showing the catastrophe to have been sudden.

Notwithstanding altitudes of the Pacific portion of the United States were greater, no traces of a continental system of glaciers are here visible, and all known glaciers are simply local, clustering around the polar sides of higher peaks. The basins of the western volcanic region were filled with a hot sea, hissing steam and volcanic products.

In the Sierra Nevada, the ancient river system has been completely changed by the later lava flows, so notable in Tuolumne, Sierra and Plumas counties.

Some discussion on this subject ensued between Dr. Blake and Mr. R. E. C. Stearns, and the question will probably come up again at a future meeting.

Hints on the Washoe Process.

(Continued from last week.)

The Crushing in the Battery.

Here might come a discussion as to the relative advantages of self-feeding and feeding by hand. Eventually I believe that automatic feeding will be universally adopted, especially for ore broken to a uniformly small size. Even under present circumstances the automatic feed is more economical than to have a man feeding who is careless, lazy, or inexperienced. For a good battery-feeder give me a small, intelligent, active, and wiry man; a tall or stout man cannot stand the jar of the battery constantly and do good work. A tough man can endure feeding twenty stamps for twelve hours. If ten stamps or less are to be supplied with ore, self-feeding is more economical than feeding by hand as performed by ordinary workmen; but if the mill is pressed with work, and the pans are of sufficient capacity to crowd the battery, the self-feeding apparatus is not so good as a man active, faithful, and skillful. Even if he must be paid five dollars a day, he will more than earn his wages by the increased production of the whole mill. Low feeding is the best; let iron almost wear on iron. The skillful workman will feed low and uniformly, and not by sight, but by the sound of each stamp. Under this system a stem may break occasionally, but it does not take long to put in another. The broken stems can be repaired by cutting off above the break and welding on a piece of a bar of rolled iron, which is subsequently turned off in a lathe. Even if three stems out of twenty are broken every month, the cost of repairing, etc., amounts to little compared with the increased production obtained by low feeding.

The stem almost invariably breaks in one place, namely, where it comes out of the stamp socket or boss. We avoid this evil partially by boring out the socket and increasing the size of the stem where it enters the socket. The broken surface of the wrought iron stem shows the iron to be thoroughly crystallized; its fibrous condition having been destroyed by the constant jar. A bar of round iron should be always on hand with which to repair broken stems.

As regards the weight and speed of the battery, my experience favors light stamps and the utmost speed. The Owyhee mill battery, 650-pound stamps, with eight and a half inches drop, (running to ten inches before re-setting,) was run at a speed of ninety-three drops a minute, the cams having been cut off so as to have short cams. Such a speed gives no time for the stem to settle in the sand; and as long as bolts are kept tight, nuts secure, and guides snug, no serious breakage need be apprehended. On ordinary ores the consumption of iron per ton, including the old iron thrown away, is about two pounds.

As regards the supply of water for the battery, there should be as much fall as possible from the battery to the tanks, so that the conducting troughs will keep clear and not choke up; they will then require no excess of water. The supply to the battery must vary according to the clay in the ore. Use as little water as practicable, consistent with keeping the screens perfectly clear. The more clay, the more water needed; the more clay, the greater necessity for careful low feeding, in order to avoid the choking up of the mortar. If too much water is used, to remedy the effect of careless folding, an unnecessarily large amount of slimes are carried off out of the mill in the waste water from the battery and tanks. To avoid the loss of slimes, it is well to use rather coarse screens, say No. 4 punched Russia iron, especially in clayey or slimy ores, so as not to puddle or churn the ores in the mortar more than necessary. This is particularly to be looked after when the ore is largely true silver ore, or the gold very fine. As regards getting the battery, it is, in my judgment, preferable to give the central stamp of the five in each mortar the most drop; those adjacent on each side one-fourth inch less, and the outside ones one inch less still. But some millmen prefer an even set.

Many persons advocate amalgamation in the battery, in order to catch part of the gold and native silver in ores containing, in addition to these metals, silver sulphuret, chloride, etc., or gold coated with oxide of iron, etc., and, therefore, requiring subsequent reduction and grinding in the pans. But there is a strong objection to amalgamation in the battery. The amalgam thus formed is mostly a gold amalgam, and hence it is worth much more than the ordinary amalgam of a silver mill, and of this the workmen are all aware. It is, therefore, an additional temptation to stealing. The only benefit to be claimed for it is the possible catching of some of the gold otherwise floating away in the water and catching in the slimes. It will be found, however, that this amount of gold is very small. By determining the proportion in weight of battery slimes, that is, the fine, clayey material carried away in the waste water from the tanks and battery, which has never been in the pans, and by ascertaining the value of the slimes in gold proportional to the value of the ore in gold, it will be found that, as a rule, the entire loss in gold in the slimes is not over one per cent. of the entire amount of the gold in the ore.

[To be continued.]

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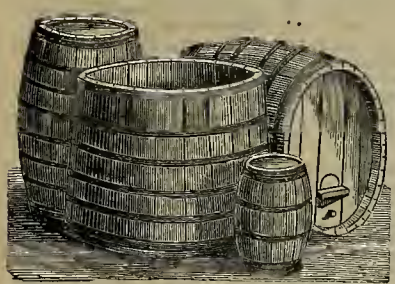
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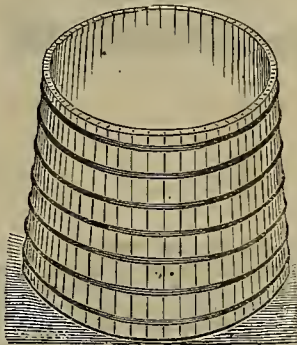
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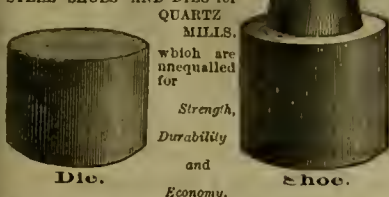
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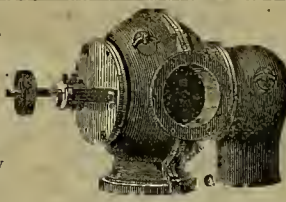
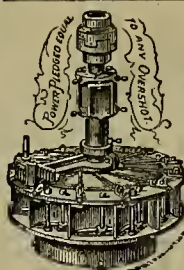
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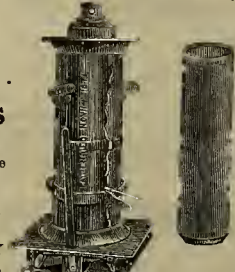
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We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our large and well adapted stock

ASSAYERS' MATERIALS

-AND-

Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grains Grammes, will be sent free upon application.

7v25-4f

JOHN TAYLOR & CO.

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits.

They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows:

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.

Ores sampled.

Assaying in all its branches.

Analysis of Ores, Minerals, Waters, etc.

Plans furnished for the most suitable process for working Ores.

Special attention paid to the Mining and Metallurgy of Quicksilver.

E. HUH,

C. A. LUOKHARDT,

Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS,

ADVANCES MADE

On all kinds of Ores, and particular attention

PAID TO

CONSIGNMENTS OF **GOODES.**

4v16-3m

Instructions in Assaying,

Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

HENRY G. HANKS

Will receive a few pupils at his new laboratory, 617 Montgomery street, up-stairs. TERMS MODERATE

LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical CHEMIST,

No. 611 Commercial Street,

(Opposite the U. S. Branch Mint.

SAN FRANCISCO CAL.

7v21-8m

J. & P. N. HANNA,

IMPORTERS AND DEALERS IN

WOODBERRY COTTON DUCK.

33, 36, 40, 42 and 46-inch Wide Duck; 8, 10, 12, and 16-ounce Duck.

Flax, Canvas, Ravens and Drills
Roofing, Sheathing and
Boiler Felt.

Ore Bags, Tents and Hose

Made to Order.

308 and 310 DAVIS STREET,

SAN FRANCISCO, CAL.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

IMPROVED GAS METER.—Jacob Radston, San Francisco. This invention relates to certain improvements in dry gas meters, and consists first in a novel construction and arrangement of the inlet and outlet pipes, so that the pipes may be put on or repaired with much less trouble and expense than hitherto. The invention further consists in passing the operating rods up through the pipes instead of through separate stuffing boxes, and in a novel device for connecting the diaphragms with the links of the operating rods, so that the connections are easily renewed, and the motion of the diaphragms made adjustable. By means of suitable passages, the interior and exterior chambers of any meter are so connected with a single discharge, that accumulation of liquid in either or both chambers can be at any time drawn off. By means of a simple device the inventor is enabled to renew the glass in front of the indicators at any time, and the whole apparatus of a three diaphragm meter is fitted into a square outer case, which is much more convenient than a round or other shaped case.

TAP AND FAUCET.—Amos C. Springer, San Francisco. This patent relates to certain improvements in that class of devices for drawing liquids, which consist of a tap to be permanently fitted into the vessel, and a removable cock or faucet, and it is of a more special value for beer barrels and for the gauge cocks of steam engines, and containing vessels which have an interior pressure. It consists first of a hollow cylindrical tube, which is permanently fixed in the barrel or other vessel, and is provided at its inner end with a hollow plug, having two or more screw threads upon the outside, and a soft metal packing upon a shoulder at the inner end, by which it is made tight. Combined with this portion is a cock or faucet, which has a slot at its inner end to fit over a corresponding projection upon the plug. A rubber packing ring surrounds the stem of this faucet and fits closely the smooth interior of the stationary tube, so that when a half turn is given the faucet to screw the plug back, the liquid can escape. A simple nut surrounds the tube of the faucet, and by screwing it into the tube, connects the whole to either. By the peculiar construction of this device the inventor claims that he secures a perfect working tap and faucet, and it will not be possible for it to leak, as most devices of this kind do before being screwed down to a bearing. It is also equally available for a gauge cock for boilers, and the cocks can be renewed whenever necessary, by simply screwing the plug down tight and removing the cock. As the plug turns out instead of into the vessel, it can be easily renewed to clean the vessel, and is not likely to become clogged with sediment.

AUTOMATIC RAILROAD SIGNALING DEVICE.—James Gordon, San Francisco. This invention is an improved device which is intended to signal the approach of trains upon railroad lines, and it consists in the use of a series of tanks filled with water, and having floats which will operate by means of air which is compressed or caused to move in pipes connecting the point where the train may be with the signal station. A train passing the point where the vessel holding the liquid is located will depress a lever and this will raise a gasometer, drawing air into an air chamber which is placed in the center of the tank, by means of metallic valves. As soon as the train has passed, the weight of the gasometer will press upon the body of air just admitted, and this will drive the air out through a pipe leading from the air chamber to another air chamber in the signaling apparatus, and communicate its pressure throughout the whole length of the pipe. A suitable device is used to serve as a check and prevent the air from flowing back when the gasometer is lifted and the valves opened. The pressure from the pipe leading from the air chamber is communicated to another vessel and then acts on a second gasometer, and will raise it together with any attached signal, the operation being very delicate and instantaneous. A certain amount of pressure is preserved so as to balance the signal and thus hold it in readiness to be acted upon by the slightest additional pressure. A valve in the pneumatic bottle allows the air to escape from the vessel so that the signal will gradually descend after the train has passed, and by regulating the size of the escape orifice the length of time which the signal occupies in descending can be controlled.

It was the intention of the officers of the Virginia and Truckee railroad to put two hundred white men to work Monday, on the switch that is to run by the new shaft of the Caledonia mine, provided they could employ them at \$2.50 per day. All the unemployed men thought the rates too low, and refused to go to work. The work will not be prosecuted at present.

THE STICKEN MINES.—The Sticken river is full of drift ice, but still closed for navigation. There are more miners and traders in Carlsbad than any previous year, and all are confident of big pay.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., May 18, 1875.

FOR WEEK ENDING MAY 4, 1875.

MAIL BAG FASTENING.—Jes. C. Franklin, Lena, Oregon.

OVERALLS.—Samuel R. Krouse, S. F., Cal.

NEWSPAPER FILE.—Franklin B. Alderson, San Jose, Cal.

CAR COUPLING.—Adolph V. Anderson, Virginia City, Nev.

STEAM PLOW.—Duncan Beaumont, Sacramento, Cal.

REFINING BASE METAL BULLION.—Frederick H. Bousfield, S. F., Cal.

SPRING BED BOTTOM.—Augustus M. Dennen and Cassy Newhouse, Stockton, Cal.

ENDLESS WIRE WAYS.—Andrew S. Hallidie, S. F., Cal.

VENTILATING MINES.—Levi J. Henry, S. F., Cal.

AUTOMATIC AIR BLAST FOR GAS MACHINES.—Robert Newton, S. F., Cal.

SHOE FASTENING.—Theophilus Tucker, Oakland, Cal.

RE-ISSUES.

STRAW-FEEDING ATTACHMENT FOR FURNACES.—David Morey, Watsonville, Cal.

STEAM BOILER.—Harvey W. Rice, Haywood, Cal.

—The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. Note.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

The Cuban insurgents are destroying the sugar plantations in most of the districts of that unhappy country. The entire number of estates destroyed up to about the middle of April is reported at 100, valued at \$7,200,000, but worth, previous to the war, \$25,000,000.

In a recent article describing Fitts' Road Steamer it was stated that "the pulling capacity was from ten to twenty tons on tracks." The last word should have read "trucks."

"A DROP OF JOY IN EVERY WORD."

FLEMINGTON, Hunterdon Co., N. J., June 26, 1874.

DR. R. V. PIERCE, Buffalo, N. Y.:

Dear Sir:—It is with a happy heart that I pen these lines to acknowledge that you and your Golden Medical Discovery and Purgative Pellets are blessings to the world. These medicines cannot be too highly praised, for they have almost brought me out of the grave. Three months ago I was broken out with large ulcers and sores on my body, limbs and face. I procured your Golden Medical Discovery and Purgative Pellets, and have taken six bottles, and to-day I am in good health, all those ugly ulcers having healed and left my skin in a natural, healthy condition. I thought at one time I could not be cured. Although I can but poorly express my gratitude to you, yet there is a drop of joy in every word I write. God's blessing rest on you and your wonderful medicines is the humble prayer of

Yours truly,

JAMES O. BELLIS.

When a medicine will promptly cure such terrible eating ulcers and free the blood of the virulent poison causing them, who can longer doubt its wonderful virtues? Dr. Pierce, however, does not wish to place his Golden Medical Discovery in the catalogue of quack patent nostrums by recommending it to cure every disease, nor does he so recommend it; but what he does claim is this, that there is but one form of blood disease that it will not cure, and that disease is cancer. He does not recommend his Discovery for that disease, yet he knows it to be the most searching blood cleanser yet discovered, and that it will free the blood and system of all other known blood poisons, be they animal, vegetable or mineral. The Golden Discovery is warranted by him to cure the worst forms of Skin Diseases, as all forms of Blisters, Pimples and Eruptions, also all Glandular Swellings, and the worst form of Scrofulous and Ulcerated Sores of Neck, Legs or other parts, and all Scrofulous Diseases of the Bones, as White Swellings, Fester Sores, Hip Joint and Spinal Diseases, all of which belong to Scrofulous diseases.—*Com.*

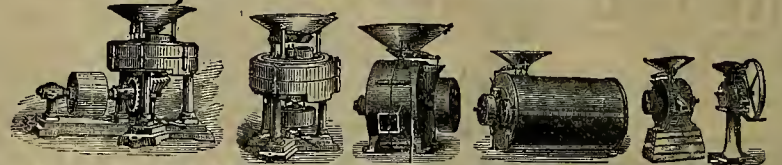
SUBSCRIBERS are requested to examine the printed address on their papers. If mistakes occur at any time, please report them to this office. The last figures (at the extreme right) represent the year that your subscription is paid to. Next to these the day and month is represented. For instance, your subscription being paid to July 4th, 1876, it would be represented, viz: 7-4-76; or 4/17/76; or July 4, 76.

WOODWARD'S GARDENS embraces an Aquarium, Museum, Art Gallery, Conservatories, Tropical Houses, Menagerie, Seal Ponds and Skating Rink.

GETTIE'S School for the Parlor Organ has reached a sale of sixty thousand copies in two years; it is a good instructor. Price, \$2.50.

1845. The Harrison Portable Mill Machinery. 1875. FAST GRINDING. SMALL POWER.

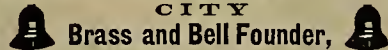
Thirty Years' Experience in this Specialty, covered by Twenty Patents.



French Burr Stone Mills, run by hand, horse, wind, water or steam power. Flouring Mills and Bolters, combined or separate; Vertical and Horizontal Corn Mills, Feed Mills and Universal Pulverizers—will grind all Grains and Mineral and Vegetable substances.

Send stamp for Illustrated Catalogue containing cut of each design and price-list. EDWARD HARRISON, Manufacturer, No. 135 Howard Ave., New Haven, Conn.

W. T. GARRATT. CITY



Corner Natoma and Fremont Streets,

MANUFACTURERS OF

Brass, Zinc and Anti-Friction or Babbet Metal CASTINGS.

Church and Steamboat Bells, TAVERN AND LAND BELLS, GONGS,

FIRE ENGINES, FORCE AND LIFT PUMPS.

Steam, Lignor, Soda, Oil, Water and Flange Cocks, and Valves of all descriptions, made and repaired. Hoses and all other Joints, Spelter, Solder and Copper Rivets, etc. Gauge Cocks, Cylinder Cocks, Oil Globes, Steam Whistles, HYDRAULIC PIPES AND NOZZLES for mining purposes. Iron Steam Pipe furnished with Fittings, etc. Coupling Joints of all sizes. Particular attention paid to Distillery Work. Manufacturer of "Garratt's Patent Improved Journal Metal." Highest Market Price paid for OLD BELLS, COPPER and BRASS. 6-1f

BOOKS.

The Latest and Most Standard Works on **ENGINEERING.**

MECHANICS AND MACHINERY.

STEAM ENGINE.

CARPENTRY, MASONRY,

ARCHITECTURE.

METALLURGY.

ASSAYING.

MINERALOGY.

MINING.

AGRICULTURE.

IRRIGATION and

HYDRAULICS.

FOR SALE BY

A. L. BANCROFT & CO.,

721 MARKET STREET, S. F.

Catalogues Supplied Free.

BAIRD'S BOOKS FOR PRACTICAL MEN.

Our new and enlarged Catalogue of PRACTICAL AND SCIENTIFIC BOOKS—96 pages, 8vo.—sent free to any one who will furnish his address.

HENRY CAREY BAIRD & CO.,

16p

Industrial Publishers and Bookellers, 406 Walnut street, Philadelphia.

RUSSELL'S

OREON PILE CURE.

To those suffering from Piles—External, Internal and Itching Piles: You can be cured, as hundreds of others have been. Send for Circular and see undoubted testimony. Will send sample bottle for \$2, or three bottles for \$5.

Call upon your druggist, or address

DR. RUSSELL,

No. 5 Post street, San Francisco.

SAN FRANCISCO

Pioneer Screen Works,

Removed to 32 Fremont Street, near Market.



J. W. QUICK, Manufacturer of perforated sheet metal of every description, at reduced rates. Mill owners using Battery Screens extensively, can contract for large supplies at favorable rates. This is the only establishment on the Coast devoted exclusively to the manufacture of Screens.

Thursday Noon our last forms go to press. Communications should be received a week in advance and advertisements sent early in the week as possible.

N. W. SPAULDING, Saw Smithing and Repairing ESTABLISHMENT.

Nos. 17 and 19 Fremont Street, near Market.



MANUFACTURER OF SPAULDING'S

Patent Tooth Circular Saws.

They have proved to be the most durable and economical Saws in the World.

Each Saw is Warranted in every respect:

Particular attention paid to construction of

Portable & Stationary Saw Mills.

MILLS FURNISHED AT SHORT NOTICE At the lowest Market Prices.

1874. A GRAND SILVER MEDAL. 1874



The highest and only prize of its class given to any Vertical Engine was awarded to the

HASKINS ENGINES AND BOILERS,

BY THE

MASS. CHARITABLE MECHANICS' ASSOCIATION,

at their Fair in Boston, in competition with the Baxter, New York Safety Steam Power and the Sharpley Engines.

Diamond Drill Co.

The undersigned, owners of LESCHOT'S PATENT for DIAMOND POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROSPECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

A. J. SEVERANCE & CO.

Office, No. 315 California street, Rooms 16 and 17. 21v26-1f

Glasgow Iron and Metal Importing Co.

Have always on hand a large Stock of

Bar and Bundle Iron, Sheet and Plate Iron Boiler Plates, Gauged Water Pipe, Cast Steel, Plow and Shear Steel, Anvils, Cumberland Coal, Etc.

WM. MCINDLE, Manager, 22 & 24 Fremont St., S. F. m6-m2

\$5 to \$20 Per Day at home. Terms free. Address G. STINSON & Co., Portland, Me.

PURCHASERS please say advertised in Scientific Press.

General News Items.

JAMES LICK has made public his revised deed of gift. It gives his son \$150,000, \$500,000 to himself, instead of \$25,000 annually, as heretofore; \$540,000 for a school of mechanical arts, \$700,000 for the observatory, and reduces the appropriation for the Capitol to the city hall here. The Key monument is to be done for \$60,000 instead of \$150,000. The other appropriations remain unchanged.

SECRETARY BRISTOW has commenced a searching investigation of the doings of a gipsy whisky "ring." A large number of distilleries have been seized in Southern and Western States and internal revenue officers arrested for complicity in defrauding the government.

It is estimated that the total loss from the glanders at Benicia barracks—the horses killed and the harness and stables burned—was between \$30,000 and \$40,000. It is thought, however, that the disease and every germ of it has been exterminated.

A FIRE at Napa on Friday morning, the 14th inst., destroyed six wooden buildings, owned by Judge Hartson and occupied by six different persons and firms. The total loss will be about \$20,000; insured for nearly half that sum.

THE Southern Californian has been enlarged, and under the able direction of Mr. Julius Chester is doing good service in making known the agricultural wealth of Kern county.

THEY have a social ulcer fastened upon the municipality of Napa known as Spanishtown, which the Reporter demands shall be removed.

THEY have a printing press connected with the Gilroy Academy, and the pupils have the privilege of learning to set type.

It is hoped that most of the mines in Pennsylvania, where work was interrupted by the strikes, will resume operations within a week.

THEY have a street car driver in this city who has been on duty fourteen hours per day for 460 consecutive days.

GEN. JOHN C. BECKENRIDGE died at his residence, Lexington, Kentucky, last Monday evening.

W. C. RALSTON has disposed of his one-half interest in the Palace Hotel to Senator Sharon, for \$1,750,000.

ASSOCIATE JUSTICE CLIFFORD, of the United States Supreme Court, is on a visit to this State.

THE Madrid government has resolved to maintain the liberty of worship in Spain.

HON. THOMAS BIDDLE, United States Minister to Ecuador, is dead.

THE hufalo gnat is said to have appeared in Western New York.

MIAO-SOU is threatened with a grasshopper pestilence.

PRINCE NAPOLEON favors a Republic in France.

SENATOR NYE is hopelessly insane.

Industrial Items.

SINCE the opening of the Lincoln coal mine in Placer county, a stratum of excellent potter's clay has been discovered between the layers of coal. A company to utilize the deposit has been formed in Chicago.

A GENTLEMAN lately returned from the San Geronimo pass, reports to the Los Angeles Express that the Southern Pacific officials have the road graded beyond the Summit to the very edge of the desert.

A GENTLEMAN in Albany, N. Y., intends furnishing his residence with redwood, and Col. Armstrong, of Santa Rosa, writes that he can deliver it in New York for \$60 per M.

THE first assessment of \$5 per share on the stock of the Petaluma and San Rafael railroad has been paid up. Bids for cutting the tunnel near San Rafael will be received up to the 21st.

PROGRESS is the order of the day in Lane county, Oregon, and the Commissioners are ordering bridges rebuilt and roads improved without once stopping to count the cost.

THE people of Woodland, Yolo county, have organized a company to build a railroad from that place to Clear lake, and thence to Humboldt bay.

THE Grangers of Eugene, Oregon, and vicinity, have incorporated a company having for its object the erection of a mill at that place.

It is reported that Stanford, Crocker & Co., contemplate purchasing the newly-discovered coal mine near Cholaine valley, San Benito county.

THE graders are at work on the fourth mile of the Los Angeles and Independence railway, between Santa Monica and Los Angeles.

THE carpenter work on the Petaluma woolen mill is completed, and the work of setting up the machinery is progressing.

THE distillery connected with the Sacramento sugar was burned last week. Loss \$6,000.

THE Point Arena paper mill is turning out 125 reams of straw wrapping paper daily.

THEY have a telegraph line from San Rafael to San Quentin.

THE rapid falling of the Sacramento river is an indication of the shortness of the water supply in the mining regions north. Many gravel claims generally will have to be shut down for want of water this season earlier than usual.

METALS.

(WHOLESALE.)

WEDNESDAY M., May 19, 1875.

American Pig Iron, 100 lb.		@ 46 00
Scotch Pig Iron, 100 lb.	46 00	@ 46 00
White Pig, 100 lb.		@ 46 00
Oregon Pig, 100 lb.		@ 46 00
Refined Bar, bad assortment, 100 lb.		@ 46 00
Refined Bar, good assortment, 100 lb.		@ 46 00
Boiler, No. 1 to 4		@ 46 00
Plate, No. 5 to 3		@ 46 00
Sheet, No. 10 to 14		@ 46 00
Sheet, No. 16 to 20	5 00	@ 46 00
Sheet, No. 22 to 24	6 00	@ 46 00
Sheet, No. 26 to 28	6 00	@ 46 00
Home shoes, per keg.	7 50	@ 8 00
Norway Iron	10 00	@ 10 00
Rolled Iron	6 00	@ 6 00
Other Irons for Blacksmiths, Miners, etc.	6 00	@ 6 00
Copper	25 00	@ 25 00
Braziers	25 00	@ 25 00
Copper Tin'd.	35 00	@ 35 00
O'Neil's Pat.	35 00	@ 35 00
Sheathing, 100 lb.	24 00	@ 24 00
Sheathing, Old Yellow	24 00	@ 24 00
Composition Nails.	24 00	@ 24 00
Composition Bolts.	24 00	@ 24 00
10x14 O Charcoal.	12 00	@ 12 50
10x14 X O Charcoal	14 00	@ 14 50
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San Francisco Boiler Works,

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CAPITAL.....\$1,000,000.

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And all kinds of Mining Machinery.

Front Street, between N and O streets,
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SHEET IRON PIPE.

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Are prepared to make **SHEET IRON** and **ASPHALTUM**
PIPE, of any size and for any pressure, and contract to
lay the same where wanted, guaranteeing a perfect
working pipe with the least amount of material.
Standard sizes of railroad Car Wheels, with special
patterns for Mining Cars. These small wheels are made
of the best Car Wheel Iron, properly chilled, and can be
fitted up with the improved axle and box—introduced by
this company, and guaranteed to outlast any other
wheels made in this State.

All kinds of Machinery made and repaired.
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Manufacturers of Quartz and Amalgamating Machinery,
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Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

PATENTED NOVEMBER 26th, 1873.

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IRA P. RANKIN. Established 1850. A. P. BRATTON

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MACHINERY AND CASTINGS OF EVERY DESCRIPTION.

Heavy Forging Boilers, Stationary
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JOBING AND REPAIRING WORK OF EVERY
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Steam Engines and all kinds of Mill
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Also manufacture and keep constantly on hand a
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From Ten (10) to Forty (40) Horse Power.

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ALL KINDS OF BRASS, Composition, Zinc, and Babbitt Meta
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FIRST STREET, SAN FRANCISCO,

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Having much experience in the business of the Re-
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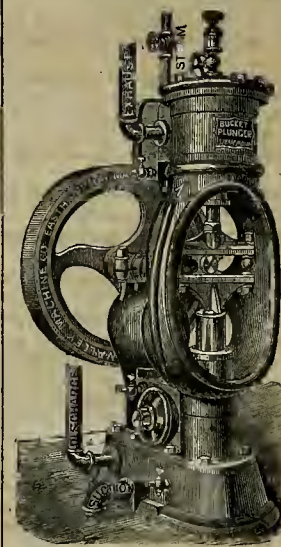
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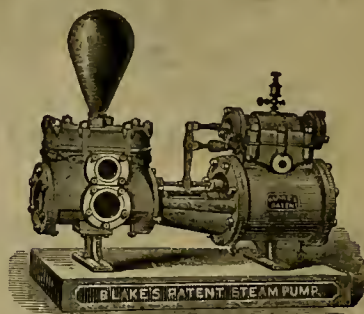
Pure Oak Tanned Leather
Belting,

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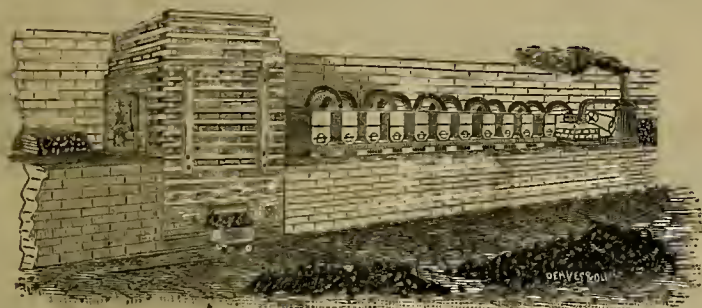
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BLAKE'S PATENT STEAM PUMP.



Over 7,500 in Successful Use in the United
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QUICKSILVER FURNACE.

THIS FURNACE REDUCES CINNABAR, (ROOK OR FINE EARTH,) AND

WORKS CLOSER TO AN ASSAY

and at LESS COST per ton than any other furnace. It will work continuously Twelve to Twenty-four
months without stopping.

NO MAN HAS EVER BEEN SALIVATED

otherwise affected by the mercury about the furnace, either in operating it or making repairs. For full
particulars, plans, &c., apply at

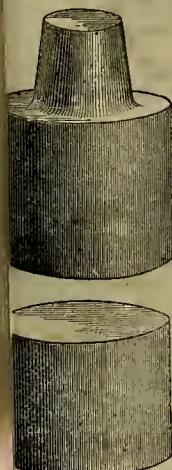
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We refer any party desiring a good furnace to either of the following Mining Companies
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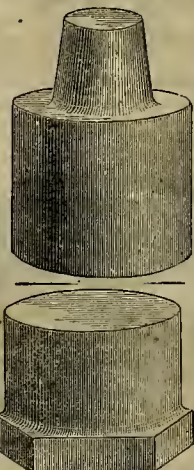
- The Manhattan Mine in Napa County.
- The Redington Quicksilver Mining Company, Napa County.
- The California Quicksilver Mining Company, Napa County.
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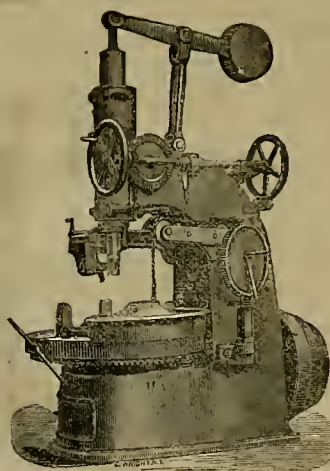
Improved Cast and Forged Steel Shoes and Dies for Quartz Mills.



(PATENTED MAY 26TH, 1874.)
Price Reduced to 16 Cents Per Pound.
SAN FRANCISCO, November 10th, 1874.
To Supls. of Quartz Mills and Mining Men generally:
We take pleasure in stating that owing to the rapid
increase in our orders, our Pittsburg Manufacturers
have been compelled to add largely to their works—
a new gas furnace and heavier trip hammer—and are
thus enabled to reduce the cost of steel and at the
same time produce SHOES AND DIES superior to any yet
manufactured. We have consequently reduced the
price to 16 cents per pound and solicit a trial order,
guaranteeing that you will find them at least 10 per
cent cheaper than the best iron. There are no STEEL
SHOES AND DIES made excepting under our patent and
sold at this office, or by our authorized agents, though
certain Eastern manufacturers advertise STEEL SHOES
AND DIES which are only cast iron hardened by the
addition of a composition. They will not out-wear two
sets of common iron, though called steel. They are
very brittle and are not capable of being tempered,
flying from under the hammer like cast iron. Our
STEEL SHOES AND DIES are in use in many of the largest
mills on the Pacific Coast, and all who have tried them
pronounce them cheaper and far superior to iron in
every respect, even at the old price of 20 cents per
pound. Their advantages over iron are cheapness on first
cost, increased crushing capacity, time saved in chang-
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by absence of iron dust and chipping, and a saving of
75 per cent. in freight. It takes 60 days to fill orders
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pound shipped at San Francisco. Terms Liberal.



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We have the best and most

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In the Country,
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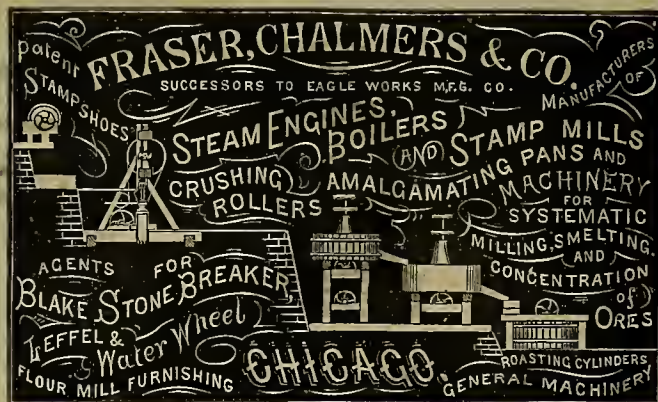
AND

R. R. REPAIR SHOPS.

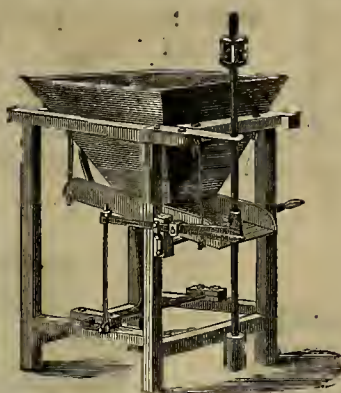
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Tulloch's Automatic Ore Feeders.



Will Feed Wet or Dry Ore
Equally Well.

Will Increase the Quantity from
One to Two Tons Per Day.

Are Durable, Compact and
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MACHINISTS, MILL & MINE OWNERS.

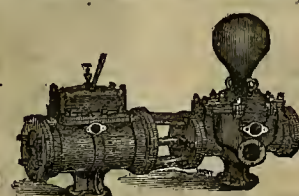
Send for sheets or catalogues illustrative of
any combination of

STEAM PUMPS, INDEPENDENT BOILER FEED
PUMPS, AND COMBINED COLD AND
HOT WATER ENGINE PUMPS.

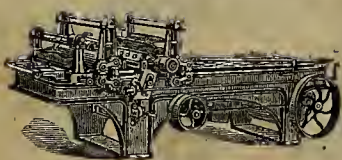
COPE & MAXWELL MFG. CO.,

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California Planers and Matchers, and Wood Working Machinery of all Kinds.



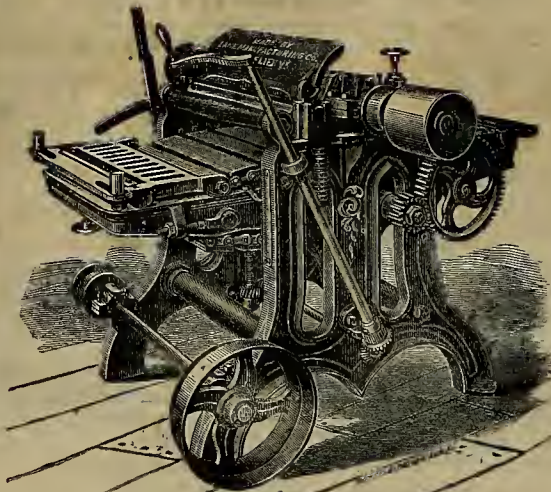
The California Planer and Matcher

Is gotten up from new patterns specially for this Coast. It has Cast Steel Slotted Cylinder Head, running in patent self-oiling boxes; Matcher Spindles also of the best cast steel. The Gears are all protected with iron covers. Will plane 24 inch wide and 6 inch thick, and tongue and groove 14 inch wide. Will make rustic and stick gutters, or heavy mouldings, etc., and is the best Job Machine ever built.

✓ We have always on hand a large assortment of Planing Mill Machinery, all of the latest improvements, including Planers, Moulding Mortising and Tenoning Machines, Band and Jig Saws, Etc.

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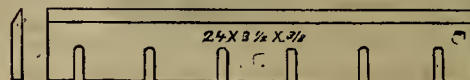
Patent Farrar Surfacar, or Endless-Bed Planer.



Improved Buzz Planer,

For jointing (straight or hollow), for beveling, for planing out of twist or truing up, for cornering, squaring, planing octagon and taper pieces, mitering and smoothing, this machine has no equal. We have 8, 12 and 16-inch machines.

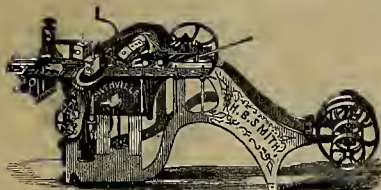
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Planer Knives of all sizes on hand.

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We have four sizes of these machines always on hand—"B," "O," "D" and "E"—to work either three or four sides. Have slotted heads and all other improvements, and may be seen in any mill on the Coast. Prices reduced to 15 per cent. less than Eastern list.



Smith's Celebrated Moulders.

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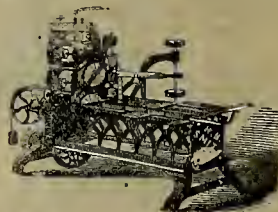


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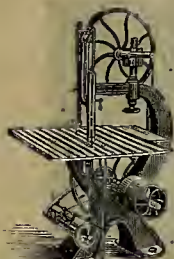


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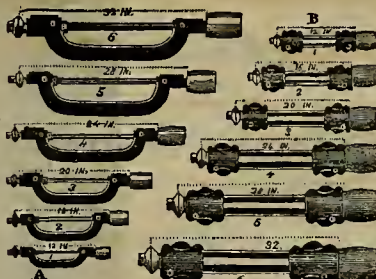
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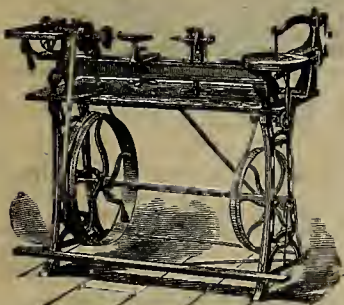
Patent Foot



Jig Saws.
Very Useful for
Small Shops.

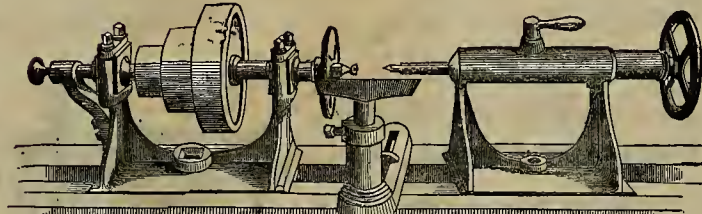


Circular Re-Sawing Machines



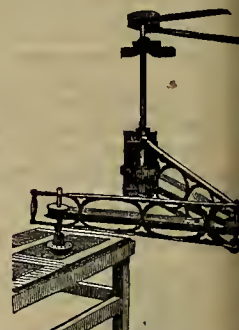
Patent Foot Lathes, with Jig or Circular Saw Attachments.

Send for Catalogue and Price List.

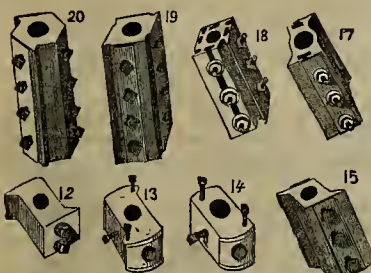


Patent Wood-Turning Lathes. We have all Sizes, at Reduced Prices.

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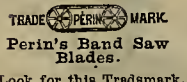
Sand-Papring Machine.



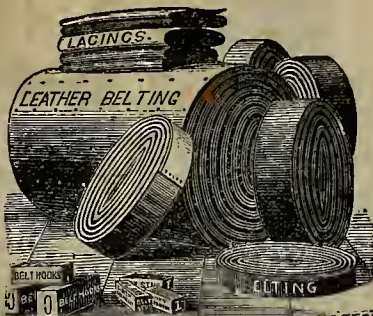
Cutter Heads for Moulders and Tenoners.



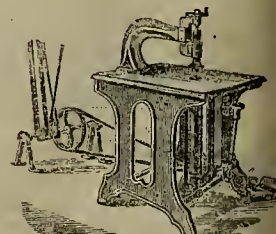
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San Francisco.

MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, MAY 29, 1875.

VOLUME XXX
Number 22.

"Sheep Back" Rocks.

In a recent issue we gave a description of the "Mountain of the Holy Cross," in Colorado, and spoke of the trip of Hayden's party down the Eagle river, in trying to discover a means of access to the mountain. A little stream joins the Eagle river from the west side, which rises among the group of mountain peaks of which the "Holy Cross" is the most conspicuous. The valley of this stream varies from one-eighth to one-fourth of a mile in width, and is about eight or ten miles in length, and so covered with rounded glaciated forms of granite that it was impossible for the party to proceed with pack trains.

The most remarkable feature of this wonderful region is the proof of a great ancient glacier which must have filled up the valley from mouth to source. The bottom extending high up on either side, is covered with the rounded granite masses, varying in size from a few feet to several hundred feet length; so that looking down upon them from a high point, they resemble a huge flock of sheep, as our illustration shows, and from this fact they have received from the Alpine geologists of Europe the appellation of "Roches Moutonnes." It is most probable the valley itself has been worn out of the granite mass. The mountains on either side rise to the height of 2,000 to 3,000 feet above the valley, and the glacial markings are visible 1,200 to 1,500 feet. The moraine deposits on the northwest side reach a height of 1,200 feet above the stream and form a sort of irregular terrace, which, when cut through by the little side streams, show that it is made up of gravel and boulders much worn. In some instances there are well worn cavities in the sides of the mountains, showing how the running water in connection with a mass of rock, formed the cavity, much as a "pot-hole" is made in our streams at the present time.

Many of the "sheep-backs" are still covered with a crust-like enamel, but usually this has peeled off. There is no doubt that all these rounded granite masses were originally covered with what may be called a glacial crust, which has scaled off, so that only remnants remain at the present time. The rounded masses of granite are mostly oblong in form, or lie in parallel lines, as if the little stream had originally occupied a dozen or more channels parallel to each other.

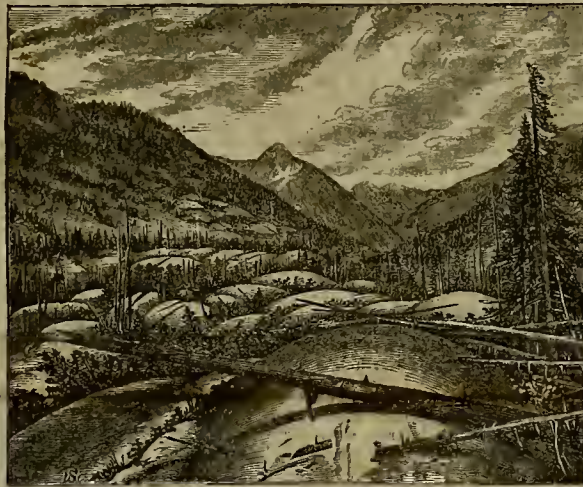
SELF LIGHTING AND EXTINGUISHING LAMPS.—Prof. Wm. H. Zimmerman, of Washington College, Chestertown, Maryland, has invented a lamp which, in general construction, resembles an ordinary student's lamp. The improvement consists in an apparatus on purely scientific principles, attached to the lamp, rendering it self-lighting and extinguishing. The apparatus is simple, and not liable to get out of order, and so cheap, as to the chemicals employed, as not to cost in a year more than would the matches consumed in the usual way for that period. A slight pressure of the finger on a key infallibly lights the lamp without touching globe or chimney. On the other hand, squeezing a gutta puruha ball with hose connection as instantly extinguishes it. Like the ordinary student's lamp, it revolves and can be elevated at pleasure. Kerosene is the fluid used, but any other can be substituted. This is a practical invention, and if some manufacturer gets hold of the patent, who will introduce it properly to the public, lamps of this character will no doubt become quite common.

"GOLD FROM THE GRASS ROOTS DOWN."—A Montana paper says: "Gold from the grass roots down," is an expression not understood in the States, and yet some of the richest placer diggings worked in Montana were of this description. We have got \$2.50 to the pan by pulling up the grass roots on Carpenter's bar, Blackfoot, and washing them, and we have \$5 washed from a pan of grass roots pulled from the rim of Harris' hill, below Bannock. The gold was coarse, and in both cases the grass roots reached the bedrock. Thousands of miners have worked diggings of the kind down as gold from the grass roots down.

Improved Quicksilver Furnace.

John M. Cutler, of Healdsburg, Sonoma county, California, has recently patented through the MINING AND SCIENTIFIC PRESS Patent Agency, an improved quicksilver furnace, a representation of which is shown in the accompanying engraving. The improvement consists in combining with an upright or stack furnace an interior upright chamber or

ing between the fireplaces so that the ore will pass readily through the chamber and out through the discharge opening. The upper end of the chamber passes up through the roof of the furnace and has constructed over it a feeding device consisting of a hopper and screw conveyor by means of which the pulverized ore is constantly fed into the chamber. In the rear portion of the chamber is constructed a fume chamber with which an opening in the rear wall of the chamber communicates. An



VIEW ON ROCHES MOUTONNES CREEK, COLORADO.

retort into which the pulverized ore is fed continuously at the upper end and withdrawn through a discharge opening at the lower end, while the heat and products of combustion pass from the fireplace into the body of the main furnace so as to surround the chamber and convert it into a muffled furnace, thus converting or withdrawing the gaseous or volatile portions without drawing with them the soot and products of combustion which usually accompany them, and from which the condensed product is difficult to separate.

Inside of the ordinary upright furnace is constructed an upright chamber, as shown in the engraving, which extends from the top of the furnace down to near the fireplaces. This chamber extends directly across the furnace between the fireplaces in the manner of a partition, and is narrow enough to provide a space directly above the fireplace between the sides and the walls of the furnace, thus exposing a large wall surface of the narrow chamber to the heat. Pipes and tubes pass, as shown, through and across the chamber so as to open into the combustion chambers on each side of it, in the manner of placing tubes in a tubular boiler.

On each side of the chamber is constructed a small chamber which extends almost to the top of the large chamber, and these chambers communicate with the main chamber by means of holes, at different heights, for the purpose hereinafter mentioned. The lower end of the upright chamber is constructed with an inclined floor, and this inclined floor leads to a discharge open-

opening in the rear wall of the furnace also communicates with the fume chamber, through which the fumes are conducted from the chamber through pipes to the condensers. It will thus be seen that the inventor encloses a

roasting chamber inside of the furnace, so that the heat will surround, or partially surround it.

The ore to be roasted in this furnace is first pulverized so that it can be fed by the screw from the hopper into the upper end of the chamber. This chamber is kept partially filled with ore all the time, and the spent ore is occasionally drawn out through the discharge opening so as to maintain a uniform quantity of ore in the chamber. The ore as it falls through the feed opening will be distributed by the cross tubes or flues and will surround them closely as it accumulates. The surrounding heat, which is in the outside combustion chambers and in the cross flues, will then be sufficient to roast the pulverized ore in the ore chamber and liberate the volatile portion so that it will rise in the chamber or pass into the side compartments, and pass into the fume chamber through the opening or passage. The lower holes which connect the main chamber with the small side chambers, serve to draw off the fumes from the ore and deliver them through the lowermost holes into that portion of the ore chamber which is nearest the fume opening, thus giving them a free passage through the side chambers.

Holes are also made through the front wall of the furnace so that the operation in the chamber can be inspected. The inventor thus

provides a muffled furnace or chamber in which ores are roasted without intermingling the products of combustion with the fumes which are generated from the body of ore, and at the same time provide for making the operation continuous. Those desiring further information concerning this furnace, can address the inventor as above.

An Improved Rock Drill.

Mr. George Atkinson, of this city, has recently patented, through the Agency connected with this office, an improvement in drills, which consists of a novel mode of operating and rotating the drill and in the manner of constructing the parts of the frame and mechanism so that they can easily be taken apart, or portions detached at will. The device, which the inventor terms a "chura drill," consists of a supporting frame for the mechanism which is made strong and light and carries the drill, operating cams, driving shaft and supplementary shaft. The drill stands vertically and passes in front of movable cross beams. A lever arm curves around in front of the drill, one end being pivoted to a timber, while the other is held by a spring catch. At the top a cross lever steadies the upper end of the drill and is held and released in the same manner by a catch. The pivoted end of this lever on one side, and the catch on the other side of the frame, are mounted on blocks which are also mounted upon the frame so that they can be turned to one side, and by this means the drill and its supports can be removed so that access can be had to the drill hole without moving the frame.

The driving mechanism of the drill is also mounted on a sliding cross-beam, and a guide which can be moved back for some distance, so as to give additional space. The shaft carries two cams, one being of some size and serving to lift the drill for each blow. The head of the drill has an adjustable sleeve secured to it loosely, and this sleeve is provided with an arm beneath which the cam rises at each revolution, thus lifting the drill, which is then allowed to fall either by its own weight if sufficient, or a spring or additional weight may be added. One cam is considerably smaller than the other, the office of the smaller one being to turn the drill at each rise for a stroke. In order to do this a plate is fitted to move up and down the drill shaft, but so as to turn the drill around with itself. This plate has a ratchet cut upon its lower surface, and the smaller cam engages with a tooth of this ratchet at each revolution of the driving shaft, thus rotating the drill to as to make a smooth even hole. When the drill is to be worked on a level, the frame will stand firmly, so that the drill may work vertically; but if it is to work at an angle the two front legs of the frame must be elevated, and this would render it inconvenient to turn the crank by which the power is provided. The supplementary shaft is therefore mounted at a considerable angle with the driving shaft, and properly supported so that the crank may be changed from one shaft to the other as convenience may suggest. This drill is a very simple one, and for light work where steam is not to be used, will be very useful.

REVISED MINING STATUTES.—We have now in press and will shortly issue the Revised Statutes of the United States which relate to Mining. We recently published a pamphlet containing the Mining Laws of the United States, with the instructions of the Commissioner of the Land Office, blank forms, etc. At the time we issued this, the Revised Statutes of the United States had not come out. Since then we have received a copy of these Statutes and will add to the pamphlet referred to all the material relating to mining which appears in the revised Statutes. Those who have already purchased the pamphlet will receive this supplement free on application to this office. The Revised Statutes will also be published in the MINING AND SCIENTIFIC PRESS. With the additions now made the pamphlet printed by us will contain in *extenso* all laws of the United States relating to mining, and the cheapness of the publication—fifty cents—places it within the reach of all.

EXTENDING THE AIR SHAFT IN THE BELCHER MINE.—The air shaft in the Belcher mine, below the 1000-ft level, is going steadily forward.



Cutler's Improved Quicksilver Furnace.

The Stock-Jobbing Juggernaut.

We take the following suggestive article from the San Francisco Chronicle of May 20th:

In the city of San Francisco there is a great banking institution, at whose head and in whose directory are many of our first, best and most prominent citizens. On our coast there is a silver mine, the oldest in point of discovery, one of the richest in point of reputation, and fittingly named after that mysterious land visited by King Solomon and Hiram of Tyre for precious metals for the adornment of the temple. In the list of trustees of this mine, who number seven, the chief stockholder of the bank has a cousin by marriage; one it owns by right of appropriation, making use of him as St. Paul utilized his hired house at Athens; another is a brother; another is a private secretary; another is the land agent and confidential real estate operator of the bank; and the remainder are presumably friendly birds, as they are of the same plumage and roost in the same cage.

The President and Directors of the Ophir mine are: President, J. D. Fry; Directors—A. K. P. Harmon, James Freeborn, Joseph Sharon, James H. Dobinson, Maurice Dore and James A. Pritchard. This mine embraces 108,000 shares, a majority of which have from time to time been owned by people interested in the bank. One year ago shares of this mine were selling at \$8; its highest point of advancement within the year has been \$315 per share; its value by yesterday's sales was \$36 per share. The variations in price have been wonderful in range, and have occurred with astonishing suddenness; a single twenty-four hours has made a change in value of five millions of dollars. The bank, as we have been informed, has loaned money upon the stock at prices more than five times its present value. Mining experts and engineers believed to be in the pay, and supposed to be in the confidence of the bank ring, have given their earnest testimony as to the richness of the mine, the breadth, depth, and assay value of its ores. The confidential and personal friends of Messrs. Sharon, Ralston, and Mills have proclaimed their confidence in the mine as a permanent investment. Statements intended to give trust in the mine have been industriously circulated upon the street and whispered into confiding ears, purporting to come directly from gentlemen who own, manage and control it. The brokers who are supposed to represent the owners do conduct themselves in the Board of Brokers as to promote the advancement or depression of the stock. Just at the moment the stock market is the most disturbed, while panic is on the ragged edge of want of confidence, when margins are threatened and fortunes hang upon a rumor, when every anxious holder looks for some ray of hope to the Directory, these agents, brothers, cousins and friends of Messrs. Sharon, Ralston, and Mills proclaim an assessment, and it is announced that the prosperous mine named Ophir, which has been taking out one hundred and fifty tons of ore per day, and whose value, according as it was desirable to elevate or depress the stock, has varied from \$40 to \$700 per ton, requires \$216,000 to pay working expenses.

William Sharon is accredited with the control and direction of the mine. Mr. Ralston is supposed to have had large interests in it, and his relations with Mr. Sharon are intimate in business. D. O. Mills, late President of the bank, is supposed to be represented by James H. Dobinson, who is set down in Langley's Directory as his private secretary. He is also clerk to William Sharon and Secretary of the Union mill and mining company. Mr. Sharon is one of the reported owners of the Virginia Enterprise and the Gold Hill News, printed where the mine is located. These journals, for one year past, have written up this mine as one of great value; its discoveries have from time to time been announced as of startling importance. The highly wrought descriptive accounts of the extent of ores and richness of assays made by these journals would justify investment even at the highest price attained by this stock during the year, and we are not prepared to say that these articles have not, in the main, been correct, as we are not endeavoring to underrate the value of the mines at Virginia City. We raise no issue with these journals as to the truth of their descriptions, nor do we question the good faith of the writers.

If this mine is honestly administered it has been an unfortunate thing for the Pacific coast. It has ruined men and women; it has demoralized values and industries; it has destroyed confidence in mining property; it has made men distrustful of their fellow men. Unless there is an altogether mistaken impression abroad in the community, the wrong lies not in the mine, but in the management. It is believed that these alternate excitements and depressing prices, are the result of carefully devised and adroitly managed manipulation. It is believed that the gentlemen whose names we have felt it our duty to mention, are through these practices acquiring from the community in which they live, and at its expense, vast fortunes. It is believed that a systematized plan of operations is carried on, in which large capital, subtle intrigue and unscrupulous misrepresentation are resorted to for the purpose (we intentionally use a mild word) of draining from the many to enrich the few. Mining is necessarily a hazardous business, but if to its ordinary hazards there is added the crime of false suggestion and false suppression of facts, these

transactions in stocks cease to be operations or investments, and the buyers and sellers become the victims of a criminal conspiracy, and are robbed of their money. With a view to illustrate how these mining operations are interwoven with such other, and with a view to give our readers food for reflection, we append the names of some of the mines in which may be found as trustees the same individuals who figure in the Ophir Directory. This unusual number of trustees in a mine is five; we do not say that a bank ring can or do control all or any of them. In the Alpha Consolidated trustees are found the names of J. D. Fry and A. K. P. Harmon. In Escher, J. D. Fry, James H. Dobinson, A. K. P. Harmon, and Robert F. Morrow. In Ocholar-Potosi, A. K. P. Harmon, J. H. Dobinson, J. D. Fry and James Freeborn. In Crown Point, J. D. Fry, A. K. P. Harmon and J. H. Dobinson. In Challenge Consolidated, A. K. P. Harmon, J. D. Fry, William Sharon, J. H. Dobinson and James Freeborn. In Caledonia, A. K. P. Harmon and E. M. Fry. In Confidence, K. F. Morrow, A. K. P. Harmon and J. H. Dobinson. In Gold Hill Quartz, J. H. Dobinson. In Dayton, A. K. P. Harmon. In Empire, A. K. P. Harmon and J. D. Fry. In Eclipse, James Sharon and J. H. Dobinson. In Imperial, A. K. P. Harmon, J. D. Fry and J. H. Dobinson. In Meadow Valley, J. D. Fry and R. F. Morrow. In Monitor, J. D. Fry. In New York Consolidated, J. D. Fry and A. K. P. Harmon. In Overman, R. F. Morrow and J. H. Dobinson. In Raymond and Ely, A. K. P. Harmon and R. F. Morrow. In Segregated Belcher, R. F. Morrow, A. K. P. Harmon and J. H. Dobinson. In Savage, J. D. Fry and R. F. Morrow. In Sierra Nevada, R. F. Morrow and A. K. P. Harmon. In Silver Hill, A. K. P. Harmon and J. D. Fry. In South Comstock, A. K. P. Harmon. In Trench, Jas. H. Dobinson. In these mines there is invested millions by honest toiling men, men of business and limited means. These trustees occupy a sacred relation to the share-owners, and the share-owners number a host of confiding, simple minded, honest people. In the management of the mine there should be economy and integrity; every dollar received and expended should be accounted for as by a bank or insurance corporation. Every share-holder has the same right of information as Mr. Morrow, or Harmon, or Fry. If the mine is not so conducted, it is dishonest; if information is withheld, it is dishonest; if by innuendo or false suggestion, or by a suppression of facts, share-holders are induced to sell or buy, they are defrauded, and the men who manage are rogues and robbers. They obtain money under false pretences; and although the false token required by the Code is wanting, they are, nevertheless, guilty of crime.

And now that we have described the temple of the stock-jobbing Juggernaut, its idols and its priests, given some hints of its interior workings, we can only say to our intelligent readers, do as you please. If you believe you can cope with these inside managers of mines successfully, do so. If you think you stand upon such equal terms in point of information as gives you an even chance with them to win at this hazardous business, go in; these persons will roll so long as you make the game. Dealing in mines under honest and honorable management is a hazardous business. Dealing in stock under dishonest and dishonorable management will result in inevitable loss.

ETNA SULPHUR MINE.—James McAllister, of Mill City, one of the discoverers of Etna sulphur mine, near Table Mountain, arrived in town last night, and gave us the following particulars of the find: The sulphur bed is located on a hill about ten or twelve miles north of the Humboldt salt marsh, on the east side of Table Mountain range. It was discovered by McAllister and Elliot, who located four quarter sections of the mound in which it is situated, and which appears to be principally sulphur. There is a depression in the summit of the mound which looks like the crater of an extinct volcano, and from which gasses, emitting a strong sulphurous odor, were escaping. He thinks there is an immense deposit of sulphur in the locality, but as he and Elliot were not prepared to prospect it, they did not dig more than a few feet into the bed in any one place, but they satisfied themselves that the greater part of the surface was covered with sulphur to a depth of at least two feet, though for aught they know to the contrary it may extend downward to an indefinite depth. He says any number of teams can be loaded there by shoveling the sulphur right into the wagons, and that it can be hauled up Pleasant and Grass valleys to the railroad for \$12 per ton.—*Silver State.*

A MINERAL belt has recently been discovered in the foothills of the eastern slope of the Humboldt range of mountains that can be easily traced from Unionville to Humboldt City, a distance of twenty miles. Several locations have already been made on this belt, and considerable work done in different places, and good prospects obtained in every instance.

IN THE Utah mine, on the Comstock, putting in the foundations and preparing for the erection of the heavy bed plates and sills for the new and powerful machinery is making steady headway. This machinery when completed will be among the most improved and powerful on the line of the Comstock.

THE N. Y. Consolidated company are tearing down their old works, and will put up more substantial ones.

The New California Mill.

The site selected for the new California mill is on the brink of the large ravine which puts down from the neighborhood of the cemetery, and thence on into Six-mile canon at the Nevada mill. As the ravine makes to the south and east to join the canon, the site is a short distance north and west of the Nevada and some distance east of the new C & O shaft. The grading for the mill, which has been very heavy, is now about completed. It has been going on at the rate of two thousand cart-loads of dirt and rock per day, ten carts having been used on each shift. As the work is approaching completion the forces have been somewhat reduced, and only eight carts are used on the day shift and six on the night. Some very hard blasting rock has been struck near the southwest corner, which has made progress a little slower than at first.

The system of loosening up the dirt which has been adopted by T. H. Rooney, Esq., under whose supervision the work is done, is ingenious and the result of long experience in the business. The grade is from seventeen to nineteen feet in depth, and in order to lift and loosen the earth holes seventeen feet in depth are drilled with old-fashioned churn drills eight or ten feet from the edge of the grade. Into the bottom of these are placed a couple of cartridges of giant powder, then the hole is tampered about six inches above these cartridges and they exploded. Any one not experienced in this kind of work would expect some sort of a demonstration of effect from such a confinement and explosion, but the perceptible result is small. Even the hole drilled in is not injured by the discharge. The result attained is the formation of a large underground chamber. This is the peculiar compressing, gravitating effect of the giant. Of course, hard rock would be broken, but in a commixture of earth and loose rock it simply makes room for itself, and the result is the underground chamber before mentioned. This chamber is now filled with black powder—all that it will contain—and the hole tamped full to the surface. When this is exploded it lifts and pulverizes the whole mass so that no more picks are necessary for the primary breaking and loosening of it. This is one secret of the exceedingly quick work made of this large and heavy grade.

In order to pass the water which flows from the city round the mill site, a 3x3 flume, made of three-inch lumber, has been constructed, running along on the north side of the ravine and emptying below where the mill will be placed. This is being covered by the grade, so that it will be almost entirely out of sight when the work is completed. It will take about six days more to complete the grading. It is the intention then to go at once to work constructing the mill. In fact, the first load of lumber which is to be used in its erection was dumped on the grounds yesterday. It was three weeks on the 9th instant since the first pick was struck into the ground. At this rate the mill will be up and running so as to exceed the \$5,000,000 net proceeds of the California before January 1, 1876. The first shipment of freight for the mill was also received yesterday at the depot of the Virginia and Truckee railroad. It consisted of two boilers, 64x16, and two double breechings; total weight, 20,000 pounds.—*Virginia Enterprise.*

AGRICULTURAL AND MINING LAND.—An idea prevails, and not without some reason for it, that there is something wrong in the law that surrenders lands for agricultural purposes which are worth, in some instances, a hundred times as much for mineral purposes. At the rate lands are being taken up it will only require a few years to put a terrible check upon mining, and as it stands to-day the discoverer of a mine or one who is willing to work it, either has to suspend work or engage in a lawsuit that requires both time and money to adjust. We are informed that there are several places near town where men could make their three or five dollars a day, but the diggings are locked up by government patents in the hands of parties who are not even willing to cultivate the soil. We believe our county would double its population in a year if this drawback upon our great industry did not exist. We believe that men should own property and be fully protected in their possession of the same, but we believe that no one should be prohibited from digging gold in any locality where it exists to an amount greater than the value of the land. This, we believe, is the intention of the law, but it is misapplied in many instances, and a remedy easier than a heavy lawsuit ought to be put in force.—*Placer Argus.*

DECISIONS IN MINING LAND CASES.—In the matter of the gold and ore placer claim, at Marysville, California, a decision has been rendered by the Land Office regarding the claim of daughters and others upon the ground that the adverse claimant had not shown citizenship or compliance with the law in holding his claim in January last. The Secretary of the Interior affirms the decision of the Land Office that the claim in Montana, located prior to the Territorial Act of 1873, could not exceed 100 feet. A subsequent hearing of the case was had, but the Secretary has just overruled this motion and re-affirmed his former decision.

The Richmond Refinery.

The refinery, or separating works, of the Richmond company, says the Eureka Sentinel, give promise of doing much more for the general well of this section than many could have been led to suppose. The benefits derived from refining our base bullion at home can scarcely be over-estimated, and that it will redound to the interests of poor men and the general prosperity of the whole district does not admit of a doubt. Heretofore it required months to get returns from bullion shipped either east or west. This was particularly trying on small operators and men of limited means. Fortunately, by the construction of the refinery, all this is changed. Now, bullion may be deposited at the refinery one day and its full market value in coin is ready the next. This ought to operate as a great stimulant to the owners of mines who have not the means to carry on business on a comprehensive scale. The utter impossibility of obtaining speedy returns for our bullion has all along proven one of the greatest obstacles we had to contend with. It required more than a princely fortune to keep a mine and smelting works afloat until the coin could be realized for their product. Indeed this was the rock upon which the hopes of several of our smaller concerns were wrecked, as many worthy gentlemen in this community can attest from dearly bought experience. The promised early completion of the Eureka and Palisade railroad is also another of the beneficial results of the Richmond refinery. There can be no question that our ability to extract the precious metal from the base will greatly accelerate the construction of the unfinished division of this important enterprise. Other benefits will of course accrue to this community, but those cited are deemed sufficient to establish the Richmond company's claim to a very large share of our confidence and esteem. To Mr. Probert, the resident Director, through whose sagacity and energy these incalculable benefits have been vouchsafed us great credit and consideration is due, and we assume the liberty of tendering him the sincere thanks of the entire community.

A Quicksilver Bonanza.

The Vallejo Chronicle a few days since alluded to the fact that the owners of the St. John mine had reached the ledge for which they had been driving with their big tunnel. The developments made by the new tunnel show an immense body of ore. The ledge has been stripped a distance of twenty feet long and fifteen high, exposing its whole face. The ore is remarkably rich, being about fifteen or twenty per cent. Miners will have a better idea of the magnitude of the development on being told that the workmen have contracted to break the ore down and take it out of the tunnel at the low price of two dollars per ton.

The Big Tunnel.

The big tunnel of which we have been speaking, that has secured such important results, was begun over a year ago, and work upon it has been prosecuted steadily ever since. It is the sixth level of the mine, and is 650 feet from the surface. The total length is 1,150 feet; it is eight feet high, and well timbered the whole distance. It cost \$12,000 to run it. The striking of ore in this tunnel therefore proves a body of ore 650 feet deep. What its thickness is at this last level must yet be determined by development; but there is every reason to believe that the ore is

Still Growing Larger

As it goes down. On the first level—50 or 60 feet from the top of the hill—the ore body was only one foot thick on the foot wall and four feet on the hanging wall. Seventy-five feet down it has increased fifteen feet, and on the Wilson level, 450 feet down, the body is found 60 feet thick. It is therefore supposed with good reason that in the big tunnel, 200 feet below the latter, the bonanza is larger still. It has a uniform width of about thirty feet the whole way down. With these last developments, there is now no necessity for any further prospecting; and all work in that direction has been stopped. The ore in sight is sufficient to feed all the furnaces.

For Years to Come.

There are fourteen tunnels now run in the mine and in every one cinnabar is found. The company are preparing to run the mine on a scale commensurate with its developments. As we have before stated they have leased the Brownlie mine furnace and will erect another furnace at their mine this summer. This will give them three furnaces, which ought to furnish a smelting capacity of from 300 to 500 flasks a month. The mine will make a very big run the present month.

Those wonderful mines in Southern Oregon, about which so much interest has been aroused, are peculiar in one respect. Instead of being the cause of "flush times," as is usual in the early history of every mining camp, it appears that common labor at the mines commands only one dollar per day, and that wages and prices generally are proportionately low.

The new incline engines for the Ophir mine are of sufficient power to work the mine to a depth of 5,000 feet.

MECHANICAL PROGRESS.

Progress in Iron Work.

At a meeting of the New York Society of Practical Engineering, held on the evening of the 22d ult., George E. Harding, M. E., read the regular paper on "The Progress of Invention in the Metallurgy of Iron," reviewing the successive steps by which this industry has arisen from its primitive methods to its present complex processes and colossal proportions. He stated that the next step forward to be made in iron manufacture is the production of shaped articles direct from the ore, without reheating or intermediate processes. At the close of Mr. Harding's paper, the Hon. Abram S. Hewitt made an extemporaneous address on the most recent successes of iron making. Among other matters of interest he stated that the production of iron direct from the ore is easy by the use of charcoal, but not with hard coal. This direct production of iron is not, however, of the same importance as it was formerly, for the reason that steel may be made direct, and as so rapidly taking the place of iron for many purposes that the production in Great Britain has risen in a few years from 20,000 tons to upward of 1,000,000, and in the United States already amounts to 500,000 tons per annum. The elimination of phosphorus from iron is no longer the problem that only recently has been the case, for it has been found that by eliminating the carbon instead, a good steel can be made, containing as much as four-tenths of one per cent. of phosphorus. Good steel may contain either carbon or phosphorus, but not both together. The result of this discovery will be to open up immense tracts of American iron mines that hitherto have been of little worth. The midsummer session of the Society of Practical Engineering will be held in July next.

Expansion and Contraction of Boilers.

One difficulty to be contended with, in the management and working of steam boilers, arises from the unequal expansion and contraction of the parts of the structure. In some instances these are so great as to be the cause of more wear and tear than any other process to which the boiler is subjected.

Iron expands in volume one-eighth hundredth; or, in other words, a bar of iron one inch square and 800 inches long would expand one inch in length while heated from the freezing to the boiling point of water. The proportion of expansion, for any length of bar, corresponding to any length of boiler, can be easily estimated. It is not to be understood, however, that the maximum expansion would occur in boilers generally, for it is rare that one is allowed to get so low in temperature as thirty degrees. Still, in the winter season, boilers when "blown down," are liable to become very cold.

From experiments made by M. Wertheim, he concluded, from certain phenomena, that there is a kind of thermal elastic limit with iron. "When heated, and when its consequent dilation of volume does not exceed that which corresponds to the boiling point, it returns to its original dimensions. Beyond a certain temperature it does not contract again to its primitive volume, but takes a permanent dilation in consequence, apparently, of its elastic limits having been exceeded."

THE EXTENSION OF THE IRON TRADE IN JAPAN.

The Government of Japan is taking steps for establishing blast furnaces, in which the excellent magnetic iron ores averaging above fifty per cent. metallic iron, and which occur in lodes, are to be smelted both with charcoal as well as coke. The iron hitherto manufactured in Japan has been made, as described in a former report, from the iron sands which occur in the islands of Yesso, by a sort of bloomery process, and these iron sands have lately been described in the report of Mr. B. S. Lyman, the geologist and mining engineer to the Government of Japan, as consisting of two varieties, the one easily smelted and pure, whilst the other is difficult to smelt, and supposed to contain titanium. He estimates the total quantity of these sands at 125,000 tons, which he regards as containing 91,000 tons metallic iron, but states that only some 5,500 tons of the sand are of the easily smelted description. —Iron and Steel Institute.

A GUN MANUFACTURED IN AN HOUR.—A gentleman recently called at the Remington gun manufactory at Ilion, N. Y., with the view of asking the purchase of some arms. He was shown through the works, and evinced great interest in all the processes. At the close of his tour of inspection a gun was shown him and repeatedly discharged in his presence. He was then told that since his entrance into the works every part of the identical gun just fired had been manufactured and put together, and that his own eyes had witnessed every stage of the work. He then offered to purchase five or six loads of guns which the Spanish inspectors had recently rejected, probably with the view of getting some small reduction, and paid the less. Remington the price named in the original contract. It is supposed that this gentleman was an agent of Don Carlos. If this be the case the Spanish government has through its officials quite overreached itself.

American Ordnance—A Novelty in Gun Manufacture.

Before the war of secession our guns were the most powerful in the world; but since that we have made no progress in that direction, while the nations of Europe have gone a long way ahead of us. There is not in the United States to-day a private or public factory capable of forging a 100-pounder of steel or wrought iron, and the proposal by a bureau officer to purchase suitable guns from abroad would be justly construed as a gross affront to the American eagle. Urgent appeals have been made every year to Congress with a fall representation of the case, but with little effect. Congressmen seem to think but little of the necessities of national defence. The contingency of a foreign war is apparently regarded as so remote that it is not thought to be worth the smallest insurance premium upon it. It is not difficult to obtain each year a few thousands of dollars for experimental purposes; but when mention is made of the millions necessary to provide a national gun factory, Congress declines with astonishment the unwelcome proposal.

After many efforts the Ordnance Department succeeded in obtaining, two years ago, an appropriation for constructing and testing some heavy rifles. It was provided, in the act that one of these should be a breech-loader. A board was appointed to select the models, and those chosen were: 1, a 12-in. Krupp; 2, a 12-in. Woodbridge muzzle-loader; 3, a 12-in. Hotchkiss muzzle-loader, besides several minor recommendations. The Krupp gun was never negotiated for, because it soon became apparent that the other projects would more than allow for the appropriation, and American genius must be encouraged, not affronted. Hotchkiss' gun has been much elaborated and modified, and the inventor expects to have his gun finished during this spring, if the funds hold out. This gun is made up by welding together iron disks, and then boring out. The plan is an old one, and failed in the hands of Dr. Ames, the gun separating into sections at the welds. Hotchkiss' improvement consists in his method of welding.

The Woodbridge gun is in most respects a novelty. He proposed his plan as long ago as 1850, when his proposal was favorably endorsed by General Scott. During the war a small gun was made by him and could not be ruptured.

His plan consists in winding about a steel tube a coil of soft steel wire. The wire is fed to the coil in a band consisting of twenty or thirty wires, each wire of three-tenths of an inch cross-section. When the coil is wound up the whole is placed in a tight flask of boiler iron, and this is put into a specially constructed furnace, muzzle upwards, and heated to redness. An alloy of 80 of copper and 20 of tin is then poured into the flask. This is a very fusible alloy, and is expected to solder the wires into a practically homogeneous mass, and to give trunnions and contour to the gun. If this succeeds the finishing of the gun is of course mere lathe-work. This project seems at first to have some of the Munchausen elements in it; but a very careful study of the elaborate details of the plan, and of Mr. Woodbridge's preliminary experiments, led every member of the Ordnance Board to the belief that it was worth trying. It is known that bronze penetrates with astonishing power between clean surfaces of iron or steel, when the latter is hot enough to preserve the fluidity of the bronze, and when the surfaces are thoroughly clean. This has been abundantly verified at the Springfield armory. Moreover, the small gun made by Dr. Woodbridge in 1861 was out into small pieces, and was found to be homogeneous and solid throughout. The furnaces, machinery and steel tube for this gun have been procured, and the calibre of the first one is intended to be nine inches, on account of the extreme novelty of the experiment; but if it proves successful a 12-in. rifle will be immediately constructed—or attempted. Difficulty has been experienced in procuring the wire. It is required to be square in section and of three-tenths of an inch in gauge, and as the inventor is extremely exacting and cautious, much difficulty has been found in fulfilling his requirements.

The principle appears to have many points to recommend it. Its longitudinal strength will be guaranteed by the obliquity of the wires, which will be reversed in the alternate layers. It is objected by many that the heating of the coil and its subsequent slow cooling will deprive the wires of a great portion of their tensile strength; but, granting this, there will still be left a very high tenacity, as has been shown by Mr. Woodbridge in his extensive preliminary experiments, and, as already stated, the inventor combines with some daring a great and perhaps excessive amount of caution and foresight in providing against possible sources of difficulty and errors of detail, so that good results are very confidently anticipated.

RECIPE FOR A CEMENT FOR MENDING STEAM BOILERS.—Mix two parts of finely powdered litharge with one part of very fine sand, and one part of quicklime which has been allowed to slack spontaneously by exposure to the air. This mixture may be kept for any length of time without injuring. In using it a portion is mixed into paste with linseed oil, or, still better, boiled linseed oil. In this state it must be quickly applied, as it soon becomes hard.

NEEDLE MAKING.—There is a needle factory in New Haven where the whole process is done by a single machine without the manual labor of any person. A coil of steel wire is put in. The machine cuts it off at the required lengths. It cuts the steel pieces consecutively, punches the eye-holes, countersinks the eyes and grinds the points, and in fact does everything until the needles drop out completely formed. Another machine picks them up and arranges their heads and points together, and a third piece of mechanism puts them into paper. One of these machines occupies no more space than an ordinary table, and each of them turns out from thirty to forty thousand needles a day. Most of the needles in use in this country have been imported from England until a few years past.

SCIENTIFIC PROGRESS.

The New Method of Electric Illumination.

Dr. Wilde, of the St. Petersburg Academy of Sciences, has recently made a report to the Academy upon the new mode of producing the electric light proposed by M. Ladyguin, of that city. Since the discovery of the voltaic arc in 1821 by Davy, many attempts have been made to utilize it practically for illumination. But in spite of the regulators devised for the purpose, it still remains variable and inconstant; being too intense used at a single point, it is yet incapable of division. Since the improved magneto-electric machines have reduced the cost of the electric light to only one-third that of coal gas, these efforts to utilize it have been redoubled. And, as a result, M. Ladyguin has made an invention which, in a very simple way, resolves both problems, rendering the light steady, and at the same time capable of division. It has long been known that the electric light proper comes from the intensely heated carbons which the current traverses, the resistance of the air between them developing this heat. So the resistance of a platinum wire placed in circuit causes it to be highly heated; but the light thus obtained, though constant, and entirely controllable, is too feeble for practical use.

M. Ladyguin has conceived the idea of replacing the platinum wire in this experiment by a thin rod of gas carbon, and with complete success. Carbon possesses, even at the same temperature, a much greater light-radiating power than platinum; its calorific capacity is less than one-half that of platinum; it is, moreover, a sufficiently good conductor of heat; so that the same quantity of heat elevates the temperature of a small rod of carbon to nearly double that of a wire of platinum the same size. Again, the resistance of the carbon employed is 250 times greater than that of platinum; hence it follows that a rod of carbon may be fifteen times as thick as a wire of platinum the same length, and yet be heated by the same current to the same degree. Finally, the carbon may be heated to the same intense whiteness without the danger of fusion to which platinum is liable. These are some of the advantages of carbon; its only disadvantage is, that heated in the air it burns, and so gradually wastes. But M. Ladyguin has happily obviated this difficulty by enclosing the rod of carbon in a glass cylinder containing no oxygen and hermetically sealed. Dr. Wilde asks, in conclusion, that the Academy recognize the fact that M. Ladyguin has solved the grand problem of dividing and rendering steady the electric light, in the simplest possible manner, and that they award him, in consequence, the Lomonosow prize.

A New Earthquake Indicator.

A highly ingenious, though simple apparatus, designed by M. Malvosia, of Bologna, to indicate the commencement of earthquake shocks, has lately attracted the attention of Italian savants. We will try, briefly, to describe it: On a slightly inclined board is fixed a spherical cap, having eight grooves, corresponding to the eight principal points of the compass. A little beyond the edge of the cap there is a projecting wooden ring which limits the inclined surface. On the top of the cap is poised a little brass ball, which is slightly flattened at the point of contact. Upon the ball rests, very lightly, a conical weight by a small screw projecting from its base. This weight is suspended by a chain from an overhanging arm, moveable up and down on a support at the side.

It will thus be seen that the least shock will cause the ball to topple over. When it does so it will run down one of the grooves of the cap to the inclined plane, at the bottom part of which it finds a hole, and passing into it, causes the discharge of a pistol. But this is not all. Whenever the ball has left its position on the cap, a spring needle, longer than the diameter of the ball, shoots out from the little screw-knob that rested on the ball and catches in that groove of the cap down which the ball ran.

Thus the direction is indicated in which the shock has been given; it has been on the opposite side to that in which the needle hangs down. The instrument is said to be very sensitive, and will doubtless render good service in what is now a little understood branch of science.

SAFETY-LAMPS NOT ALWAYS SAFE—AND WHY. Twenty-two large explosions have taken place in English coal mines since the year 1866; among these seventeen took place at the moment of the firing of a blast at a distance. Galloway conceived from this the suspicion that a violent sound wave might be capable of pushing the flame through the wire gauze of the safety lamp, and thus ignite the inflammable gas around. It was known that when explosive gases are drawn through a wire gauze with a velocity of ten to twelve feet per second, the flame penetrates and ignites them; but it was not known that a sound wave would do the same thing, and this is what Galloway has proved by experiment. He placed a safety-lamp in an explosive mixture, and fired a pistol at a distance of twenty feet, or ignited a box filled with a mixture of coal gas and oxygen; in either case a large flame was projected through the wire gauze out of the safety-lamp, and ignited the surrounding gas. He found no difference when the gas was separated from the air by means of a thin membrane, which would not permit air currents to pass, but only transmit the sound wave. The experiment was varied by transmitting the sound wave through a tube twenty feet long, and of which the axis was directed toward the safety-lamp; closing this tube with an elastic membrane made no difference whatever. He therefore came to the conclusion that a blast in a coal mine may make all the safety lamps useless, while it explains the fact that an explosion in one part of a mine is often immediately followed by another explosion at a distant point.

NEW METHOD OF PRESERVING MEAT.—A method for the preservation of meat, by keeping it in a cool, dry chamber, has been communicated to the French Academy by M. Tellier, well known as the inventor of very efficient ice-producing machinery. His new device consists in the employment of methylic ether, a substance that is gaseous at ordinary temperatures and atmospheric pressure, but which can be reduced to a fluid by a pressure of eight atmospheres. The methylic ether is condensed and then allowed to expand in contact with metal compartments containing a solution of chloride of calcium, which it reduces to a low temperature. Air is blown through this apparatus, its moisture is deposited as hoar frost on the metal, and it passes in a dry and cold state to the chamber in which the meat is placed. It is found that the flavor of the meat is not injured by retention in this situation for forty to fifty days, although it is said to acquire a greasy taste after that period.

THE PLANET URANUS.—The spectroscope has enabled astronomers to ascertain that the atmosphere of the planet Uranus, which is further from the sun than any other planet except Neptune, is composed chiefly of hydrogen gas. Mr. Proctor says that if there is even a small proportion of oxygen present, an electric spark, however minute, would cause tremendous convulsions by combining the hydrogen and oxygen into water. The *Spectator*, referring to his assertion that there is probably no life upon the planet, asks, "Why may there not be life which needs no oxygen?"

FAILURE OF COPPER SULPHATE.—Railway sleepers injected with sulphate of copper will be preserved indefinitely, provided the copper remains in its original combination with the ligneous tissue. But M. Max Panlet shows that, on railways where carbonate of lime exists in the stone ballasting of the track or in the soil, the carbonate gradually penetrates the wood and substitutes the copper. Decay then follows, for carbonate of lime is not a septic agent.

MUSIC FROM GAS JETS.—An extraordinary new musical instrument, called the pyrophone, invented by M. Kastner, of Paris, has been exhibited at the Society of Arts. The notes are produced by the singing of gas jets in glass tubes, and are sweet and pure, and, at the same time, have great penetrative power. After the reading of the paper on the invention, illustrations of the music emitted were given separately and in concert with the human voice.

NEW ELECTRO-PROCESS.—A very ingenious application of electro-metallurgy has recently been brought before the notice of the Society of Arts. It consists in the application of a coat of silver, by means of electro-deposition, on natural leaves and flowers. By this means very delicate ornaments are produced, since the precise form and texture of the natural leaf is preserved under the thin silver film. The special process by which these results are attained is the invention of a Mr. Denton.

INTERESTING DISCOVERY.—A discovery of a curious nature has been made in Egypt by a savant who has found and deciphered an inscription in honor of Toutmosis III., containing more than four hundred geographic names, very precise and recognizable, concerning Arabia, Armenia, Nubia, and the coasts of the Mediterranean. The inscription is thirty-five centuries old, and will give rise to some historic and geographical debate of great value.

LEAD VEINS are evidently formed by the accretion of gaseous particles, and the growth or repletion carried forward by the laws of crystallization. Suppose this crystallization to be under the control of any appposable principle, and each mass of ore (whether in regular cubes or having the edges or solid angles of the cubes truncated) to have direct reference to each other cube, and the key of the filling or repletion of the vein system of a lead field may be had.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

BUNKER HILL.—Amador Ledger, May 22: This mine, situated near Amador City, is being rapidly developed into a valuable property. The main shaft has reached a depth of 270 ft., and the ledge at that depth is very extensive, and the entire mass of ore far beyond the average in point of value. In connection with the mine is a 10-stamp mill, which yields from the rock crushed, from \$7,000 to \$8,000 per month, with an almost unlimited amount of ore now developed. The mine is under the superintendence of Mr. John Palmer, a practical miner, under whose intelligent management the Bunker Hill is rapidly advancing in importance, and may now be ranked with the permanent paying mines of the county. The mill now in use will, at the proper time, be superseded by one of greater capacity, when the monthly yield of the mine will equal the most productive on the great mother lode.

KENNEDY MINE.—As sinking progresses in this mine the prospect of its future value becomes more apparent. The rock taken out in sinking is becoming remarkably rich, far more so than at any former period in the history of the mine. We saw rock taken from the bottom of the main shaft literally filled with gold, and which would yield a fabulous amount of gold to the ton of ore; nor does such rock seem to be of limited quantity; on the contrary, about four feet of the ledge in the bottom of the main shaft is very rich in free gold and sulphurets.

A NEW QUARTZ MILL.—Amador Dispatch, May 22: The owners of the Volunteer mine near this place have already commenced hauling the timbers, etc., for their new 10-stamp quartz mill, which they will erect on the creek a short distance below the mine. This looks like business, and is an evidence that the proprietors have the most implicit confidence in the richness and permanency of their mine.

CALAVERAS.

WEST POINT ITEMS.—Calaveras Chronicle, May 22: Champion, rich as ever. A large quantity of ore on the dump. Mina Rica running levels at the depth of 167 ft., with fine indications that the main north chertony will prove extensive on this level. The Enterprise company are also running a tunnel transversely to the former "Maria." The tunnel is in some 200 ft., and the vein will be tapped in two weeks time. The mill is kept in motion. A. M. Harris crushed a lot of ore from an abandoned mine which yielded \$123.33 per ton. Josephine shaft found 60 ft. Although a large shaft, nothing but pure pay ore is in sight. Some 100 tons are being hauled to the Zacarero mill and will be worked with the appliances available. The superintendent intends to send sample lots of ore to San Francisco to be worked there at prominent reduction works previous to erecting a mill on the mine. Good Faith tunnel is very near the third vein it is intended to tap and will soon be in condition to turn out large quantities of high grade ore. The new shaft on the Doyle mine is down 40 ft.; the machinery is now being used for hoisting. Mr. Carey deserves success for his unflinching energy. A new shaft is being sunk on the Anderson Flat mine, 200 ft north of the working shaft; the two will be connected by a level which has been already started from the south shaft. Times, never better.

FRESNO.

QUARTZ.—Fresno Examiner, May 26: W. A. Sanders, who has lately been visiting the quartz mining region at the head of Big Dry creek, left at this office samples of gold, silver and copper ore which he had procured in that neighborhood. Some of the specimens were very good in appearance. The claim of Barnes & Co. he thinks the best of any that he examined, though none of them were sufficiently developed to enable a proper estimate of their extent or value to be formed. The quartz mill to be erected by Messrs. Jensen & Keys will enable an estimate of the value of the mines to be formed. In our opinion the day is not far distant when a number of valuable quartz mines will be developed to this county and be profitably worked. It is indeed strange if valuable quartz mines do not exist in Fresno when rich ones have been discovered in all the adjoining counties.

INYO.

PANAMINT DISTRICT.—Panamint News, May 18: The Jacob's Wonder is being thoroughly opened and prepared for taking out ore in large quantities. In the west winze, which is now down 76 ft from No. 1 level, 4 ft of \$275 ore is exposed, and the quality is steadily improving as sinking progresses.

STEWART'S WONDER.—Work on this mine is being rapidly pushed ahead, and it will soon be opened by drifts and winzes to a depth of 325 ft.

HEMLOCK.—We have always looked on this mine as one of the greatest on the Pacific coast. It is being most thoroughly opened, and great preparations are being made to supply the mill with its rich ores. The mine is being opened by a shaft 70 ft in depth, from the bottom of which a tunnel has been run in 80 ft, cutting the ledge. From this level a drift has been run east 127 ft, through a body

of fine ore. To the west a drift has also been run 204 ft on the same level. From where tunnel No. 1 cuts the ledge a winze has been sunk 142 ft, through an excellent body of ore. At the depth of 50 ft, drifts have been run east and west 40 ft, showing a body of high grade ore. A tunnel is also being run to cut the ledge at the bottom of this winze, through which all the ore will pass out to a fine road that is being built.

WYOMING.—This mine is being the most extensively worked of any in the district. The preparations and plans for opening it are not only on a large scale but are being rapidly pushed ahead. Tunnels, drifts, winzes and stopes are so numerous in this mine that it is almost impossible to remember them. There has been a tunnel run 185 ft, which cuts the vein at the 287-ft level, and at this level a drift has been run 74 ft west on the ledge, running through the finest body of ore that has ever been found in this mine. The drift has now passed the winze sunk from the 193-ft level, giving fine ventilation to this portion of the mine. The cutting of this vein at the depth of 286 ft removes all doubt as to the permanency of this mine, and settles to the wind the prognostications, made some time ago, of certain incredulous experts, who never can be made to believe that the works and ways of the Almighty are past finding out.

The Panamint Consolidated mining company are working 25 men, running night and day, on their mines.

NEVADA.

IRON MINE.—San Juan Times, May 22: The North Bloomfield gravel mining company have recently struck a bed of blue gravel which is paying immensely. This strata was struck near one of their numerous tunnel shafts and only a few feet below the surface gravel, and about fifty or sixty feet above bed rock. It extends to bed rock and grows richer as they go down. The company is now washing through two monitors, using 3,000 inches daily. Their dam at Bowman's is filled with water, and if no accident occurs they will have a sufficient supply of water to keep the two monitors at work until the fall rains set in. The company now employ about fifty laborers, half of whom, probably, are Chinamen.

HIRSCHMAN & GROVER'S CLAIMS.—Nevada Transcript, May 22: The hydraulic claims of Hirschman & Grover, situated about a mile west of Nevada City, on Quotaham hill, are being worked, and the owners are busily engaged in piping away. The company has 850 inches of water, using two monitors. The remainder of the mining season will be employed in washing up bottom gravel, which is very rich. The water will probably last six weeks or two months longer, and it will take that time to complete their season's work, in securing the large proportion of gold, which is always found on the bed rock. None but white labor is employed in these claims, the owners being satisfied that they can be better served by paying a higher price for white men than employing Chinamen. The Hirschman & Grover claims have had some good clean-ups this season, but the next one, judging from the appearance of the ground sluices, will eclipse them all. There is now no doubt, from the gravel formation and the discoveries continually being made, that the lead is a continuation of the Manzanita and Nebraska claims, and that the main channel runs directly under the Sugar Loaf ridge.

AMERITA.—Foothill Tidings, May 22: This is the name of a mining location on Deadman's flat, on the now famous Pittsburg lode. The owners are about to open it up in good shape by a tunnel, which in its extreme length—300 feet—will give them 220 ft of back. 300 ft in, however, they expect to get the ledge and pay ore.

PLACER.

DURCH FLAT AND GOLD RUN.—Placer Herald, May 22: Both places the large hydraulic mines are nearly all running with full heads, and it is thought that the water will hold out until the last of June. During the recent cool weather, which has been interspersed with showers here and in the valley, there has been considerable snow fallen on the mountains, which, though somewhat unexpected at this season of the year, will serve to materially lengthen the miners' harvest season, and result in an important difference in the year's yield of gold in this county, and doubtless in the whole State, to what was a few weeks ago expected. Altogether the season for hydraulic mining will be almost, if not quite, an average; for though we have had no rush of water this spring from the sudden melting of large deposits of snow, as is usually the case, what we have had has been well distributed, enabling the minor to commence early, and as now seems, to run tolerably late.

The discoverers of the chrome mine have made a new arrangement with the proprietors of the chrome reduction works of Baltimore. The latter take the mine and work it, and pay the former \$3 a ton royalty, for all the ore taken out.

We learn that a mine on the St. Lawrence extension, near Ophir, is now being opened, which gives very favorable indications of being rich and extensive. It is rumored that an English company, with over a million dollars capital, are about to take hold of it, who, it is thought, will put on extensive works.

PLUMAS.

QUARTZ MINE SOLD.—Plumas National, May 22: A few days ago the Wolf Creek company's mine and mill near Greenville, owned by

Butcher, Borge, Lowery & Co., was purchased by Messrs. Lawrence, Bidwell & McIntyre, for the sum of \$8,000. The mine has recently been paying well, and the gentleman purchasing probably got a good bargain.

IRON CLAIM.—Wilburn & Haven, whose claims are situated near Hardscabble, Mohawk valley, have certainly got a big prospect ahead. They took out about \$19,000 last season, and we are credibly informed that, notwithstanding the short run of water, they will do fully as well this year. They picked up a \$200 chip the other day, and it is reported that they pick up \$100 per day in coarse gold. No clean-up has been made yet, but when the "indications" are such as above mentioned, it don't require much judgment to tell what the result will be.

GRANT GRAVEL MINING COMPANY.—This is the name adopted for the extensive gravel claims on the Middle Fork, recently purchased of Gould & Telf by Mr. F. A. Smith, of Sacramento, who buys for a company of Sacramento capitalists. Mr. Smith has been making a thorough examination of the ground and water right, and the indications show that he was pleased with the prospect. The claim will be opened on a creek, directly at the eastern side of Little Long valley. At this point there are splendid advantages in the way of dump, fall for flume, undercurrents, etc., and the solid, clear gravel is over 400 ft in depth. Work on the ditch to bring water to the mine will be commenced about the 1st of June. The ditch will be fourteen miles in length, and will take up all the waters of Cedar creek, and the undrained waters of Hurley creek, Anthony creek and Willow creek, and from there to the Middle Fork. The plan of operations is first to dig a grade 10 ft in width, in which the ditch is to be sunk. It is to be 7 ft on top, 4 ft on bottom and 20 inches deep, and with a grade of one-half inch to the foot. It is calculated that it will be of a capacity of from 3000 to 4000 inches. Work on the ditch will commence at the lower end, so as to get water to the claims as soon as possible. No flume will be used, but in one or two places the water will be conveyed by iron pipes for a short distance. It is probable that the ditching will be done by contract, and as the proprietors intend to finish it this summer, a large force of men will have to be employed. Mr. A. J. Gould has received the appointment of superintendent. We think Mr. Smith showed good judgment in the investment, for the water will cover any amount of gravel, and can be used for 50 years to come in such a way as to make it profitable.

GREENVILLE NOTES.—The Wolf Creek mining company have sold this week to Messrs. Bidwell, Lawrence and McIntyre. The price paid was \$8,000. The new proprietors propose putting up a new mill immediately, and the contract has already been let for the timbers. The Lone Star mill is to be taken down and removed, and steam power attached. All the mills in the neighborhood are doing better than usual. The Greenville mill, twenty-four stamps, will start up in a few days, after a rest of eighteen months. The paying rock recently discovered in the ledge continues to improve in quality as developments are made, and the chances of the Greenville are flattering. Tanner and Wiley are erecting hoisting works on the Cornville ledge, and are preparing for extensive operations soon.

SAN BENITO.

TIN MINE.—Gilroy Advocate, May 22: Mr. C. H. Pratt spent Wednesday night in Gilroy with his son, H. O. Pratt. He has been engaged in prospecting for tin and quicksilver in San Benito county, and says the prospect is encouraging for a good tin mine. A piece of pure tin, the size of one's fist has been found. The place is high up on the mountains and difficult of access. With some grading for five miles it could be reached with a team.

SHASTA.

MAMMO.—Correspondence San Jose Mercury, May 22: Mining prospects are looking up in Shasta county; in fact, the copper mines of Oak Run, the gold mines on Bear creek, and the iron mountain on McCloud river, all in this vicinity, and all recently discovered, are attracting hundreds of adventurous ore seekers to the mineral region. As far as prospecting, the mines in all the above named places offer abundant yields. Coal of superior quality has also been found in the same region, and with this combination of metals, certainly nothing is wanting to facilitate the extraction of the valuable from the invaluable. Mr. Peck, proprietor of the copper mines, recently disposed of a part of his mine not yet prospected, for the sum of \$15,000.

SIERRA.

RICH.—Mountain Messenger, May 22: The rich strike in the Union mine at Gibsonville is a big thing, and promises to stimulate prospecting in that section. It is an entirely new lead that they have found. It has generally been supposed to exist, but never before demonstrated.

DERON.—We understand that the prospects are very good for the building of a large ditch this summer, to convey the water of several lakes in the vicinity of Gold Lake to the northern portion of the county, particularly to the ridge running from Soles' digging to St. Louis. There are thousands of acres of rich mining ground in the limits spoken of, lying idle and unproductive, simply for the want of water. The enterprise of bringing in this ditch will not involve the outlay of over \$150,000, it is indeed, that much. There are no canyons to cross and no expensive tunnels to run. The volume of water obtainable would be large, and

its sale, in a few years, would repay the outlay and good interest thereon.

BIO STRIKE AT GIBSONVILLE.—"Sheep," the La Porte mail carrier, informs us that the Union company, whose claims are located back of Gibsonville, have recently struck it rich, and the best part is, it proves the existence of the big blue lead under the main ridge, and will cause the owners of the adjoining claims to drive ahead their works, with a certainty of being rewarded for their toil. The Union company washed up fifty-three ounces from 200 car loads. There are sixteen shares in the claim, and the owners are jubilant, feeling certain of a fortune. The chances are now favorable for Gibsonville to regain all its lost glory and come back to the lively times of twenty years ago. The owners in the Union are entitled to credit for their perseverance, having run their main tunnel over 3,000 feet, and that, too, without being positive that they would get pay. We hope the strike may make rich men of all of them.

TUOLUMNE.

THE GAZELLE.—Union Democrat, May 22: We are informed that very good ore has recently been found in this once famous mine. A vast amount of money has been made here the past few years without adequate returns, but patience and perseverance seem about to be rewarded.

ALABAMA.—Tuloume Independent, May 22: The Alabama mine has passed into the hands of an incorporated company, under the title of Consolidated Alabama gold and silver mining company. It is their intention to work the mine on a large scale. The company are now engaged erecting hoisting works, and contemplating running a tunnel to their mill, and say that within a year they will be taking out of the mine one hundred tons of rock per day, which (the mine opened) they can extract and mill for less than \$2 a ton. Cowles and Johnston are putting up one of their patent giant quartz mills. They are confident that they can crush fifty tons of hard rock, through a sixty screen per twenty-four hours.

OMEGA, TABLE MOUNTAIN.—The Omega gravel mine is five miles above the "Rough and Ready." E. L. H. Watt has again taken hold of the above claim with his wonted vim as superintendent, and is pushing the work with night and day shifts to intersect with the Alpha at the line of their claim. At this point, Superintendent Collins, of the Alpha, has a forty foot breast of gravel with ledge pitching. Considerable pieces of heavy, black gold, etc., (indicating the old Caldwell channel), weighing eleven, thirteen and twenty-one dollars, were found. This character of gold does not amalgamate, but nevertheless, on account of its great heft, finds its way and nestles into the riffles of the flume.

Nevada.

WASHOE DISTRICT.

ORION.—Gold Hill News, May 20: Daily yield, 150 tons of ore. This ore is being mostly extracted from the 1455-ft level. The ore stopes are all looking well and are yielding the usual quantity of good ore. Three mills are now running steadily on ore from the mine, and others will be added as soon as they can be obtained. The northeast winze has reached the 1600-ft level, and the bottom has been connected by a drift with the prospecting works at the bottom of the north winze, thus securing a fine circulation of pure air, and greatly facilitating the operations in that portion of the mine. The northeast winze passed the entire distance from the 1455 to the 1600-ft level through good milling ore, the body of ore at the bottom being over 100 ft in width. The winze below the 1600-ft level, being sunk with the inclination of the ledge, is down 45 ft, the bottom still in good milling ore. The east drifts from the main shaft, on both the 1500 and 1600-ft levels are being pushed rapidly ahead, and will soon reach the main ledge. Cross-cut No. 3 on the 1700-ft level is being pushed rapidly ahead toward the ore vein, and it is the intention, in a day or two more, to start also cross-cuts Nos. 2 and 4 on the same level. The erection of the new incline machinery is making favorable progress.

FLORIDA.—The station at the 400-ft level is well opened, and the drift started west for the ledge. It is in to-day about 10 ft, and will have something over 100 ft to run in order to reach the ledge.

UTAH.—All the men that can be worked to advantage are employed in grading, laying the foundations and in the erection of the new machinery, and new hoisting works building.

BAVAGE.—The new incline machinery is all working finely. Sinking the main incline is again making rapid progress, the rock in the bottom blasting out finely.

CALIFORNIA.—The cross-cuts on the 1500-ft level are all being forwarded with all the energy possible, there being no change of importance in any of them since our last report. The lateral drift to connect cross-cuts Nos. 3 and 4, on the 1500-ft level, is steadily advancing, the face still in rich ore.

BALTIMORE AND AMERICAN FLAT.—Sinking the main shaft is again making rapid progress. On the 750-ft level, the north cross-cuts have developed a body of fine compact quartz and low-grade ore 30 ft in width, of a very promising character. This development is an entirely new and very important feature, as no such body of quartz and ore has ever been found before so far to the northward.

CONSOLIDATED VIRGINIA.—Daily yield, 400

tons of ore. The ore breasts are all yielding richly as usual, and show no signs whatever of giving out. The mills are all steadily running, and the yield for this month will undoubtedly be as great as that of the month of April. The joint east cross-cut on the California line is steadily proving a much greater extent of ore in that portion of the mine than was expected.

SERRA NEVADA.—The rock in the bottom of the old shaft is much harder. The face of the main east drift on the 700-ft level is still in ledge material. Sinking the new shaft is also making fine progress. The foundations for the new and powerful air compressor are completed.

EUROPA.—The new three-compartment working shaft is well timbered and completed to the depth of 25 ft. The necessary carpenter and blacksmith shops have been erected, and the timbers are beginning to arrive for the erection of the new hoisting works building.

YELLOW JACKET.—Work is being pushed at all points on the 1740-ft level with all the vigor possible. The north drift is being especially crowded forward to make a connection with the main south drift on the 2000-ft level of the Imperial for air purposes.

PAUL SHERIDAN.—The face of the main west drift is to-day in porphyry, quartz and clay, being considerably softer material than that heretofore met with.

SUTRO.—A survey has been made during the week which shows the ledge to be over 50 ft distant from the face of the tunnel yet, the distance to run being greater than was anticipated.

IMPERIAL EMPIRE.—The main south drift on the 2000-ft level is being steadily pressed forward to connect with the north drift from the Yellow Jacket on the same level.

CROWN POINT.—Daily yield, 550 tons of ore, keeping the mills all steadily running. The ore breasts show no change for the week past. Prospecting on the 1600-ft level has made no new developments of importance. Work will be resumed in a day or two more at the 1700-ft station.

ORIGINAL GOLD HILL.—Cross-cut No. 2, south, at the 340-ft level, is in fair grade ore, and shows improvement as further progress is made into the ore body.

HALE & NORCROSS.—The west cross-cut on the 2100-ft level is still pressed vigorously ahead, the face in ledge material.

GOULD & CURRY.—The north drift on the 1700-ft level is being driven vigorously ahead to connect with the Best & Belcher south drift.

BULLION.—The ledge developments on the 1400-ft level of the Imperial shaft continue to improve as the work advances, with every indication of the finding of a pay mine.

LADY BAYAN.—The main west drift on the 380-ft level has penetrated the ledge for a distance of 30 ft, which at this point is solid white quartz, of the most encouraging character, carrying spots of fine ore. The red, oxidized ores, found on the levels above, have apparently all disappeared, and the ledge is assuming all the essential characteristics of the Comstock. The south drift on this level has not yet reached the ore vein. The face of the main south drift on the 250-ft level is still in ore of a good quality, as is also that of the south drift on the 170-ft level. The main south drift, on the 80-ft level has developed a fine body of milling ore, further to the southward than any heretofore found, one that promises a lasting development of much value.

BELCHER.—Daily yield, 500 tons of ore. The ore for the past week shows a slight improvement in quality, and there seems no prospect whatever of a diminution of the yield. Work at all points on the 1500-ft level is again being vigorously prosecuted.

BUCKETT.—The prospects of the mine are of such an encouraging character that it has been decided to erect more powerful machinery for its development. The new machinery is to be of sufficient power to sink the shaft to a depth of 1500 or 2000 ft.

CHOLLAR-POSSL.—Sinking the main incline is making fair progress. The south drift on the 1250-ft level is also making rapid progress, the face in soft porphyry. Grading for the new combination shaft is making all the progress possible.

NAGARA.—Sinking the main shaft is making splendid progress, the ore vein at the bottom showing a steady improvement as greater depth is attained.

AMAZON.—The cross-cut now being run to intercept the ledge at the 100 ft station is in 20 ft, and will soon reach the ore vein. This portion of the Comstock ledge is beginning to attract considerable attention, and it is confidently expected that pay ore will be found in this cross-cut.

JUSTICE.—The drift south at the 800-ft level is softer and more favorable vein material than heretofore.

SUCOON.—Preparations are being made to track ore from the slopes opened in the drifts in from the bottom of the shaft, east of the hill.

BEST & BELCHER.—The rock in the face of the south drift from the bottom of the winze at the 1700-ft level continues extremely hard. **JACOB LITTLE CONS.**—Good ore continues to meet with in the northeast drift, some of which gives high assays.

NORTH SAN FRANCISCO.—Sinking the main shaft is making the usual steady and favorable progress, the rock in the bottom working freely.

WALLS-PARCO.—Three shifts of hands, working night and day, are making lively work in sinking the shaft, and drifting at the 150-ft

level. Very promising and favorable material is met with at both points.

OVERMAN.—Draining the water from the bottom of the shaft is making favorable headway. No work is yet being done on the 900-ft level.

MEXICAN.—The winze below the 1465-ft level is down 12 ft in quartz and ore of a highly encouraging character.

Arizona.

MINING ITEMS.—*Arizona Citizen*, May 15: The Silver King, Pinal mountains, is now down nine ft and richer than ever.

Welch's new discovery, five miles north of the "King" is said to be half silver.

Florence, the county east of Pinal county, depopulated on account of the above information, only four persons remaining to take care of the women and children.

"Pike" came in Thursday from the mountains with the richest lot of specimens ever brought here, and reports rich veins in the different parts of the Pinal.

Parties who have visited the Quacharty pronounce it a true and rich mine and negotiations are now pending for its purchase. In the hands of parties able to conduct operations on a large scale there is no question but these valuable mines would be made to produce immensely.

The Young America copper mine is beginning to receive returns from shipments made to California and receive over \$100 per ton profit. This is claimed to be the most valuable copper mine on the globe.

Colorado.

BULLION.—*Georgetown Miner*, May 15: The silver bullion shipped by the Stewart silver reducing company for the two weeks ending May 14th, amounted to \$15,948. The Juda & Crosby reduction works shipped during same time \$3,645.

LOW GRADE ORES.—There has never been a time, in this mining camp, when more interest was manifested in the great veins carrying low grade ores, than at present. The immense veins that have been for years neglected will soon be paying tribute to industry and enterprise. It only remained for the time to arrive when enterprises, guided by experience, should construct dressing works calculated to condense the wealth locked up in these great "ore channels," to make them yield the wealth they have so long securely held locked up in the chambers of the hills, and that time is at hand.

GENEVA.—Through the efforts of James Teal, in England, a strong company has been organized, which has bought and will work a mine in Geneva district. As soon as the snow melts on the Range, Mr. Teal will commence operations.

From Downieville and Mill City comes encouraging news. Several mines have lately been discovered that show large bodies of mineral, and are being rapidly developed. Old neglected claims, which litigation has paralyzed, have been re-located, and are receiving due attention, while our high prices for ore have stimulated the owners of many mines to fresh efforts.

Idaho.

OTU MINES.—*Owyhee Avalanche*, May 22: Reports of the condition and prospects of the mine in this vicinity are quite encouraging, and there is every indication that the season will be one of marked activity and prosperity. The developments in many of the leading mines are of the most hopeful character, and fully justify our recent predictions concerning the extent of the yield the coming summer.

GOLDEN CHARIOT.—The developments within the past week are the most promising of any that have ever yet come to light in this or any other section of the Pacific slope. The samples of the new ores which are now on exhibition at the office of Superintendent Keown fully justify this statement. They are from a ledge of the Chariot which has long been supposed to have an existence, and which, both as regards the quality and quantity of the ore, is a remarkably important development. The ledge was discovered from the old workings on the second level, following a vein running west of south, which led into the main vein 30 feet west, parallel with the old vein of the Chariot. It bears characteristics of the true dip, the ore being surpassingly rich, and in the best walls of the mine, demonstrating that the ledge of the mine has now been reached. By cutting west on different levels, a new mine of untold wealth presents itself.

SOUTH CHARIOT.—The 10th level drift is coming into good ore. The 9th level drift, north and south, are in good ore, that in the south being no doubt a portion of the rich chimney recently opened in the lower levels of the Mahogany mine, and the superintendent thinks that the same class of ore will be encountered on the 10th and 11th levels, which will be reached in the course of two months. The prospects of the mine are steadily improving.

MAHOGANY.—Superintendent Corey, under date of the 19th inst., reports that large bodies of high grade ore are being opened on the 9th and 10th levels. They continue to widen and lengthen as they are opened. Milling will be commenced about the 1st of June, when it is anticipated that the results will come up to the most sanguine expectations of all interested. All work at the mine is in progress as usual.

RED JACKET.—The developments in this mine for the past week have been very satisfactory.

WAB EAGLE.—This mine is said to be looking better throughout its entire work than it has ever looked before. The New York mill is kept

constantly at work on its ore, of which there is a large quantity on hand at the mine, and is now being hauled to the mill.

Montana.

MINING ITEMS.—*Helena Independent*, May 8: Silver Star, in Madison county, expects to have three mills running ere long. Hoisting works will be put on the Green Campbell lode, and Mr. Everett will give his attention to the business of the company this season.

Wadams & Shenon, of Bannack, have enough ore on to run their mills through the summer.

Bragg & Peck have been working all winter on the Del Norte lode, Blaine Wing district, taking out rich ore.

At Vipond, Spott & Co., Collins, Patton, Sautorn, Wunderlich, Bubecker, Wilber and others, are taking out good ore, which they hope to convert into money this summer. The ore assays from \$50 to \$200 per ton, and can be reduced here at considerable profit.

At Divide, Mr. Elser's reverberatory smelter has more than paid for itself, though only operated for a short time before the cold snap, and is now running with a splendid prospect ahead. All the material for building, lining and hearth was found near the site, and the peculiarities of the ores in camps near by are such as to enable the works to run steadily at a profit to proprietor and mine owners. Wunderlich and Elser are to be congratulated, on their success.

Oregon.

CLEAN-UP.—*Bedrock Democrat*, May 19: Powers & Co., of Rye valley, made a clean-up from a short run in their placer claims, and had the proceeds run into a bar at the assay office of J. W. Virtue on last Monday. The bar was worth \$2500. We understand the claims are yielding and prospecting better than ever before.

VIRTUE.—(Telegram) Bullion shipped on the 25th, \$11,000.

SALE.—*Coos Bay Record*, May 19: It is reported that the Eagle mining company has sold its black sand claim. The terms are not made public as yet.

Industrial Items.

THE LOS ANGELES EXPRESS of the 20th says: The car for the prismoidal railway came down on the *Orizaba*. As soon as it reaches the city it will be tried on the section of track 200 feet long which has been prepared for the experiment, and if the test proves satisfactory the work will be begun at once on several prismoidal roads. No doubt is entertained but that the experiment will prove a success.

REPORTS are to the effect that the Carson river is lower than ever before at this season of the year. Even the wood drivers are in despair, and the mill men are fast joining them. The wood-drive comes down so slowly that great difficulty is apprehended in getting the full supply.

MESSES. Clark & Banghman, a firm from Quincy, Illinois, will start an organ manufactory in this State, and although they made their sample instruments in Oakland, the Petaluma *Argus* thinks they will establish their manufactory permanently in Petaluma.

THE ALASKA COMMERCIAL company of this city has entered into a contract with Cramp & Sons, whose works are on the Delaware river, by which the latter will construct a first-class thousand ton steamer for the Northern trade.

THE LAST LEGISLATURE of Arizona passed an act awarding a premium of \$5,000 for the first artesian water obtained at a greater depth than 500 feet, or \$3,000 for artesian water obtained at a less depth, in that Territory.

THE DEMOCRAT says Santa Rosa has now an opportunity to erect a woolen mill. H. Bale & Son, of Petersburg, Illinois, are willing to bring their mill to California and take one-third the capital stock.

THE LOS ANGELES PAPERS think the oil wells of that section will some day rival those of Venango county, Pennsylvania, or at least yield a better profit to the producer.

THE SALT LAKE HERALD says that the amount which the English parties are to have for constructing the Portland, Dalles and Salt Lake railroad is \$28,000 per mile.

WORKMEN are engaged in putting machinery in place in the Petaluma woolen mill, and if no looked for event transpires, the factory will be in operation within two weeks.

THE MACHINERY of the California broom factory has been moved to South Vallejo, and the manufacture of brooms will hereafter be conducted there.

VISALLA expects to have gas works; the illuminating property being derived from crude petroleum.

A MRS. BLACKBURN, of Merced, is supplying the community with rag carpet woven by herself.

THE PETALUMA CHEESE-FACTORY will make 150 tons of cheese this year.

THE VIRGINIA, NEVADA, CHRONICLE has again changed hands. Mr. D. E. McCarthy, formerly of the San Francisco *Chronicle*, is now the sole proprietor.

ANOTHER explosion at the Hazard powder works. Three widows mourn the fatality which leaves their children fatherless.

Hints on the Washoe Process.

(Continued from last week.)

The Crushing In the Battery, Continued.

This is not a very heavy loss, and, besides, most of this gold can be collected in the slime yard, while of the remainder much is so fine that it is doubtful if quicksilver in the battery would catch it. The saving, then, is very small, if there be any, on ordinary ores. But, on the other hand, it is not practicable to use quicksilver without a mechanical loss; and the quicksilver being more or less charged with gold, the loss of each as is not gathered and united involves more or less gold also. Every casting, such as a shoe or die, in the battery is full of flaws and blow-holes. Hard gold amalgam collects in these, and in spite of the most careful picking and breaking, (to say nothing of the occasional carelessness of workmen,) every shoe and die, when used up and thrown away, contains a very considerable amount of gold amalgam. The cracks in the wooden troughs get filled with gold amalgam; the settling vats or tanks have their seams, after a long time, caked with it; and in the slime yards will be found some of the gold partially amalgamated. Why should we, then, amalgamate in the battery, when we know that, except a very small and doubtful saving from the gold of the slimes, (which seems offset by the mechanical losses above alluded to,) all this gold is saved just as thoroughly in the cast-iron pans? The pulp is not concentrated before entering the pans. If it underwent such a process, of course there would be additional chance of loss of fine gold, an additional argument for amalgamation in battery. It will be perceived that the reasoning just given applies, therefore, to the Washoe process, and not necessarily to gold mills where pans are not used. Yet even then the practice of amalgamation in battery is not universal nor, indeed, the best.

The Settling in the Vats or Tanks.

There should be as many tanks as possible, in order to settle the maximum quantity of slimes inside the mill; and the system should be so arranged that as each tank is emptied of sand, the escape or waste water can be returned into it. Each tank thus becomes in turn the final one of the series, and receives all the water after settling through all the other tanks. There should never be more than three tanks full of sand; the remainder, even if there are twenty of them, should be used for the settling of the slimes in the water.

Each tankful of sand must be settled or prepared so that the contents can be easily handled with the shovels, and charged into the car for transfer to the pans. In other words, the superfluous water must be removed; and this should be done without allowing the slimes to pass out of the tank, only to be carried by the current through the other tanks, and thus be driven ahead constantly toward the escape. Hence, it is as well not to settle the sand at all till the tank is full of sand. Then let the apout be turned into the next tank, and put in the plugs of the full one, thus cutting off communication and isolating this tank, after which the sand may be settled with crowbar and shovel, and the water haled out.

The ore is now in the shape of a wet, coarse sand, called pulp, containing, according to its original nature and the character of the crushing, more or less slime, (locally called "slim.") So far the process has been entirely mechanical, and the efficiency which has been achieved in this part of the treatment is measured by mechanical tests. The result with the arrangements above described may be summarized as follows: forty-eight tons of hard ore, crushed with twenty stamps of 650 pounds, dropping eight and a half inches ninety-five times a minute; the ore from the breaker being fine, and No. 4 screen being used. This is, per twenty-four hours, two and four-tenths tons per stamp, or 1.39 tons per horse-power developed.

The Treatment of the Pulp in the Pans.

There are many different styles of pans. I prefer the Wheeler for a small pan, and the Stevenson mold-board pan where a large one is desired. The general principle is the same. The ore is to be heated and ground thoroughly to an impalpable substance; an active motion or circulation given to the pulp; the silver thoroughly reduced; the gold thoroughly brightened and cleaned from its occasional intimate mechanical mixture with foreign minerals; and finally, the gold and silver are to be as entirely as possible taken up by the quicksilver. Chemicals are used, partly to reduce the ore, partly to save quicksilver and keep it clean, and partly to reduce by cheaper means what would otherwise be reduced at the expense of the quicksilver.

(To be Continued.)

The following portion of the programme for the celebration of the Centennial of our Independence has already been perfected: President of the day, the President of the United States; Orators, Charles Francis Adams of Massachusetts, and Lucius Q. C. Lamar, of Mississippi; Poet, H. W. Longfellow, of Massachusetts; Reader of the Declaration of Independence, Ralph Waldo Emerson, of Massachusetts; Grand Marshal, General W. T. Sherman; Master of Ceremonies, General Joe. E. Johnston.

The Kern County *Courier* has changed hands, and the last issue presents an improved appearance.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Fourteenth Lecture Delivered before the University of California College of Agriculture, on Monday, February 8th, by Prof. C. E. BRSEY.

(Continued from our last issue.)

Ornamental Plants.

In the Virginia creeper, *Ampelopsis quinquefolia*, found east of the Rocky Mountains, we get one of the finest deciduous vines that we have.

In a little order, very nearly allied to the vine family, the order *Meliaceae*, a small group of two hundred species, tropical shrubs and trees, we find the mahogany tree; and as it is a tree of great commercial value, it is worthy of special notice. This tree is the *Swietenia mahoganii*, found in Jamaica and tropical America, a large tree with ash-like leaves. Very frequently they can get the trunks large enough so that they will square from four to five feet.

Jamaica cedar, which also comes into this market from the island of Jamaica, is *Cedrela odorata*, a large tree resembling mahogany. The only thing I need mention here is, that it is not a cedar. It stands nearer to the maples than the other trees. *C. australis*, found here also in the market, is a good, large tree, sometimes ten feet in diameter, yielding very valuable wood. Satin wood, of which you can see specimens at the furniture shops, is *Chloroxylon*, (the species I don't know) from the East Indies; and then again in another allied family, a very small one, of some fifty species, we get what is called zehra wood, a reddish brown wood, with peculiar zehra-like markings upon it, (*Omphalobium Lambertii*.)

It is a good sized tree found in South America. The wood is fine. These are of great importance to furniture makers especially. We pass now to another family, the

Flax Family,

Linaceae, containing about one hundred species of herbaceous or small, shrubby plants. They are usually rather a natural species, and are found mostly in temperate regions.

The only plant of importance to us is the common flax, *Linum usitatissimum*, which has been grown for nobody knows how long. We find the remains of linen fabrics among the remains of the pre-historic lake dwellings, in Switzerland. You know that within the last few years discoveries have been made about those lakes, archaeologists finding that some people lived there long before the period of which history gives any account. Among other discoveries are these remains of linen fabrics, proving the use of linen to have been known at a very ancient period.

Mummy Cloths

Are found in a good many cases to be made of linen also. The plant, now grown almost everywhere in the temperate climates, seems to be peculiarly well adapted to all climates, can be grown in temperate climates as well as down next to the tropics; it is accordingly grown very largely. Its fiber, which belongs to the outer portions of the stem, is separated from the remainder simply by breaking it up and then by carefully combing out the bark and woody portions.

In order to facilitate this it is subjected to a sort of rotting process, either artificial or in the open air, and is allowed to lie for some time, and then it is broken up.

Within the last few years some French chemists have been experimenting on the flax fiber, with a view to making it finer, as all our fiber is somewhat coarse. These chemists, knowing very well the nature of the fiber, that it is simply a hollow tube, tried soaking it in an acid solution, then washed this out, then used a certain alkaline solution, then soaked it in a solution of a carbonate—some carbonate which had a great deal of carbonic acid in it, etc., the object being to burst open the fibers. The result was that the flax was very much finer than it otherwise would have been. In that way the "Cottonized Flax,"

As it is termed, was made. It was supposed at one time it would be brought into general use, but for some reason it is not used as much as perhaps it deserves to be. In some countries where flax is grown, the seeds are gathered and used for the manufacture of oil, which is the linseed oil so largely used in all paints, and the crushed seeds are manufactured into what is called cake meal, used for feeding cattle.

Passing to the next group, the tea family, the order *Camelliaceae*, embraces trees or shrubs, mostly of the better parts of the globe—in fact none are to be found in the colder climates.

About 130 species are known, and of these the plant of most importance is the tea plant, *Thea Chinensis*. (Fig. 2.) a small sized tree, growing ten or fifteen feet in height and supposed to be a native of Assam; it is a little country just north of the bay of Bengal; and from this country it was carried eastward into China and Japan. It is now grown largely throughout China, Japan and to some extent in some other countries with a climate somewhat similar. In your botanies you will probably find that instead of one species given for the tea tree you will have two species. This comes from a mistake made by the earlier botanists. We have in the market what is called green and black tea. Botanists first thought that these were derived from different plants. Later investigations show that they are derived from the same species. In procuring tea, the pro-

cess is this: simply gathering the leaves, and more or less rapidly drying of them. If they are dried very rapidly, so that no fermentation takes place, the product is green tea. If they are dried slowly, so that fermentation begins, the product is a black tea; and there you get the essential difference. There is another element that may come in to determine the greenness or the blackness of the tea. If the earliest leaves are taken, the first growth of small leaves, it is much easier to make green tea than if the old ones are taken. So that they do not need to be as careful with the early as with the later growth, to determine whether the tea shall be green or black, while from old leaves they cannot make anything but the black tea. Now, whether green tea is better because it has not been partially fermented, or not, I cannot say. Possibly it is, my taste would say that it was. [Student.—"I have heard, Professor, that green tea was the tea leaves dried on copper, and that there was an acid came out of the leaves, as it were, which gave color to the leaves." That statement has been made, and if you attempt to look up the matter thoroughly, you will find that the observers make all sorts of statements. Now, in some books you will find that there is one variety of green and another variety of black. That, we know to be a misstatement. Others state that the difference is due to packing. That is, some observers, seeing the manner in which the natives separate the young leaves from the old, have been led to this conclusion. Others give another story, saying it was entirely due to manipulation. The fact is this, that all these might have something to do with the determining of the variety of the tea. Some very poisonous coloring matter has been used, so that a great many years ago many people stopped using green tea on that account; but the facts are as I have essentially given them. Peculiar varieties are obtained by selection and manipulation; and under the head of manipulation, of course, you will get the use of coppers and all that. They are results of different methods of growing, or, just simply slight differences. Of course, you understand, only a slight difference would give another variety. Now,

Teas Can be Grown in California

And in very many States east of the Missis-



Fig. 2. Leaves and Flowers of Tea Plant. This has been tried here, but labor is so costly we cannot manipulate it, cannot roll it, cannot gather it leaf by leaf; and you see that you cannot go and take a stem and take all the leaves. They have to be carefully picked.

So they found they could not produce tea after it was actually grown, and so, of course, it was given up.

Now, if our ingenious mechanics here can give us some machines which will do the work which has hitherto been done just by hand—all of our best teas have been rolled leaf by leaf—if that work

Can be Done by Machines

There is no reason in the world why we cannot grow all the tea wanted on this coast; also, all wanted on the Atlantic coast. There is a curious thing about this matter of tea. The demand is wonderful—almost beyond belief. We brought into this port here, last year, more than fourteen million pounds; of course a considerable amount of it was reshipped, sent across the continent; and yet, about a hundred years ago the first tea was taken to England; about a hundred years ago it was first taken to Europe and introduced there, and yet, in this time we have so changed our habits that the demand is such an immense one as I have just given you. Taking the statistics for the past few years I find that the proportion of value is about this: Fourteen million pounds of tea are valued at

About Five Million Dollars

When brought here. Now you see the immense profit that there must be in it right here at home. The more you study up this matter of tea the more you will be astonished, and you will find yourself especially astonished at the cheapness of it where it is produced. At the present time you can buy it for almost nothing. And then, when you consider the amount of labor given to it, and the transporting of it hundreds and thousands of miles, the only wonder is that we do not have to pay more for it than we do.

I will briefly call your attention to the remaining matter I have on the board, because I cannot spend any more time on this subject of economic botany. I have upon the board the mallow family, order *Malvaceae*.

It is made up of herbs, shrubs and trees, including about 1,000 species. It has some representatives in the temperate regions, but they

grow mostly in the tropics. Under these is the most important plant in the world, the cotton plant, *Gossypium herbaceum*, growing in places about five or six feet in height. It produces cotton which is made up of little fibers. It is found native in the East, in the Asiatic countries and in the tombs of the Incas; in Central America and in Mexico we find the remains of cotton fabrics. The question is, how they got there. It is cultivated now almost all over the globe, and very largely in the United States. It is biennial, triennial, or annual, just as it is treated. The one that we have specimens of here is the species called *herbaceum*, and is the one mostly grown. They plant it in the East about as they plant Indian corn, in March or April, and pick it along in the latter part of the year. In the Mississippi valley it yields 357 pounds per acre, that is about a bale per acre. In 1858, 3,000,000 bales were produced there. Now, to illustrate the dependence that agricultural labors have upon mechanical inventions, I simply will call your attention to the invention of the cotton gin. In 1793 Whitney invented a machine for separating the seeds from the cotton fiber. If you try to hand to do that, you will find the process tedious. Before he invented that machine it took a man about a day to get out a pound of cotton. By his machine, after it was improved a little, a man was able to separate 300 pounds, so that it increased one man's usefulness just three hundred fold. The next thing that is needed, and the thing that will make it possible to grow cotton in California, is a

Machine to Pick the Cotton.

It will not do to cut the whole growth down and take it to the barn or stack to be afterwards separated. The field must be gone over time after time, and if when the pods burst open, rain comes, there is danger of their being spoiled. The need now is, for some Eli Whitney to get up, or invent, something by which this can be easily gathered. Its culture in California will have to be deferred until that time; you cannot do the work cheap enough, unless you can train Chinamen. But I am told after a time they become as well accustomed to demand high wages as other people.

This, (alluding to specimens,) is the California cotton, very good, too.

Under the poppy family, *Papaveraceae*, we have a hundred species, milky, narcotic plants, including the one of greatest importance, the opium plant, *Papaver somniferum* of Asia Minor and India.

Under the magnolia family, we get trees again, and the most important is this great soft wood tree of the east, the tulip tree; or white wood, or yellow poplar (*Liriodendron tulipifera*), the best soft wood, perhaps, in the world; grown only in the United States, east of the Mississippi river.

Wood and Iron in Building.

This is much more nearly the age of iron than any which has preceded it. The age of wood is passing. In every part of the world, the demand for timber is so great, that forests are being cut down at a rate which threatens to leave the earth's surface in a few years desolate and bare. Metal must become an object of increasing use, and iron, as the strongest and cheapest of metals, will be most generally employed. Ship-building has already taken a very decided turn in that direction, which is due in a great measure to economy in the use of metal. In houses and public buildings iron is used for many purposes which were at one time entirely occupied by wood. In this country the plentifulness of timber has been a great source of injury rather than of benefit. We have used it in many ways wasteful and dangerous, and the fact that more property is destroyed by fire in the United States than in any other country in the world is to be attributed to the reckless use of wood in our buildings. But we have already reached that boundary of this extravagance.

In the next place, it is a matter of complaint that the supply is lessening with such rapidity that it will be absolutely necessary not only to create legal obstructions to the course of extravagance, but to encourage the planting of trees, in the hope of producing wood for future advantage. In building, although the use of timber continues, it is by no means as common as it was a few years ago. The frame house is a novelty in the cities. Brick and stone replace it. The shingle roof is becoming scarcer, iron, and tinued iron, and various roofing compositions have superseded the shingle. Some of the latter are not improvements in the line of inflammability, but they show that the cypress shingle is becoming scarcer, and necessity requires the use of other materials. The diminution in the use of wood for building purposes will reduce the risks from fires. Buildings of stone, brick and iron, in which wood is employed for no purpose, would be practically fire-proof, and stand in the way of those destructive conflagrations which sweep through our great cities, causing tremendous destruction of valuable property. The insurance companies have it in their power to aid in a great work by offering policies at reduced rates for fire-proof, or nearly fire proof houses. This might be done with great advantage. The problem is one of necessity, a solution of which can not much longer be deferred.—*American Builder*.

Antique and Walnut Furniture Finished in Oil or Wax.

This style of furniture is very effective if the design is appropriate. The French call it the style Renaissance, or revival of old style. In removing ancient buildings there were many fine sculptured oak panels (copies of those found in the Vatican at Rome, and designed by Raphael, Michael Angelo, and other celebrated artists,) the wood of which, from age, had become very dark. They were adapted to book-cases, cabinets, etc., in connection with new oak. The new wood was dyed with nutgalls to match the panels, and all finished in oil or wax. This was to bring the carving out in bold relief, as varnishing or bright polish destroys the effect.

The color of American walnut, when oiled, approaches very near the color of dark old oak, and finishes much finer. American walnut requires the grain to be well filled with a composition to resist the action of the heat of our dwellings, and mere oiling will not do, as it leaves the pores of the wood so open that it absorbs the heat; in a room at a temperature of seventy-five degrees the oiled walnut will absorb the heat to within five degrees of that of the room, whilst varnished oak will reflect the heat, and will not reach over forty-five to fifty degrees. It is therefore important to have wood well seasoned and the grain filled with shellac or other material to prevent shrinkage.

If the furniture is well varnished it is easily renovated by rubbing with a rag moistened with turpentine and linseed oil, in equal parts. If not properly finished and the dust collects in the pores of the wood so much that it will not wipe off, the application of oil and turpentine will restore the color, and a very light coating of shellac will protect it in a great measure. If nothing but oil is in the wood, it is best to have a cabinet maker finish it properly, otherwise it must be oiled every time it looks rusty. Linseed oil hardens wood, and well made walnut work, finished with it and shellac, will in a few years become polished almost like bronze. The French use this finish only on sculptured work or on very fine root walnut veneers in connection with ebony moldings. They do not use it as a finish for plain furniture, but use a polish made of gum shellac and alcohol, applied by manipulation, using a wooden pad, moistened with polish, enclosed in a soft old linen rag. It makes a fine soft finish and wears well in a humid climate; but evaporates soon in ours. Wax is used on walnut when the natural color is to be preserved, and in connection with ebony moldings, polished finely, the effect is beautiful. This style is the favorite in Europe, and will no doubt become popular here.—*The Cabinet Maker*.

THE EUROPEAN larch has such a fine grain, and is so exempt from cracking that painters use it for their pallets and to paint pictures on; for this purpose it was used by the ancients; several of Raphael's paintings are on larch wood. Its beautiful color and capability of high polish adapt it well for cabinet work.

The late Duke of Athol, (the great larch planter,) several years before his death had boards of it sawn to make his coffin. At his death they were sent to a cabinet maker to be worked for that purpose, and in them he was buried. While lying in state, and the people passed to view the body, their persons were reflected by its lustrous polish.

REMOVING PAINT FROM WINDOWS.—Inexperienced painters, when painting window-casings and sashes, frequently spatter paint in minute dots over the surface of many of the panes, where it is left until it becomes dry and hard. Neat workmen always have a clean cloth or sponge, which is dipped in a little spirits of turpentine, and the paint is rubbed off before it has dried. After the paint has become dry and hard, strong soap-suds will not remove it without a vast deal of hard rubbing. The most economical way to remove dry paint from the panes is to make a small swab having a handle some eight inches long, dip it in a little diluted oxalic acid, and rub off the paint with the swab.

THE ELDER.—It has been said that the elder tree supplies us with the softest kind of timber, as well as that which is the most easily split; and yet experience shows us that in the water it is the most enduring of all. But, soft as it is, it sustains the greater part of the city of Venice, for the massive buildings stand upon piles of elder which have been for ages sunk in the sea. No other timber could have endured so long under the great harden and the rotting power of the water, and formed such a sure and lasting foundation for that noble city.

To paint on zinc, make a weak solution of sulphate of copper and wash the zinc with it, then wash it afterwards with hot water. When dry, it will take any paint you wish to lay on. Mix your colors with turpentine, and not with oil, adding a little good varnish, that the colors may dry a dead face. When completed, varnish with good copal, your paint will not blister, and the colors will be bright and durable.

ENGLISH IRON IN THE UNITED STATES.—Last year no English railroad iron was brought into the United States, except on the Pacific coast. Some Bessemer steel rails were also imported under the name of iron. In 1873 English rails declined in the United States from \$73 to \$58 per ton. In December, 1874, they had sunk to \$49 or \$50.

USEFUL INFORMATION.

The Fahrenheit Thermometer.

"Zero," on the common thermometer, like the fanciful names of the constellations, is a curious instance of the way wise men's errors are made immortal by becoming popular. It may be worth while to say that the word itself comes to us through the Spanish from the Arabic, and means empty, hence nothing. In expressions like "90° Fahr.," the abbreviation Fahr. stands for Fahrheits, a Prussian merchant of Dantzic, on the shores of the Baltic sea. His full name was Gabriel Daniel Fahrenheit.

From a boy he was a close observer of nature, and when only nineteen years old, in this remarkably cold winter of 1709, he experimented by putting snow and salt together and noticed that it produced a degree of cold equal to the coldest day of that year. As that day was the coldest the oldest inhabitant could remember, Gaeriel was the more struck with the coincidence of his little scientific discovery, and hastily concluded that he had found the lowest degree of temperature known in the world, either natural or artificial. He called that degree zero, and constructed a thermometer, or a rude weather glass, with a scale graduated up from zero to the boiling point, which he numbered 212, and freezing point 32—because, as he thought, mercury contracted the 32d of its volume on being cooled down from the temperature of freezing water to zero; and expanded 180th on being heated from the freezing to the boiling point.

Time showed that this arrangement, instead of being truly scientific, was as arbitrary as the division of the Bible into verses and chapters, and that these two points no more represented the real extremes of temperature than "from Daa to Beere-haba" expresses the exact extremes of Palestine.

But Fahrenheit's thermometer has been widely adopted, with its inconvenient scale; and none thought of any better until his name became an authority, for Fahrenheit finally abandoned trade and gave himself to science. Then hisbit made people cling to the established scale, as habit makes the English cling to the old system of cumbersome fractional money.

Our nation began to use Fahrenheit's thermometer about the middle of the last century, or not far from the time when old style was exchanged for new style in the writing of dates.

The three countries which use Fahrenheit are Holland, England and America. Russia and Germany use Reaumur's thermometer, in which the boiling point is counted 80° above freezing point. France uses the centigrade thermometer, so called because it marks the boiling point 100° from freezing point.

On many accounts the centigrade system is the best, and the triumph of convenience will be attained when zero is made the freezing point, and when the boiling point is put 100 or 1,000° from it, and all the subdivisions are fixed decimally.

If Fahrenheit had done this at first, or even if he had made it one of his many improvements, after the public adopted his error, the luck of opportunity, which was really his, would have secured to his invention the patronage of the world.—*Ex.*

FOREIGN TALENT AS AN AID TO PROGRESS.—Some countries, such as Russia for instance, have always done their best to attract foreign workmen, foreign artists, foreign talent of every sort, conceding special rights and immunities to the valuable colonists whose skill and knowledge silently help to reclaim the natives from barbarism. But for such importations from England, Holland and Germany the great empire of the Czars would not at the accession of Peter the Great have possessed a ship, or a sailor to navigate it, or a foundry for cannon. Some famous old manufactures are now all but extinct in the birthplace of the art. Toledo and Damascus no longer furnish their historic sword-blades to half a world; Florence and Mantua no longer clothe Europe; the Venetian glass has been but artificially revived, for none can obtain the subtle spirit Prosperity to their chariot wheels; and when greed or neglect has brought about the period of decay, it is but a blank prospect that awaits native industry.

HOW TO MAKE OIL LAMPS SAFE.—A great many accidents are happening every day from the use of kerosene. I will tell you a method by which they can be to a great extent prevented, and I hope you will publish it for the benefit of poor people, who are obliged to buy cheap oils. If the body of the lamp is filled with cotton, such as jewelers use to wrap their articles in, after it is stuffed lightly it will receive one-half the quantity of oil which it would if the cotton were not put in. If any accident happens, the oil cannot spill or flow about; but is, as it were, "sopped up" in the cotton, which burns like a fagot, but all in one place.—*Ex.*

TO RENDER PAPER OPAQUE AND AGAIN TRANSPARENT.—It is worth knowing that if one volume of castor oil be dissolved in two or three volumes of spirits of wine it will render paper transparent, and the spirit rapidly evaporating, the paper, in a few minutes, becomes fit for use. A drawing in pencil or in Indian ink can thus be made, and if the paper is placed in spirits of wine, the oil is dissolved out, restoring the paper to its original condition. This is the discovery of Herr Fischer.

GREEN BRONZE ON IRON.—A process for producing a green bronze on iron, devised by Paul Weiskopf, is given by *Dingler's Journal* as follows: One part of sylvate of silver is dissolved in twenty parts of oil of lavender, forming a sort of varnish, which imparts a beautiful and permanent green bronze appearance to cast and wrought iron, sheet iron and wire. The surface to be bronzed is cleaned and dried, but need not be polished. The varnish is thinly applied with a camel's hair brush, and the object heated quickly to 300° Fahr. The proper temperature is indicated when the article shows a bright green color which is even all over it. To produce a bronze drawing, Venetian turpentine or colophonium solution is substituted for part of the lavender oil. It is better to rub up the dry sylvate of silver with resin in a mortar or on a palette, and then add enough lavender oil to make it as thin as ordinary paint. Articles of iron bronzed in this way can afterward be electroplated.

LIQUID PARCHMENT.—According to Dr. Hoffman, a fluid by this name, consisting of gutta-percha softened and soaked in ether, is especially adapted for forming a coating for pictures and cards, it permitting the removal of dirt with a moist rag. Pencil and crayon drawings may be rendered ineffaceable by sprinkling with this liquid by means of an atomizer, an exceedingly delicate film remaining on the evaporation of the ether.

MAKING BRITTLE GOLD STRONG.—Gold is sometimes so brittle that the jeweler can not well work it; this is probably due to phosphorus, which, being no metal, is of course not detected in the assay. The remedy is to pass chlorine gas through the molten gold, by which treatment most of the gold which had otherwise to be set aside as unfit for certain kinds of work, can be redeemed.

CEMENT TO UNITE BRASS AND WOOD.—The *English Mechanic* says the best cement for this purpose is a glue composed of best gelatine one part, glacial acetic acid one part. Soak the gelatine in cold water until it has swollen up and become quite soft. Throw away the water and dissolve the gelatine in the acetic acid, applying gentle heat if necessary.

GOOD HEALTH.

Copper in the Human Organism.

Recent experiments by M. Bergeron demonstrate the presence of traces of copper in the human body. The organs examined were the livers and kidneys; and in fourteen instances copper was detected. The experiments were made with 800 to 1,000 grammes of organic materials in each case. Special precautions were taken to prevent the accidental introduction of copper into the solution undergoing analysis. A special chamber was constructed containing no copper; the laboratory tables were of wood; the balance, water-baths, gas-burners, etc., were of iron; and the filter paper, distilled water and reagents were carefully tested, and found to be free from this metal.

The organs were heated in a large porcelain capsule to complete dryness, and afterwards to carbonization. Incineration of the carbonaceous mass was performed in a muffle furnace at a low temperature.

The ash, treated with nitric acid, evaporated to dryness and, redissolved in water, produced a solution which gave reactions for copper—with ammonia, with ferrocyanide of potassium, and with polished steel.

In eleven cases, the organs being taken from individuals varying in age from seventeen to fifty-eight, the maximum amount of copper found was .002 grms.; the minimum amount .0007 grms. In one case, the individual being seventy-eight years of age, the amount of copper was found to be .003 grms. In six other cases, where fetal organs were examined, copper was detected in minute traces.

The copper existing in the organism is without doubt introduced in the use of food.

The use of copper vessels, the daily contact with various objects of copper or brass, coins, keys, etc., introduce in our organs traces of copper, of which the greater part is eliminated; but there remains in a state of combination a minute trace of the metal; which is found in the liver and the kidneys, and this is true whatever the age, sex or mode of life, and averages .002 grammes in weight.

TREATMENT OF WOUNDS.—A wound produced by a sharp cutting instrument will heal without trouble when the edges are nicely brought together and then kept so, and left without putting on any salve, provided the access of air is not shut off and the individual possesses a constitution not undermined by the excessive use of drink or the results of other vices.

If the wound is produced by a rusty nail or a similar cause, so as to be septic, it will soon become very inflamed, and in such a case it is recommended to smother the wound with burning wool or woolen cloth. It is said that twenty minutes in the smoke of wool will take the pain out of the worst wound, and that repeated once or twice it will allay the worst case of inflammation arising from a wound. It is claimed to have saved many lives and relieved much pain, and assuredly it is worth trying.

Typhoid Fever.

If you knock a man down, he may rise up again, but after two or three such knockings, he loses the power of rising. In ordinary fevers the system has a recuperative power, especially when the weight of the malady has been removed by suitable medicine; but when that recuperative power is lost, the system will not rise to health, although medicine has done all that was expected from it, and the patient dies. This inability may exist in all forms of disease. "Typhoid" means "like typhus," and typhus itself means "stupor," a kind of sleep or death. There is a growing tendency in all diseases "to take on the typhoid type," which simply means that the constitutions of the people are growing weaker and weaker, less and less capable of resisting the onsets of disease; hence a less amount of sickness kills now than formerly; and added to this, physicians of every grade have observed that their patients can't bear as large doses of medicine as heretofore; and the tendency is to give less and at longer intervals, and wait and see "what nature will do." The practical use to be made by the reader of these facts is to habituate himself to a greater watchfulness against the causes of all disease, and to a greater care of himself when he is sick; and this care should be observed in three main directions:

1. In recovering from any form of disease, keep abundantly and comfortably warm.
2. Stodiously avoid taking cold.
3. Watch against over-exercise for several days or weeks.
4. Eat very moderately and at regular intervals, of plain, nourishing food.

If these four things are observed, relapses would be rare, and the patient would be saved. The most difficult of the four is to avoid eating too much; there is special danger of yielding to a craving for some particular kind of food. We knew an estimable lady who was happily recovering from an attack of typhoid fever, but she had such a strong desire for a sweet potato that it was allowed her; in less than an hour the symptoms became unfavorable and she died the next day.

The sleepiness or stupor arises from the fact that the brain, and thence the whole nervous system, is oppressed by the disease; is weighed down; can't act; goes to sleep and dies!—*Hall's Journal.*

A MAN DIES OF THE HICCUGHS.—One of the most singular cases of death that ever came within our province to mention, is that of Milton W. Blair, of Louisa county, who died last week in a town in California, of the hiccoughs. Mr. Blair is an old merchant of Louisa county, but has not been engaged in business for a number of years. He has been residing near Morning Sun since retiring from business. Last fall he was attacked with a fit of hiccoughing, which continued for some weeks, with scarcely any intermission. Becoming alarmed at the long continuance of the spell, Mr. Blair came to Burlington to consult with a doctor, who, after treating him awhile, declared he could give him no relief. From this city he proceeded to Chicago, and consulted the best medical authorities there, who did all in their power for him, but could not relieve him. By their advice he went to California, accompanied by his sister, thinking that the change of climate would help him; remaining in that State to the time of his death, hiccoughing almost continually, and having but few intervals of rest. The continued strain and distress wore him to a mere shadow of his former self, and last week his sister telegraphed to friends and relatives in this and Louisa counties that he was dead, and she was bringing his remains on for burial.—*Burlington (Iowa) Hawkeye.*

WALKING EXERCISE, as a means of health, is the most practical and universally available of all other forms; it promotes the activity of the circulation; it enlivens the spirits; exhilarates both body and brain, and, not least, it costs nothing. But to take a lively, active, brisk, cheerful walk, which infuses a new energy into the whole being, there should be a well-fitting shoe, and feet undeformed by corn or bunion, or other distortion; but, standing at any point on Broadway, and taking the first hundred persons over twenty years of age, for examination as to the condition of the feet, we may feel very sure of not finding half a dozen which are natural. It fairly makes one shiver to look at the exposed foot of any adult—ngly protuberances, bony excrescences, turned-in nails, piled-up toes, and skin all mottled and scarred by excessive hindering or ill-fitting shoes, all inclining us to pity human nature, if not to despise it, for unnecessarily submitting to the numerous evils arising from the unnatural conditions referred to.

THE DURATION OF LIFE.—The old saying is on the duration of life appear in a German paper: In ancient Rome, during the period between the years 200 and 300 A. D., the average duration of life among the upper classes was 30 years. In the present century, among the same classes of people, it amounts to 50 years. In the sixteenth century the mean duration of life in Geneva was 21.21 years, between 1814 and 1833 it was 40.68, and at the present time as many people live to 70 years of age as 300 years ago lived to the age of 43.

DOMESTIC ECONOMY.

The Art of Cooking—No. 2.

FRYING.—That part of cooking is not as difficult as it is generally believed, and properly fried objects are good and do not taste greasy. To fry requires care, and nothing fried will taste greasy if it has been dropped in fat properly heated and in enough of it to immerse the object. When an object tastes greasy, it is not because it has been fried in grease, but because there was not enough of it, or because it was not properly heated, for, if heated enough, it closes the pores of the object and carbonizes the exterior, so that it cannot absorb any.

ROASTING.—When an object is placed on the spit according to directions, remember that it cannot be basted too often. The time necessary for roasting a piece of meat, or anything else, depends as much upon the fire as upon the nature of the meat. Meat especially requires to be placed very near the fire at first, and then put back by degrees. There is nearly as much difference between roasted and baked meat as there is between broiled and fried meat. It is generally admitted here that English roast beef is so superior to American roast beef that it cannot be compared to it. It is not in the quality of the meat that the difference lies, but in the process of cooking. Meat cannot be roasted in an oven, be it in an ordinary or in a patented one. That peculiar flavor in roasted meat is produced by the air coming constantly in contact with the heated meat while revolving on the spit. Cold roast meat, when desired to be served warm, is enveloped in a battered paper and placed on the spit just long enough to warm it.

SEASONING.—This is the most difficult part in the science of cooking. To season is not difficult, but to season properly is quite another thing. It is not only necessary to know well how to stew or roast a piece of meat or anything else, but to know how to season it, to be able to judge what quantity and what kind of spices can be used to season such or such a dish, to what extent all the spices used agree together, and what taste and flavor they will give to the object with which they are cooked; for, if not properly used, they may just as likely destroy the taste and flavor of the object as improve it. Some dishes require high and much seasoning, others just the contrary. With a good fire and a good spit it is not necessary to be a thorough cook to roast a piece well, but the cook is indispensable to mix the gravy or sauce with the proper seasonings.

SIMMERING.—Simmering differs from boiling only in the amount of heat allowed under the boiler, kettle, or pan. To simmer is to boil as gently and slowly as possible.

SEWING.—To sew properly it is necessary to have a moderate fire and even as possible. A brisk fire would cause much steam to evaporate, which steam is the flavor of the object stewed.—*The Housekeeper.*

Routine Work.

The recurring duties which the change of seasons brings naturally suggests the fact that the greater part of the life of the average man and woman is spent in doing the same thing right over and over and over again. Every spring the housewife renews her house, in order, in cleanliness, in comfort, reclothes the members of her family, and makes due preparation for the summer. She does essentially at this time the very same thing that she did the last season, that she will do the next. If she is a good housekeeper, each succeeding season makes the task easier because she is more accustomed to it and should know how to take it to better advantage than ever before, but the task is still the same.

The farmer plows the same fields that he plowed last spring, harrows them, plants them, and then goes over them again and again, and again with hoe or cultivator till the harvest, so far as he can make it so, is secure. The merchant takes account of stock just as he did last year, lays in his goods for the summer season, depends and widens the channels of his trade, if possible, but lets the channels remain the same. In like manner the mason, the carpenter, the compositor, the teacher, the editor, the lawyer, the physician, minister, do over the same work from week to week, from month to month, from year to year, with variations so slight that the routine seems essentially the same. Of course all this monotony sometimes gets tiresome and we clamor for a change and fancy that some other mode of industry will be easier and more agreeable than that which circumstance or choice has made ours—that somebody else is better off in this respect than we are. But when we get inside of the life of that somebody else we find that routine work makes up the larger portion of it, and that without the mastery of routine work in the lower fields success in the higher ones had never been attained. The biographies of all who have achieved nobly, shows this so plainly that he who runs may read.—*N. Y. Tribune.*

TO CLARIFY DRIPPING.—Put the dripping into a basin; pour over it boiling water, in which a teaspoonful of salt has been dissolved, and keep stirring the whole to wash away the impurities, let it stand to cool, when the water and dirty sediment will settle at the bottom. Repeat this operation at least twice with fresh water. When cold, remove the dripping from the water and melt it into jars.



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San Francisco:

Saturday Morning, May 29, 1875

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Among the Foundries.

Risdon & Tower, managers of the Pacific
Boiler, Sheet Iron and Water Pipe Works, are
now engaged in making the boilers for the new
"C & C" shaft on the Consolidated Virginia
and California mines on the Comstock. They
are also making two sets of boilers to go to Pan-
amint mining district. They are making boiler-
era to go to Peru, and have a large amount of
other work contracted for. Fifty men are em-
ployed at these works, all kinds of boiler and
sheet iron work being done and high and low
pressure boilers built and repaired. The of-
fice and works are 118 and 120 Fremont street,
between Mission and Howard. Mr. J. N. Ris-
don was formerly of Office & Risdon and Risdon
Iron Works, and Mr. Charles Tower was for-
merly foreman in the boiler works of the same
institutions.

Large amounts of mining machinery are at
present being made by our local foundry and
machine shops. This has perhaps been the
busiest season in this direction our foundrymen
have ever experienced. The machinery being
made is mostly of a heavy and expensive char-
acter and of the most improved patterns.
Scarcely any of the foundries are without or-
ders for mining machinery of some kind.

At the Pacific Iron Works, on First street,
the immense hoisting works for the joint shaft
of the Consolidated Virginia and California
mines on the Comstock, are rapidly approach-
ing completion. We described the machinery
in detail a few weeks since, so that our readers
probably remember its large proportions. It
will be the heaviest machinery on the Com-
stock.

At the Dayton mine laying of the founda-
tions, and the erection of the new and power-
ful hoisting and pumping machinery is being
pushed to completion with all the energy pos-
sible.

Chances for Finding Mines.

The limits of the areas on the Pacific slope
which are unexplored by the prospector, are of
course being gradually reduced, but there still
remains much country which, for all practical
purposes, is unknown to the miner. It is not
enough for his purpose that nearly all parts of
the country are, even when not settled up, oc-
casional visited by hunters, stock men, etc.,
or run over hastily by people not seeking pre-
cious metals. Every day fresh discoveries are
being made in places which have had a small
population in the vicinity for years, and we have
no reason to assume that a tract contains no
gold, silver, lead, coal or quicksilver, because
up to the present time it has not attracted the
attention of the miner. The prospector has
not to travel far to find new country, and in
the neighborhood of older mining districts
there are many tracts yet undeveloped. More-
over, there are many claims which were aban-
doned years ago, before perfect appliances for
saving the precious metals were thought of,
and when labor and food was high.

It is, moreover, by no means certain that be-
cause other prospectors have passed over
ground that there is nothing to be found.
Many of us remember instances where ground
was supposed to have been thoroughly pro-
spected, and after perhaps a hundred different
men had gone over it, another man would
come along and strike it rich. The writer
remembers having camped in one locality a
week with three other prospectors, and thor-
oughly worked over a small section, finding
nothing. Two weeks after two men camped at
the same spring, and found a vein cropping
out, which, after working about three years,
they sold for \$130,000. This vein was not 200
yards from the spring where the camps were
located, and the first party had passed over the
croppings, which were small, many times with-
out seeing them. This is by no means an
isolated case.

Many old miners, however, prefer to work
and re-work well known gulches and flats rather
than spend their time in making trials in new
ground. It is often stated that in new camps,
the miners, curiously enough, almost always
accidentally open the richest claims first; but
those who make this statement do not always
take care to examine the facts. At first new
discoveries—the finding of any rich pocket,
excited the public mind, and even without ex-
aggeration, the facts made known in the early
days of our gold mining were startling; but
more extraordinary results are obtained now,
week after week, than many which occurred in
early days.

When we read a paragraph in a newspaper
informing the public that the last clean-up of
such a claim was \$60,000, or such a mine is
raising 200 tons of ore per day, worth \$150 per
ton, there is neither surprise nor excitement.
The public has become accustomed to regard
these as ordinary occurrences, and fails to con-
trast them with what was presented to their
observation ten or fifteen years ago. In Cali-
fornia, this is more particularly noticeable in
quartz mining.

In fact, the prosperity of California mining,
paradoxically, stands in the way of its advance-
ment. If our miners were not well off, if they
had not good machinery and appliances to aid
them, if they were obliged only to select the
richest rock, and pound it up in a mortar, as is
often done in new camps, the results of their
labor when made known would attract hun-
dreds to the mines. But merged in averages
and given in bulk, they fail to convey intelli-
gence which excites the mind. In many cases,
if miners had to select the rock, as in early
days they used only the richest dirt, results
now often obtained would seem so extraor-
dinary as almost to exceed belief.

Take California, for example, with regard to
new mines. Ten years ago it was thought
that at this time there would not be a thousand
miners in the State, but there are more than
ever before. All this time with quicksilver as
valuable as it was, there were only two or three
mines of this character being worked. Last
year, when the price of the article was very
high and a new mine or two was found, pros-
pectors started in all directions, and the result
was that many people found the precious metal
almost under their noses, on their ranches, near
their towns and in all directions. It has been
found in all the coast counties from Mendocino
to San Diego and away back in the interior.

The measure of the success of the mines
must not be gauged by our exports alone, nor
must it be gauged altogether by the published
statements of hullion product. Immense sums
have been expended in all the mining States
and Territories in the construction of roads,
ditches, mills, machinery, etc. In many places
large towns, with fine buildings, etc., show
that no small share of the wealth the mines
have yielded has been profitably used in turn-
ing the wilderness into a habitable abode. In
many places where a few years ago man's step
was unknown, we hear now the roar of hun-
dreds of stampheads, the rush of water, and
see the hills stripped of their trees, the streams
elevated from their natural beds, fine houses,
wide streets, tall chimneys, churches, theaters,
etc. If in some places there has been a profuse
outlay, it has not been that of the spendthrift,
but rather that of the wise, enlightened and
perhaps too liberal population, who have faith
in their prospects, and show it more in deeds
than words.

Short Lectures on Patents.

Nb. 6—By JND. L. BOON, of Dewey & Co's MINING AND
SCIENTIFIC PRESS Patent Agency.

Re-Issues.

If the patent covers more than the inventor
is entitled to claim, or if it does not cover all
that he might claim, it can be re-issued and
the trouble remedied. There is no limit to the
number of times that a patent can be re-issued.
In applying for a re-issue a new or amended
specification, and new or amended claims are
presented to the Patent Office for action. If
the application is granted the old patent must
be delivered up and a new patent or re-issue is
issued to the inventor, and the new patent will
stand in lieu of the one originally issued. A
re-issue does not extend the life of the patent
but it will expire on the day that the original
patent would have expired had it not been re-
issued. A re-issue is not retroactive in its
operation. It cannot reach the infringer of the
original patent if the original patent could not
do so, and even then the infringement must be
continued after the date of the re-issue. The
old patent stands as a repealed act while
the re-issued patent goes into force on the day
of its issue.

Nothing can be claimed in a re-issue which
does not appear in the application on which
the original patent was issued. The specifica-
tions can be re-written entire, new claims may
be substituted instead of the old, but no new
matter, nothing discovered or invented since
the issue of the old patent can be embodied in
it. An application for a re-issue is examined
the same as if it were an original application,
and the Patent Office can even reject a claim
which is contained in the original patent if it
is embodied in the re-issue and is found on the
re-examination to be wanting in novelty. The
old patent must be delivered back to the Patent
Office if the re-issue application is granted, but
if it is rejected the patentee can withdraw his
old patent and hold it the same as if he had
not applied for a re-issue, and this is the case
even if a portion of the claims contained in the
old patent are rejected, but such a withdrawn
patent is liable to be defeated in a suit at law.

If a patentee has assigned an undivided in-
terest in his patent he cannot re-issue it with-
out first obtaining the consent of the assignee.
If two or more separate inventions are covered
by one original patent, the patentee can in a
re-issue make each invention the subject of a
separate application and receive a separate
patent for each.

To properly prepare a re-issue case requires
the greatest skill of the patent solicitor. It
involves not only the necessary legal knowl-
edge, but a thorough mechanical knowledge
of the principles involved in the invention.
He must develop in clear and unmistakable
terms the little mechanical points which unite
together to form the main idea, and he must
grasp the main and connected features, so as to
make legal and allowable claims on legitimate
and necessary combinations. It is the tearing
down of a poor or defective structure, in order
to build another and a perfect one in its stead
and with the same materials. Knowing the
defects of the original patent, and having had
the experience of actual practice and tests ob-
tained in his endeavor to introduce the inven-
tion to the public, it is expected that the inven-
tor will see that his patent covers the invention,
fully and completely, so as to hedge out possi-
ble infringers.

Usually the defects of a patent, if it has any,
are revealed soon after the patentee introduces
his invention to the public. Our American
inventors do not often permit the patentee to
escape long if he makes a successful invention
without giving him cause to look to the scope
and validity of his patent. His only defence
if any flaw exists is in a re-issue. It is seldom
that the specification and claims of a patent
cannot be proved after the inventor has had
the experience of a year or two before the
public, and it is generally the case that the
Patent Office will allow broader and stronger
claims on a re-issue application than on an
original application. It is usually those who
are successful in introducing their inventions
that apply for reissues. The patents for in-
ventions which cannot be made pecuniarily
profitable are seldom interfered with by in-
ventors, and they do not therefore need to be
re-issued. It is the successful patents that need
to be strong to ward off infringers. It is there-
fore of the greatest importance that these cases
be prepared carefully and by some person who
is skillful, both in law and in a knowledge of
mechanics.

Although the reissue is usually resorted to
for the purpose of enlarging the scope of the
patent, it is also used to lessen its scope when
it contains more than the inventor is entitled to.

It is well that the law provides a means for
remedying the defects in a patent. The coun-
try is over-run with a class of patent agents,
who know but little about the requirements of
a patent, and care less. Their sole object is to
secure patents for their clients, no matter how
much or how little the patents cover, so long
as they receive their pay for getting them. If
the patentee does not succeed in introducing
his invention and making money out of it, he
may never know how poor a patent he holds,
but if he is successful in his attempts to in-
troduce it he soon discovers that in order to
protect himself he must reissue his patent, and
claim what he should or might have claimed in
the first instance.

[To be continued.]

Engineering Items.

Work is still being carried on at the Oakland
harbor improvements. Mr. Gnarin is now
superintending the operations. The first con-
tractor, being unable to fulfill his contract, was
removed, and the second lowest bidder is now
on the work.

PRELIMINARY operations are now being car-
ried on in San Diego for the improvement of
that harbor, by turning the San Diego river
into False Bay. Gen. Alexander, Col. Stewart
and Lieut. Weedon of the U. S. Board of Engi-
neers are now in San Diego making the neces-
sary surveys.

The new revenue steamer for the Pacific
coast is to be built by the Oregon Iron Works,
of Portland, Oregon, their bid being the low-
est—\$92,000. The vessel is to be one of the
staunchest in the service, and will be 145 ft
long, 23 ft breadth of beam and 11 ft depth of
hold. Her draft of water will be 10 ft 10 in,
and she will be of 227 tons custom-house
measurement. She is to be a propeller with a
vertical inverted engine, 34 in. diameter of cyl-
inder by 34 in. stroke, and provided with a an-
tifa condenser.

The following information may be useful to
our steamship owners. It is an extract from a
Glasgow journal of a recent date: "An inter-
esting paper was read before the graduates of
the Glasgow Engineers' and Shipbuilders' In-
stitution, on the 13th ult., on 'Corrosion of
Marine Boilers,' illustrated by sketches and
specimens of boiler plates, angle iron and stays,
exhibiting the riddling effect of the agent to
which the metallic fragments had been sub-
jected. The result was attributed to the pres-
ence inside the boiler of a powerful, volatile,
fatty acid, which speedily dissolved the surface
of the iron wherever it was unprotected by
the water. This acid is the issue of the de-
composition of tallow, which is frequently in-
troduced to excess, for the purpose of prevent-
ing the annoying occurrence known in engi-
neers as 'priming.' In order to neutralize the
effect of the acid, the lecturer recommended
that pounded chalk should be largely used in
boilers, as this substance, by forming a basis,
would render the acid inoperative."

San Francisco Microscopical Society.

This hard working little society held its regu-
lar semi-monthly session last week. The
Committee on Annual Reception made a report
of progress, stating that Mercantile Library hall
had been engaged for Thursday evening, May
27th. Nearly all the members present handed
the committee a list of objects which they would
exhibit on that occasion; and the favored ones
who receive tickets from the members to attend
the reception will find an exhibition most grati-
fying and instructive. We acknowledge the
receipt of an invitation.

Mr. Hyde exhibited a sample of some wooden
ships which he had made from well-seasoned
Spanish mahogany and perforated with one
or more different sized apertures, which he
utilized as cells for dry mounting. The sides
were noticeable for lightness and durability,
but he stated that they were rather more ex-
pensive than glass ships.

Mr. Kinne exhibited a turn-table of his own
invention, which he stated could be attached
to any now in use, and by means of clamps,
levers and light spiral springs, automatically
fixed the slide in a central position for mount-
ing objects, cell-making or finishing. The ap-
pliance was made by Will & Finck, of this city,
under the direction of the inventor, and its
finish and usefulness were both noted and re-
ceived the approbation of all present.

As several members of the society who had
been interested and instructed by the papers
and remarks of Dr. Harkness on the vegetable
cell, were desirous of hearing and seeing some-
thing of analogous animal structure, the Dr.
had prepared a series of objects for exhibition,
which he introduced by a few remarks as to the
general characteristics of the animal in cell,
and which he fully described and alluded to as
the basis of life, all the tissues being eliminated
therefrom. Proceeding to the illustration of
the matter, he exhibited a number of objects,
which had been prepared by himself and
mounted for the evening's study. The meet-
ings of this society are always well attended,
and great interest is manifested in the proceed-
ings, both by members and visitors.

Progress at the Sutro Tunnel.

The following is the report of progress in the
Sutro tunnel, for week ending May 22, 1875:

Number of feet in tunnel, May 15.....	9,408
Number of feet driven during week.....	57

Distance in, May 22.....	9,475
--------------------------	-------

Details of work performed, are as follows,
heading being 8x10 feet:

Holes drilled.....	460
Holes blasted.....	460
Holes re-blasted.....	76
Aggregate depth.....	2,530 feet
Average depth.....	5 to 10 feet
Powder consumed.....	1,315 lbs
Explosives consumed.....	640
Car loads.....	379

Six drill, instead of four, will soon be set at
work, probably by the end of this week.

[Signed] A. SUTRO, Gen. Supt.

Gravel Mining.

Generally throughout the State a short water supply for hydraulic mining is expected, and most of the gravel mining enterprises are being pushed ahead with vigor at present, to make the most of the present abundant water supply. The result of most of the operations coming under our notice is quite favorable and the aggregate yield will doubtless be larger than usual. In many localities new enterprises are being started up and larger areas of ground will next year come under the pipe. In Calaveras county all the hydraulics are running full banded and the tunnel claims are being worked to the extent of their capacity. The Calaveras *Chronicle* states that a number of abandoned claims have been re-located, and there is no question but there are extensive gravel fields within the reach of the water company's ditch, yet comparatively unprospected, that can and will be profitably worked. For several years past, especially since the more modern appliances for hydraulic mining came into use, the gravel mining interest has been constantly increasing in importance, until it has reached a place second to none other in the county. Further development in that direction is stimulated by the success so uniformly met with and the *Chronicle* thinks they can safely calculate on a steady enlargement of the field of operations.

In Plumas county the recent strike of blue gravel under the lava cap at Neelon Point promises to be one of the most important discoveries made in the county for years. The owners of the ground, Messrs. Pierson, Winters & Jolly, have been pushing their tunnel along, and although they are not on bedrock, are getting splendid pay. The Plumas *National* is credibly informed that the gravel in the top of their tunnel prospects at the rate of twenty-five cents to the pan. The layer of gravel is from fifteen to twenty feet deep from the bedrock to the lava cap, and as it seems to run wherever the lava is found, it gives promise of being very extensive. Considerable excitement has been raised in mining circles, and the ground, it is said, is already claimed for over two miles. There is talk of making up a company to start in another tunnel. Should this prove to be the continuation of the blue lead it will bring back the old-time flush times to Nelson, and make it one of the liveliest mining camps in Plumas county.

Another strike in the ancient river channel was recently made at the Rough and Ready claim, on Table mountain, near Peoria Flat, owned by the Tuolumne hydraulic mining company. The Tuolumne *Independent* states that they have four feet of blue gravel in the face of the tunnel, with an overlay of two feet of secondary wash, red gravel, which latter prospects well. The former, the regular blue gravel, prospects all through from one to two bits to the pan. This claim was formerly worked by hydraulic, and the red gravel was supposed to be the cream of the mine, but after about two years' trial the Superintendent concluded there must be another channel in the mountain, which he went after with a determination to find. He commenced tunneling, starting from the old tunnel, which was 1200 feet in. He, however, started from a point 800 feet from the mouth, and commenced running levels up the mountain, and struck the old river bed as before stated. Wherever this has been found in Table mountain heretofore, the old channel has proved immensely rich. Taking the lay of the ground, they have probably the best thing yet struck in the county. The gravel is expected to average ten to twelve dollars to the car load, and they are working night and day shifts.

The channel spoken of here, as most of our readers probably know, runs through the whole length of Tuolumne county, in Table mountain, and spots equally rich have been found in most cases where the old bed has been reached. All up and down the mountain are tunnels given up years ago, many of which are probably within a few feet of the old channel; but the coin and patience of old prospectors gave out before they reached the reward which will be repaid hereafter by those who have the faith to invest.

At Michigan bluff, Placer county, old miners who reside there estimate that there are ten thousand acres of good paying mining ground in that divide now lying in its primitive state for want of capital to open it up. Hydraulic mining is extensively carried on at Michigan bluff, but the Placer *Herald* thinks that tunnel mining is bound to take the lead there. To open and work a mine on this principle, as on the hydraulic principle, requires extensive capital. Hence much of the ground in that section—perhaps the best—has never yet been touched. There are many drift claims at or near the bluff now, but they are being worked, but not one tenth what might be. Several are now being worked with profit and others are being fitted up. The principal hydraulic mines now in operation at Michigan bluff are the Big Gun, Light Foot, and Sage Hill. These and other smaller mines in that vicinity have had quite a successful run, though their season is destined to be short. The water is already beginning to fail, and in a few days more the ditch company will shut off the supply entirely in order to repair and improve the ditch.

The Gene-e Valley mine, in Plumas county, recently incorporated, is a little mine which has paid steadily in a modest way ever since it was discovered and opened in 1854. No assessments have been levied on it. This mine was first worked as a hydraulic mine, yielding an average of six or eight dollars per day to the

man. The bed rock exposed by the water showed a perfect network of small veins of decomposed quartz, some of them fabulously rich. As high as \$70 has been taken from a single pan of this decomposed rock. When the surface ground was exhausted a small mill was erected, and its stamps have been busy ever since, and always with good results, and the *National* is informed that the prospects of the mine are to-day as good as they ever were.

A circumstance of this kind ought to encourage prospectors in other directions. In this connection we notice the Grass Valley *Union* recommends prospectors to try the head of Squirrel creek, in Nevada county, for quartz. A week or so since a lot of beautiful gold nuggets, taken out of James Gassaway's claims, on Osceola ravine, were shown in a Grass Valley bank. The nuggets were valued in all at \$450, and the largest was worth \$115. They came from near the head of the ravine. Osceola ravine empties into Squirrel creek, and the creek has always been noted for having heavy lumps of gold in its bed. It is quite probable that a large quartz ledge exists somewhere near the head of Squirrel creek, and the *Union* advises prospectors to hunt it up.

Mint Operations.

Professor R. E. Rogers, of the University of Pennsylvania, who arrived in this city last



LADIES' CAMPING LOUNGE.

week, commenced immediately to prepare the refinery for the mint. This refinery will have a capacity of 1,500,000 ounces per week. The present refinery, at the corner of Brannan and Seventh streets, is able to refine \$1,000,000 monthly. The refinery at Carson has a capacity of \$300,000 monthly, and that of New York a capacity of \$1,000,000 per month. No refining is done at the Philadelphia mint, and little elsewhere in the country. The aggregate capacity of all the refineries of the United States is at present far behind the production of the precious metals, and likely for some time to remain so.



NEW PATENT CAMP LOUNGE.

The United States mint, in this city, is the finest establishment of the kind in the United States, being able to coin \$2,000,000 per month in silver and \$3,000,000 in gold. The coinage for this month will probably amount to about \$3,500,000, making a total for the last eleven months of \$30,000,000. Double eagles and twenty-five cent pieces are now being coined, and the coinage of the twenty cent pieces will soon be commenced. This new coin is described as follows: "On the obverse side a female figure sits, holding in her hand a pole bearing the liberty cap, the whole representing the usual figure of the Goddess of Liberty. Underneath the figure are thirteen stars, representing the thirteen original States of the Union. On the reverse side is the figure of an eagle displayed, surrounded with the inscription 'United States of America,' and the denomination of the coin. A rim inside the edge and the edge itself will be ribbed, as are our other coins."

The new refining machinery is being put in place as rapidly as possible, under the direction of Professor Rogers, who has been sent out by the government for that purpose. It is said that the Professor has some new methods, which he will put to practical test, that will greatly facilitate the process of refining.

The new "C & C shaft" on the California and Consolidated Virginia mines is making rapid headway, the work being driven with all the energy possible. The foundations for the new machinery are fast approaching completion, and preparations for the erection of the different portions are being forwarded with all the speed possible. The grading for the new mill is about completed.

New Patent Camp Lounge.

To people who are accustomed to go on camping trips every summer, and to hunters, prospectors and others who frequently sleep out of doors, the patent camp lounge shown in our illustration on this page is of interest. As may be seen from the engraving, it makes a light compact couch, easily carried and capable of being quickly arranged for use. The invention is simply a piece of canvas, which, when stretched on a frame, forms a bed or lounge. There are two side sticks, three feet nine inches long, and two girths, one at the head and one at the foot, forming the transverse portions of the frame. The girth forming the head is straight, and into its extremities the shanks of the double ferrules are screwed with right and left hand threads. The inner pair of ferrules receive the ends of the side sticks. The shanks of the ferrules of the lower girth are arched so as to raise the hip of the person reclining a short distance above the ground. The width of the frame can be extended at pleasure. In putting the couch together the side sticks are inserted through the side hems and the head girth through an additional head piece. The foot girth rests on the ground. The girths are

then turned to proper width and the canvas stretched tightly. In order to support the lounge at a suitable incline, two sticks are inserted in the outer ferrules of the double ferrules on the head girth, said ferrules being formed at right angles to those to which the side sticks are inserted. A loose piece of canvas is provided, secured to the main portion, and which rests upon the ground beneath the lower portion of the body and feet of the occupants. The small compass and convenient shape into which the device can be folded is shown in the small cut. It comprises the head and front girths and canvas.

It is not absolutely necessary to carry any of



Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

IMPROVEMENTS IN WINDMILLS.—Albert H. Southwick, San Francisco, Cal. This invention relates to improvements on the "Dexter" windmill, which was patented by the same inventor. The present improvements relate to the construction of and arrangements for operating the shutters by which the wind force is admitted, regulated and cut off entirely, when desired, from the wind-wheel. In the "Dexter" windmill a horizontal wind-wheel is mounted inside of a suitable frame or awning and is surrounded by a series of overlapping shutters, mounted on suitable bearings and connected together so that they can be simultaneously opened and closed, so as to regulate the speed of the wheel by ganging the quantity of wind admitted to it. In constructing these shutters the inventor secures, longitudinally along the middle line and on each side of each shutter, a rib or baton, which will prevent it from warping; and to each end of the shutter is secured a metal shoe which also aids in keeping it from getting out of order, and preserves its easy movement in its bearings. The bearings of the shutters being made of metal, the shutters cannot bend or become stiff. The inner or overlapped edge of each shutter is made angular, so that when the shutters are closed the angular edge will fit closely against the inner outside edge of the next shutter and make a tight joint. The angular edge will also project inside of the plane of the shutter and thus form a wing which will receive the force of the wind as it passes between the shutters. Therefore, when the wind increases in force its action upon this wing will tend to close the shutters in proportion to the pressure of the wind. The rods which connect the shutters are so secured that the length of the rod can be adjusted after it has been secured in place. To provide for the simultaneous adjustment of the shutters the upper end of two opposite shutters is extended through the ceiling of the frame or housing, so as to provide a projecting end above the ceiling, to which a crank arm is secured. A lever extends across above the wind-wheel and is pivoted at its middle so as to provide two arms. One end or arm of the lever is connected with each of the crank arms by a rod, so that by moving the lever about its center or groove the shutters are simultaneously opened or closed. A cord is attached to each end of the lever and extends down outside of the frame to within easy reach of a person standing on the platform of the mill. By drawing upon these ends the lever is shifted and the shutters operated. The shutters can be turned with precision and held at any desired position. This invention greatly improves the "Dexter" mill by obviating faults which it has heretofore possessed.

BIT STOCK.—E. R. Charles, Petaluma, Sonoma county, Cal. This is an improved tool holder and bit stock, in which is a novel arrangement for securing tools or bits in handles, so that they can be readily removed, and which will at the same time hold the tool or bit securely when fastened to the handle. The hole in the end of the stock in which the base end of the bit is inserted is made round, and along one side of the hole is made a groove. The inserted end of the tool is made round to fit the hole and has a rib on one side which fits into the groove referred to. A short distance from the end of the bit stock a groove is made entirely around it, and in this groove is fitted a ring with a milled edge, which can be turned by the fingers. In the bottom of the groove in which the ring fits is a slot on one side of the groove, and on the inside of the ring is a projection so that when the ring is turned in one direction the projection will be moved across the groove. The rib in the base of the handle has a recess out in it at the proper point to allow the projection on the ring to enter it when the tool has been inserted in the stock and the ring has been turned so as to bring the projection across the groove, thus fixing the tool firmly in the handle or stock. This arrangement is quite simple and extremely strong, while it is easily operated to place and remove tools.

BRAKE BLOCKS.—Wm. Hendricks, Milton, Stanislaus county, Cal. This invention relates to certain improvements in brake bars and the securing of the independent brake blocks to these bars so that the block is firmly held in its place. The brake bar is not weakened by cutting it away inside of the line of wheel and the screw which operates to secure the block is protected from injury from the outside. The block can also be adjusted to accommodate the increasing "dish" of the wheel by use.

THE BLACK HILLS.—A company of cavalry has passed through Dubuque, Iowa, en route to Yankton, Dakota. They were well equipped, and intend to keep a vigilant eye on the movements toward the Black Hills. General Canby says his expedition to the Black Hills will leave Fort Lincoln June 1st, and if miners are going into the Hills in large numbers, as Western papers report, it will probably take the whole summer to drive them out.

SAFE INVESTMENT.

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A rapidly growing interest is being taken in the Pacific Coast Twelve Per Cent Consols, in consequence of the many advantages offered in regard to investment, interest and dividends. So much uncertainty exists in connection with nearly all mining and other speculative companies, there is something very assuring in an incorporation which not only guarantees twelve per cent. per year to all stockholders, but provides for the honest payment of dividends. The Twelve Per Cent. Consols were incorporated on the 12th of February last, for the purpose of transacting a general business in buying and selling mining properties, city real estate, and agricultural and other lands, in the States and Territories of the Pacific Coast. Determined to do only a strictly legitimate business, the Directors rejected the old method in vogue by mining companies generally, and adopted a new one which secures to all parties who become shareholders, equal advantages in the business transacted. By the provisions of the by laws,

A Sinking Fund

Is to be made of one-half the proceeds of the total capital stock, which shall be held on the joint account of the original co-owners. The stock will be classified as follows: Sinking Fund, mining property, city real estate and agricultural lands. Before any stock is issued in any class, the property will be appraised by the owners, and the stated value entered upon the books of the Company. Shares for not more than fifty per cent. of the valuation will be issued in any of the classes, and the amount of shares offered for sale in any one class, exclusive of the sales of stock in the Sinking Fund, will not be allowed to exceed 50,000, if sold at less than the par value of a dollar per share.

Guarantees of Safety.

In regard to the Sinking Fund, which will constitute fifty per cent. of the par value of the stock, all moneys received as the proceeds of sales of stock on account of the fund will be deposited with some solvent banking institution, which pays interest on deposits invested in interest bearing stocks, bonds and other securities, which can be realized on in thirty days, and in no case will it be lawful for the directors or trustees to invest any moneys of the Sinking Fund in the purchase of stocks, bonds or other securities of any incorporation whatever, which shall have failed to pay interest or dividends for a period of six months preceding any proposed investment pertaining to the Sinking Fund of the Company.

Payment of Interest.

The by-laws further make positive provision for the payment of interest monthly on all stock issued in each class at the rate of twelve per cent. per annum, payable on the 5th day of each month. Another important concession is that any shareholder has the option to take stock in payment for interest at par value in any class that may be preferred. No assessment will be levied until the total stock of the Sinking Fund shall have been sold and paid out as provided by the by-laws. Indeed, so secure is the plan of the Company that in case the whole capital stock of the Company should be sold immediately and the Sinking Fund invested as provided, the proceeds would be sufficient to pay the interest for eight years and a half on the total capital stock. Perhaps no other company in the world has ever been able to present so brilliant a certainty.

Dividends.

Stockholders will not only be sure of their twelve per cent. per annum, but will share in all the surplus profits. The dividends will be paid from the profits and sales of property, and only on shares of consols that have been issued for property valued and entered on the books of the Company. As there can be very little question that the transactions of the Company will be very extensive, and that the profits will rapidly reach something handsome, the dividend prospect should serve as a strong inducement to stock purchasers, for perhaps in no other direction can they be positive of receiving one per cent. a month for money invested, and almost a certainty of large yearly dividends in addition.

A further provision can be made at any time by the Company by setting aside the percentage agreed upon of the sales of the properties of the Company. The main object of the directors is to incorporate a more legitimate and assured method of transacting business in mining and property than has hitherto obtained on this coast. They are therefore resolved to touch nothing but bona fide investments, and to make it a rule to have nothing to do with speculative values. Every possible care will be taken to protect the interests of shareholders; and in order that they may be constantly posted in the transactions of the Company, a monthly statement of affairs will be prepared by the officers, and the books will be at all times open for inspection. Shares for the first series issued for mining property in Washoe, Storey and Lyon counties, and on the Comstock lode in Nevada, and for account of Sinking Fund, will be ready for delivery to subscribers and purchasers to-morrow, at Greenbaum & Co's, 306 Montgomery street. The net selling rate will be one-twenty, and the buying rate one-nineteen. The principal office of the Company is at 306 Montgomery street. T. Phelps is the President, and W. S. Reynolds the Secretary. my22sohwbp

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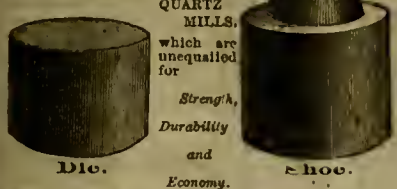
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OAKES'S PATENT



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Patented January 26, 1875.

For description see MINING AND SCIENTIFIC PRESS, March 6, 1875.

For Cleaning Quicksilver Before Using it for Amalgamation.

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This machine, complete, weighs 1,500 lbs. Has an iron frame, five steel arms with stamps weighing 17 lbs. each, which strike 250 blows per minute, in a mortar provided with screens on both sides, and crushed 2½ to 60 lbs. per hour, requiring one-horse power to drive it. Has been thoroughly tested, and is guaranteed to give good satisfaction. PRICE, \$200.

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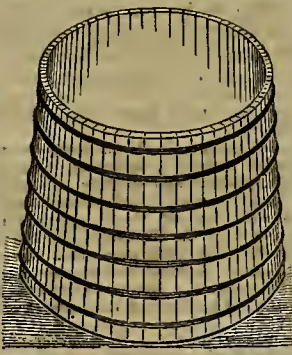
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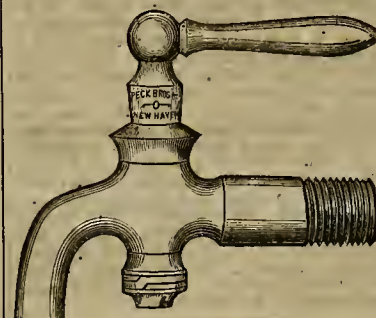


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These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco

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Ore Bags, Tents and Hose

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Sales at S. F. Stock Exchange.

FRIDAY, A. M., MAY 21.		50 Pruslan	35
30 Alpha21:40	200 Panther	15
40 Beta	.....18:20	500 Prospect	.....	10
40 Belcher	.....21:40	200 Pioneer	.....	12
270 Best & Bel	.....49:45	200 Pioneer	.....	12
240 Bullion	.....48:47	200 Pioneer	.....	12
120 Bullion	.....48:47	200 Pioneer	.....	12
200 Baltimore C. n.	.....44:44	120 Raymond & Ely	.....44:47	17
10 Caladonia	.....19:4	120 Ray Patch	.....	17
403 California	.....55:54	65 Schriot	.....	17
100 California	.....55:54	150 S. California	.....2:42	23
10 Confidence	.....17:1	75 War Eagle	.....	33
133 Con Virginia	.....40:40	405 Wells-Fargo	.....20:23	40
270 Crown Point	.....29:28			
240	.....29:28	TUE-DAY, A. M., MAY 25.		
100 Disney	.....75	55 Alpha	.....19:4	
20 Empire Mill	.....46:41	150 Belcher	.....21:48	15
50 Elchop	.....15:1	635 Best & Belcher	.....47:47	2
100 Elchop	.....15:1	270 Bullion	.....48:48	17
10 Hale & Nor	.....b 5:31	175 Oboller	.....38:40	13
150 Imperial	.....8:40	100 Crown P.	.....40:40	17
100 Imperial	.....8:40	200 Con Virginia	.....41:42	20
130 Julia	.....19:19	25 do	.....b 15:42	20
65 Kentuck	.....19:19	240 Confidence	.....19:20	17
65 Kentuck	.....19:19	50 Chalmers	.....	17
65 Kentuck	.....19:19	270 Crown P.	.....40:40	17
100 Dryan	.....16:17	20 Caladonia	.....17	
65 Mexican	.....16:17	15 Dayton	.....75	
51 do	.....h 5:16	50 do	.....h 39:25	25
20 New York	.....17:17	150 do	.....h 39:25	25
100 Presidential	.....45:45	80 Empire Mill	.....54:56	8
183 Ophir	.....45:45	501 Gould & Curry	.....18:18	5
250 do	.....h 30:45	150 Imperial	.....70:71	17
241 Overman	.....45:48	100 Imperial	.....70:71	17
100 Overman	.....45:48	55 Justice	.....33:35	
25 S Hill	.....81	715 Julia	.....105:111	11
95 Savage	.....92	150 Kentuck	.....131	
85 Sierra Nevada	.....10:1	250 Kentuck	.....131	
750 Sierra Nevada	.....10:1	150 Lady Bryan	.....32:33	40
285 Woodville	.....10:1			

35 Yellow Jacket, ..9

[illegible]

210	Leopard	1 1/2
200	Lady Washington	1 1/2
100	Leviathan	1 1/2

70	American Flat.	33¢/40	385	Meadow Valley	74¢/75
53	Alpha	19	326	Mahogany	109¢/5
125	Belcher	57/60	230	Mint	177/20
119	Bell	102/105	370	Mineral	177/20
54	Bullion	47/50	375	New York	24¢/25
10	B1 Con	34¢/35	40	Occidental	7
30	Bacon	3	200	Oriz Gold Hill	110/10
310	B. C. Point	35	200	Prussian	3
1135	California	33¢/35	50	Panther	14
51	Challenge	6	400	Prospect	55¢/4
295	Chollar	19¢/20	180	Rare Part	13¢/12
50	Caledonia	11	260	Raymond & Elv.	47¢/45
10	Camp	11	300	S. C. Hill	70¢/75
400	Dayton	105¢/103	500	S. California	22
824	Eureka Con.	65¢/60	600	War Eagle	32¢/34
30	Empire	20	530	Woodbine	200¢/8
30	Empire Mill	60	450	Wells-Fargo	200¢/8
10	Eschwege	230			
280	Espeje	60			
20	Galena	30			
20	Hale & Nor.	30¢/32			
405	Imperial	94			
394	Julia	84¢/94			
10	Kanick	4			
140	Knickerbocker	4			
95	Kentuck	13			
120	Lady Bryan	34¢/35			
105	Lead	10			
1645	Mexican Valley	16¢/16			
760	New York	13¢/12			
2325	Ophir	44¢/45			
10	P. S. S.	3			
255	Overman	34			
145	Raymond & Elv.	40			
10	Savage	2			
330	Silver Nevada	10¢/10			
215	Silver Hill	83¢/89			
480	Union	64¢/66			
30	Utah	54			
10	Woodbine	10			
30	Yellow Jacket	26			

MONDAY, A. M., MAY 24.

275	Alpha.	19c	19c	85	Imperial.	74	74
289	Am Flat.	31	31	90	Julia.	12	12
110	Belcher.	28	28	90	Justice.	100	100
275	Bell.	47	47	90	Kerkbeck.	10	10
210	Bullion.	47	47	90	Kentuck.	13	13
50	do.	s	5	95	Lacy Bryan.	10	10
85	do.	more	Con	5	Madison.	11	11
10	Buck.	1	1	95	Man York.	23	23
20	Con Virginia.	402	402	100	Occidental.	10	10
60	Crown Point.	31	31	919	Ophir.	35	35
80	do.	31	31	919	Rockland.	5	5
875	California.	35	35	100	Rock Island.	5	5
10	Caladonia.	16	16	100	Siena Nevada.	11	11
50	Dard nelles.	47	47	100	S Hill.	2	2
150	do.	47	47	100	Union.	10	10
35	Eclipse.	3	3	100	Union Con.	5	5
230	Gale & Curry.	11	11	100	Utah.	2	2
10	Gale & Nor.	11	11	100	Yosemite.	2	2
150	Imperial.	11	11	100	Yellow Jack.	18	18
1350	Julia.	95	10	100			
5	Justice.	10	10	100			
100	Kearlchocker.	11	11	100			
1235	Mexican.	11	11	100			
290	New York.	21	21	100			
1855	Ophir.	31	31	100			
20	do.	10	10	100			
125	Overman.	35	35	100			
120	Siena Nevada.	11	11	100			
20	do.	11	11	100			
25	Succor.	11	11	100			
20	Silver Hill.	8	8	100			
2	S. Fort.	11	11	100			
44	Union Con.	5	5	100			
100	do.	h	31	64			
15	Utah.	2	2	100			
20	do.	2	2	100			
55	Yellow Jack.	18	18	100			

AFTERNOON SESSION

1775	Andes.	42.41	42	Madaw.	106.61
106	Cosmopolitan.	59.4	70	Muhogany.	1
920	Eureka Con.	762.13	80	Maryland.	50
50	do.	1.3	90	Madison Hill.	1
60	Empire L.	1	50	Pauper.	1
50	Florida.	3	100	Painter.	1
124	Golden Chariot.	3.3	100	do.	b 30.103
100	do.	h 30.85	50	Prospect.	1
270	Golden Gate.	1.3	50	Raymond & Ely.	42.24
140	K K Con.	3.103	50	Rd.	50.4
30	Leopard.	15	50	Ed. Ch.	130.30
130	Long Val.	10.5	50	Ed. Ch.	130.30
185	Mammoth.	100.9	615	Ed. Ch.	130.30
200	Mmt.	150.1750	100	W. foot.	50
240	Mt.	1750	100	W. foot.	50
240	Nisara.	1750	100	W. foot.	50

SALES OF LAST WEEK AND THIS COMPARED

THURSDAY, A. M., MAY 20.		THURSDAY, A. M., MAY 27.	
179 Alpha.....	18 1/2 @ 19 1/4	300 American Flag.....	14 1/4 @ 15
480 Best & Belcher.....	43 1/4 @ 44	180 Alpha.....	2 @ 2 1/4
160 Baltimore Con.....	41 1/4 @ 42	300 Best & Belcher.....	47 1/2 @ 48
200 Belcher.....	2 1/4 @ 2 1/2	300 Belcher.....	30 1/2 @ 31
50 Bullion.....	48 1/4 @ 49	300 Baltimore Con.....	4 1/4 @ 4 1/2
50 California.....	55 1/2 @ 56	210 Bullion.....	48 1/4 @ 49
2 35 California.....	55 1/2 @ 56	2565 California.....	80 @ 81
300 Crown King.....	29 1/4 @ 30	265 Choblog.....	80 @ 81

965	Chollar Potom.	74	75	Calsdonia	165	191
90	Confidence	172	280	Confidence	190	194
110	Con Virginia	40	240	Crown Link	40	194
90	Dance	10	125	Con Virginia	420	193
200	Empire Mill	45	115	Challenges		
415	Gould & Curry	14	115	Dayton		
75	Hale & Norcross	37	200	Dayton		
90	Hatch	10	253	Gould & Curry	183	193
25	Justice	87	30	Hale & Norcross		40
165	Julia	88	35	Imperial		
100	Kentuck	3	95	Imperial	102	193
50	Kentuck	13	1230	Julia	16	194
165	La Bryana	3	100	Kentuck	14	191
1050	Mexican	15	475	Kentuck	14	192
100	Mecher	3	475	Kentuck	14	192
30	Overman	37	210	Mexican	18	191
100	Silver Hill	53	58	New York	24	
200	Succor	1	2563	Phir	6	193
30	Succor	3	2563	Phir	6	193
50	Savage	33	240	Occidental		
30	Sierra Nevada	10	50	Rock Island		
355	Union	5	165	Silver Hill	9	191
20	Yarrow	5	350	Silver Hill	35	191
20	Yarrow Jacks	76	30	Succor		

AFTERNOON RESIDUAL

30	American Flat.....	2½@2½	1410	Woodville.....	2½@3½
400	American Flag.....	2½	110	Yellow Jacket.....	8
2055	Andes.....	3½@3½			
	Belmont.....	2½			
650	Cosmopolitan.....	45c			
50	Cherry Creek.....	1½			
240	Gondor.....	75c			
20	Empire, I.....	1½			

2015 Eureka Con.
585 Golden Chariot.
160 Gile

570	Gila	1	630	Andes	1
571	Idaho	1	20	American Flag	2
572	Jefferson	9/2@9	150	Alps	1
573	K & Con	2/3@3	151	Belmont	2
574	Leviathan	1	152	Concord	9/5@5
575	Leopard	15/2@15	120	Cornucopia	1
75	Meadow Valley	6/5@6	200	Condor	16/1
240	Mint	15/6	500	Enreka	62/9
430	Mohogany	1	501	Escalado S	1
435	Mohogany	1	166	Empire	15/6
530	New York	13/4	625	Golden Charlot	73/4
23	Occidentals	3	813	Gila	1
576	Panther	1	577	Jefferson	4/2@4
50	Prospect	1	570	K & Con	1
800	Panther	1/2	270	Leopard	12/2@12
575	Prussian	1	43	Meadow Valley	1
576	Prospect	1	573	Mohogany	1
60	Raymond & Ely	4/3	420	Meadow Valley	6/5@6
80	Rye Patch	1	225	Ogig Gold Hill	1
500	South Owl	1	225	Prospect	1
330	South Owl	1	180	Poorman	8/2@10
330	South Charlot	1/2	100	Panther	1
20	Rnck Island	4/4	100	Ray & Ely	4/2@4
1225	Wells-Fargo	20/5	530	W. Eagle	14/2
530	W. Eagle	1/4	100	Wentfoot	3/4@3

The Mining Stock Market

Mining stocks still continue in a depressed condition, although some signs of improvement in prices have been manifested this week. As will be seen by our stock quotations, Ophir still comparatively low in price, although whether it is not even now higher than the mine warrants is a question. The stock has fluctuated between \$40 and \$50 during the week, and no one seems to know what way it is going. Mexican follows it steadily up and down, as in fact do most of the Comstock mines. Even the Houanzas mines feel to some extent the depression caused by Ophir's downfall. All along the line of the Comstock, however, according to the local papers, more or less better development work is being done than ever before, and more capital being effectually employed.

The new Pacific Stock Exchange now has seventy-nine members, including some of the heaviest capitalists and dealers on California street. These men are mostly desirous to do business with the old Board, preparatory to transferring it to the Exchange, and the effect is apparent. The withdrawal of a few such men as Baldwin, Kellogg, and a score of others we might name, is a serious blow to the usefulness of the old Board, and their places cannot be filled.

A handsome premium is now offered for seats, \$10,000 being bid, with no takers. The Exchange has secured the Museum property for which \$325,000 will be paid as soon as the necessary preliminaries are arranged, and will immediately proceed to pull down the building now cumbering the site and erect a new structure. In the meanwhile Sauborn's Long Room has been secured, Sanborn turning over the lease for one year, at a monthly rental of \$1,000.

The only outside stocks showing any animation at present are the Idaho stocks. If you can credit the local papers the strike in Gold Chariot is a valuable one, and consists of new vein not heretofore known. All the other Idaho keep up well in the market, and are beset with glowing reports. The Gold Chariot stock dividend comes this way. It will be remembered that the capital stock was recently increased from 30,000 to 90,000 shares, the par value remaining unchanged, namely \$100 per share. The trustees used 15,000 shares of the increased capital to liquidate some claims against the company. This makes 45,000 shares remaining of the new stock. It is to the holders of these shares that the stock dividend applies. The remaining 45,000 shares were divided pro rata among the present stockholders, 375 holders.

STOCKHOLDERS OF THE 27th INSTANT.

ANSWERS TO CORRESPONDENTS.

In answer to "Alphabetical," in your last issue, for a remedy for consumption in its first stages, I can recommend Dr. Pierce's "Golden Medical Discovery," if taken according to directions, for it has been thoroughly tried by my family, and the results were glorious. "Alphabetical" must not expect one bottle to do the work—my wife took three bottles before she could discover any change, but after the third bottle every dose seemed to strengthen the lungs, and now she is well and hearty. "Alphabetical" will write to me I will get answers to the above.

HENRY H. M. PATTON
Lawrence, Mariou Conuty, Ind.
—*Cincinnati Times Feb 4 1875*

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. F. Journals.]

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

Company.	Location.	No.	Amt.	Levied.	Delinq't.	Sal.	Secretary.	Place of Business.
American Flat M Co	Washee	6	1 00	April 10	May 14	June 2	C A Sankey	331 Montgomery st
Baltimore Cons M Co	Washee	8	1 00	April 12	May 19	June 7	C A Sankey	331 Montgomery st
Belmont M Co	Nye Co Nevada	5	1 00	May 10	June 12	July 1	O H Bogert	402 Montgomery st
Caledonia S M Co	Washee	12	3 00	May 10	June 14	July 6	R Wegener	414 California st
Chloride Mill & M Co	San Diego Co Cal	15	5 00	April 15	May 22	June 15	R Wegener	414 California st
Chollar-Potosi M Co	Washee	6	5 00	April 14	May 18	June 8	W E Dean	419 California st
Europa M Co	Washee	3	25	April 14	May 20	June 8	R B Noyes	419 California st
Gold Mt G M Co	Bear Valley Cal	5	50	May 5	June 5	July 1	J F Cavallier	513 California st
Harvey Hill & Cons S M Co	Washee	46	5 00	April 13	May 18	June 9	T L Kimball	419 California st
Huhn & Hunt S M Co	Ely District	11	50	May 7	June 15	July 9	T L Kimball	419 California st
Iida Ellmore Co	Idaho	17	100	April 29	June 24	June 25	A B Higgins	402 Montgomery st
Iowa M Co	Washee	3	1 00	May 13	June 14	July 7	A D Carpenter	605 Clay st
Johns & M Co	Washee	22	2 00	May 12	June 14	July 10	A D Carpenter	419 California st
Klickerbocker M Co	Washee	12	1 30	April 27	May 29	June 18	J H Sagre	Stevenson's Bldg
Lady Bryan M Co	Washee	7	1 00	May 10	June 10	June 29	F Swift	419 California st
Lady Washington M Co	Washee	3	50	April 17	May 21	June 8	H O Kibbe	419 California st
Lehigh S M Co	Washee	10	1 00	May 14	June 15	June 8	Wm H Watson	402 Montgomery st
Nevada Land & M Co	Elko Co Nev	17	70	May 14	June 19	June 8	Wm H Watson	302 Montgomery st
New York Cons M Co	Washee	13	1 00	April 22	May 25	June 12	H O Kibbe	419 California st
New York N Co	Washee	4	1 00	April 22	May 25	June 12	H O Kibbe	419 California st
North Hill & M Co	Washee	19	2 00	April 19	May 19	June 8	J H Wrensend	419 California st
Opbit S M Co	Washee	29	2 00	May 14	June 17	July 8	J Marks	419 California st
Piccone S M Co	Ely District	9	1 00	May 3	June 10	July 1	C E Elliott	419 California st
Raymond & Ely M Co	Pioche	4	5 00	April 1	May 10	June 9	J W Cohnun	419 California st
Rock Hill & S M Co	Washee	5	1 00	April 21	May 21	June 9	E W Clark	419 California st
Savage M Co	Washee	8	5 00	April 27	May 31	June 16	E B Holmes	419 California st
Sierra Nevada S M Co	Washee	41	1 00	May 3	June 5	June 21	R Wegener	414 California st
Silver Cord S M Co	Idaho	9	1 00	April 24	May 31	June 24	O B Higgins	402 Montgomery st
Sierra Nevada & S M Co	Washee	11	50	May 12	June 12	June 24	J H Wrensend	419 California st
Suopar M & M Co	Washee	11	50	April 8	May 13	June 3	W H Watson	302 Montgomery st
Woodville Cons S M Co	Washee	1	1 00	Mar 25	April 23	May 17	M W Helman	401 California st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

SOUTHERN CALIFORNIA				THE ELK				THE COMB			
Alhambra Q M Co	Sonoma Co	Cal	1	5	May 10	June 10	June 16	R V Von Pfister	Merchants' E		
Alhambra Belcher Quicksilver M Co	Cal		1	20	April 10	June 10	June 31	J R Huntington	Merchants' E		
Benjamin M & M Co	Lyon Co	Nevada	2	10	April 14	May 22	June 14	L Leavitt	401 California		
Oherokee Flat Blue Gravel M Co	Cal	34	5	5	April 23	May 29	June 19	O H Bogart	402 Montgomery		
Chicago Quicksilver M Co	Washe		10	10	April 9	May 10	May 31	G R Cottrell	310 Kearny		
Chrysophylls G & S M Co	Cal		10	10	May 10	June 10	June 29	A Noel	311 Kearny		
Co & S Co	Grass Valley Co	Cal	10	10	May 23	June 10	June 29	J S Caldwell	531 California		
Combination G & S M Co	Inyo Co	Cal	6	10	April 22	May 27	June 18	D Wilder	Merchants' E		
Cherry Creek M & M Co	Nev	3	25	May 18	June 21	July 15	D F Verdenal	409 California			
Cordillera O & S M Co	Mexico			10	May 8	June 18	June 17	Henry R Reed	321 Washington		
E D Baker & Co	Cal		1	25	April 26	June 10	June 10	J E Leavelle	412 Kearny		
Empire & Middleton Cons Q M Co	Cal	1	10	10	April 17	May 23	June 17	G R Giley	432 Montgomery		
Equitable Tunnel & M Co	Utah	10	25	May 12	June 16	July 7	C S Healy	Merchants' E			
Florence M & M Co	Humboldt Co	Cal	2	10	May 15	June 10	July 7	J E Delevan	220 Montgomery		
Golden Run M Co	Nevada Co	Cal	11	15	April 7	May 10	June 22	O O Palmer	302 Montgomery		
Golden Gate M Co	Utah	1	5	5	April 28	June 1	June 22	H B Congdon	41 Market		
Illinois Central M Co	Idaho	3	15	May 21	June 21	July 12	R H Brown	402 Montgomery			
Lake & Co	Grass Valley Co	Cal	2	50	April 9	May 13	June 5	J H Baird	316 California		
Magenta S M Co	Grass Valley Co	Cal	2	50	April 9	May 13	June 1	L Kaplan	Merchants' E		
Mariposa L & M Co	Cal	1	100	May 10	May 12	June 5	L Leavitt	401 California			
Mariposa & Walling M & M Co	Cal		50	April 24	May 15	June 17	B H Hickox	408 California			
Missouri M Co	Sonoma Co	Cal	1	25	April 17	May 19	June 7	F H Rogers	320 Pine		
Monumental M Co	Washe	1	25	April 17	May 19	June 7	W R Townsend	320 Pine			
Minnie Tunnel & M Co	Utah	1	5	5	April 28	June 1	June 22	H B Congdon	Merchants' E		
North Carson S M Co	Cal		25	May 12	June 16	July 7	Thomas Leigh	416 California			
New York Tunnel & M Co	Washe	13	10	April 22	May 22	June 7	O K Kibbe	419 California			
North Highland Gravel M Co	Cal	37	100	April 22	May 25	June 6	Thos Barber	323 California			
Omega Table Mt M Co	Cal	5	15	April 30	June 5	June 28	D Wilder	Merchants' E			
Orleans M Co	Oras Valley Co	Cal	4	100	April 27	June 1	June 22	Geo P Thurston	315 California		
Pioneer Cons M Co	Eureka Nev	3	10	May 18	June 21	July 18	O S Neal	419 California			
Pioneer Cons M Co	Idaho	7	100	May 18	June 25	July 25	W H Davis	323 California			
Rooky Bar M Co	Washe	7	10	April 22	May 27	June 17	J P Cavalieri	513 California			
Silver Central Cons M Co	Washe	1	5	May 10	June 15	July 5	L Hermann	330 Pine			
Silver Sprout M Co	Cal		5	5	April 17	June 17	June 17	T B Wingard	318 California		
St. Giovanni S M Co	Cal	2	10	May 15	June 20	June 20	D Wilder	Merchants' E			
St. Helena G & S M Co	Napa Co	Cal	1	20	April 17	May 20	June 10	R V Von Pfister	Merchants' E		
St. Paul G & S M Co	Napa Co	Cal	1	10	April 17	May 20	June 10	R V Von Pfister	Merchants' E		
Starr King S M Co	Elko Co	Nevada	11	25	May 21	June 21	July 1	L Kaplan	Merchants' E		
Union Gravel M Co	Nevada Co	Cal	10	100	May 8	June 14	July 7	T Derby	320 California		
Virginia Cons M Co	Inyo Co	Cal	10	10	April 21	June 1	June 28	T B Wingard	318 California		
Weaverville D & H M Co	Cal	6	100	May 4	June 1	June 7	F H Rogers	320 Pine			
Weaverville G & S M Co	Washe	3	10	May 19	June 23	July 23	E B Montgomery	421 Montgomery			
Wyoming G M Co	Nevada Co	Cal	6	35	May 11	June 12	June 30	M B Buffington	311 California		
Zacatero G M Co	Calaveras Co	Cal	3	10	April 27	June 3	June 24	L Hermann	Merchants' E		

MEETINGS TO BE HELD.

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Arizona S M Co	Washeo	Wm Miles	419 California st	Annual	June
Bacon M & M Co	Washeo	Ed May	419 California st	Annual	June
Crown Point G & S M Co	Washeo	C O Elliott	419 California st	Annual	June
Crown Point S M Co	Washeo	Chas E Elliott	419 California st	Annual	June
Cherry Creek M & M Co	Nevada	D F Verdenal	409 California st	Annual	June
Clune M Co	Nevada	J Campbell	232 California st	Annual	June
Elmore Hill Hydraulic M Co	Cal	W B Blow	411 1/2 California st	Annual	June
Lady Bryan M Co	Washeo	Called by Trustees	419 California st	Special	June
Rye Patch Cons M & M Co	Nevada	D F Verdenal	419 California st	Annual	June
Mammoth S M Co	White Pine Co	D A Jennings	401 California st	Annual	June
Mineral Fork M & S Co	Utah	R B Neys	419 California st	Annual	June
Miser's Dream S M Co		W F R Schindler	535 California st	Annual	May
Monumental M Co		W R Townsend	230 Pine st	Annual	June
Mount Savage M Co	Nevada	D F Verdenal	409 California st	Annual	June
Silver Hill M Co	Nevada	W E Dean	419 California st	Annual	May
Wheeler M Co	Washeo	J Campbell	232 California st	Annual	June

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.				Amount.	Payable.
Name of Co.	Location.	Secretary.	Office in S. F.		
Belcher M. Co.	Washeo.	H. O. Kibbe.	419 California st	3 00	Jan
Black Bear Quartz	Cal	W L Oliver		25	May
Barstow M & M Co	Cal	Frank Swift	419 California st	10 00	May
Cons Virginia M Co	Washeo	Charles H Fish	401 California st	10 00	May
Crown Point M Co	Washeo	C O Elliott	414 California st	2 00	Jan
Diana M Co		N. C. Fasset.	226 Clay st	1 00	Jan
Emp M Co.	Cal	D A Jennings	401 California st	50	May
Enreka Consolidated M Co	Nev	W W Traylor	419 California st	1 00	Mo
Excelsior M & M Co		Frank Swift	419 California st	1 50	April
Jefferson S M Co	Nevada	J A Sankow	331 Montgomery st	1 00	May
Blackblott S M Co	Nevada	Chas S Neal	419 California st	1 00	May
Rye Patch M Co	Nevada	D F Verdenal	409 California st	50	May

METALS.

[WHOLESALE.]

WEDNESDAY M., May 26, 1875.

American Pig Iron, $\frac{3}{4}$ ton		@	45 00
Scotch Pig Iron, $\frac{3}{4}$ ton	46	@	43 00
White Pig, $\frac{3}{4}$ ton		@	46 00
Oregon Pig, $\frac{3}{4}$ ton		@	46 00
Best mixed assortment, $\frac{3}{4}$ d.		@	46 00
Refined Bar good assortment, $\frac{3}{4}$ d.		@	46 00
Builder, No. 1 to 4		@	46 00
State, No. 5 to 8		@	46 00
Sheet, No. 10 to 20		@	46 00
Sheet, No. 16 to 20	54	@	54 00
Sheet, No. 22 to 24	62	@	62 00
Sheet, No. 26 to 28	62	@	62 00
Horse Shoes, per keg.		@	8 00
Nail Rod.	7	@	7 00
Norway Iron		@	6 00
Rolled Iron		@	6 00
Other Irons for Blacksmiths, Miners, etc.		@	4 00
COPPER.			
Braziers	35	@	35 00
Copper Tin d.	37 1/2	@	40 00
O'Neil's Pat.	41	@	40 00
Sheathing, $\frac{3}{4}$ d.	40	@	24 00
Sheathing, Yellow.	40	@	24 00
Sheathing, Old Yellow		@	12 00
Composition Nails.	24	@	24 00
Composition Bolts.	20	@	25 00
English Galv. $\frac{3}{4}$ d.	20	@	25 00
Anderson & Woods' American Cast.		@	16 00
Drill	18	@	16 00
Flat Bar.	9	@	10 00
Flat Pig.	9	@	10 00
TIN PLATES.			
10x14 I O Charcoal.	12 00	@	12 50
10x14 X Charcoal.	14 00	@	14 50
Roofing Plate I O Charcoal.	11 00	@	11 50
Ranca Tin.	30	@	32 00
Australian.	28	@	30 00
Zinc, 36 by 36.	28	@	30 00
Zinc, Sheet 33 ft No 1 to 10 $\frac{3}{4}$ d.		@	11 00
do do 33 ft No 11 to 14		@	11 00
do do 33 ft No 15 to 18		@	11 00
do do 33 ft No 19 to 22		@	11 00
do do 33 ft No 23 to 26		@	11 00
do do 33 ft No 27 to 30		@	11 00
do do 33 ft No 31 to 34		@	11 00
do do 33 ft No 35 to 38		@	11 00
do do 33 ft No 39 to 42		@	11 00
do do 33 ft No 43 to 46		@	11 00
do do 33 ft No 47 to 50		@	11 00
do do 33 ft No 51 to 54		@	11 00
do do 33 ft No 55 to 58		@	11 00
do do 33 ft No 59 to 62		@	11 00
do do 33 ft No 63 to 66		@	11 00
do do 33 ft No 67 to 70		@	11 00
do do 33 ft No 71 to 74		@	11 00
do do 33 ft No 75 to 78		@	11 00
do do 33 ft No 79 to 82		@	11 00
do do 33 ft No 83 to 86		@	11 00
do do 33 ft No 87 to 90		@	11 00
do do 33 ft No 91 to 94		@	11 00
do do 33 ft No 95 to 98		@	11 00
do do 33 ft No 99 to 102		@	11 00
do do 33 ft No 103 to 106		@	11 00
do do 33 ft No 107 to 110		@	11 00
do do 33 ft No 111 to 114		@	11 00
do do 33 ft No 115 to 118		@	11 00
do do 33 ft No 119 to 122		@	11 00
do do 33 ft No 123 to 126		@	11 00
do do 33 ft No 127 to 130		@	11 00
do do 33 ft No 131 to 134		@	11 00
do do 33 ft No 135 to 138		@	11 00
do do 33 ft No 139 to 142		@	11 00
do do 33 ft No 143 to 146		@	11 00
do do 33 ft No 147 to 150		@	11 00
do do 33 ft No 151 to 154		@	11 00
do do 33 ft No 155 to 158		@	11 00
do do 33 ft No 159 to 162		@	11 00
do do 33 ft No 163 to 166		@	11 00
do do 33 ft No 167 to 170		@	11 00
do do 33 ft No 171 to 174		@	11 00
do do 33 ft No 175 to 178		@	11 00
do do 33 ft No 179 to 182		@	11 00
do do 33 ft No 183 to 186		@	11 00
do do 33 ft No 187 to 190		@	11 00
do do 33 ft No 191 to 194		@	11 00
do do 33 ft No 195 to 198		@	11 00
do do 33 ft No 199 to 202		@	11 00
do do 33 ft No 203 to 206		@	11 00
do do 33 ft No 207 to 210		@	11 00
do do 33 ft No 211 to 214		@	11 00
do do 33 ft No 215 to 218		@	11 00
do do 33 ft No 219 to 222		@	11 00
do do 33 ft No 223 to 226		@	11 00
do do 33 ft No 227 to 230		@	11 00
do do 33 ft No 231 to 234		@	11 00
do do 33 ft No 235 to 238		@	11 00
do do 33 ft No 239 to 242		@	11 00
do do 33 ft No 243 to 246		@	11 00
do do 33 ft No 247 to 250		@	11 00
do do 33 ft No 251 to 254		@	11 00
do do 33 ft No 255 to 258		@	11 00
do do 33 ft No 259 to 262		@	11 00
do do 33 ft No 263 to 266		@	11 00
do do 33 ft No 267 to 270		@	11 00
do do 33 ft No 271 to 274		@	11 00
do do 33 ft No 275 to 278		@	11 00
do do 33 ft No 279 to 282		@	11 00
do do 33 ft No 283 to 286		@	11 00
do do 33 ft No 287 to 290		@	11 00
do do 33 ft No 291 to 294		@	11 00
do do 33 ft No 295 to 298		@	11 00
do do 33 ft No 299 to 302		@	11 00
do do 33 ft No 303 to 306		@	11 00
do do 33 ft No 307 to 310		@	11 00
do do 33 ft No 311 to 314		@	11 00
do do 33 ft No 315 to 318		@	11 00
do do 33 ft No 319 to 322		@	11 00
do do 33 ft No 323 to 326		@	11 00
do do 33 ft No 327 to 330		@	11 00
do do 33 ft No 331 to 334		@	11 00
do do 33 ft No 335 to 338		@	11 00
do do 33 ft No 339 to 342		@	11 00
do do 33 ft No 343 to 346		@	11 00
do do 33 ft No 347 to 350		@	11 00
do do 33 ft No 351 to 354		@	11 00
do do 33 ft No 355 to 358		@	11 00
do do 33 ft No 359 to 362		@	11 00
do do 33 ft No 363 to 366		@	11 00
do do 33 ft No 367 to 370		@	11 00
do do 33 ft No 371 to 374		@	11 00
do do 33 ft No 375 to 378		@	11 00
do do 33 ft No 379 to 382		@	11 00
do do 33 ft No 383 to 386		@	11 00
do do 33 ft No 387 to 390		@	11 00
do do 33 ft No 391 to 394		@	11 00
do do 33 ft No 395 to 398		@	11 00
do do 33 ft No 399 to 402		@	11 00
do do 33 ft No 403 to 406		@	11 00
do do 33 ft No 407 to 410		@	11 00
do do 33 ft No 411 to 414		@	11 00
do do 33 ft No 415 to 418		@	11 00
do do 33 ft No 419 to 422		@	11 00
do do 33 ft No 423 to 426		@	11 00
do do 33 ft No 427 to 430		@	11 00
do do 33 ft No 431 to 434		@	11 00
do do 33 ft No 435 to 438		@	11 00
do do 33 ft No 439 to 442		@	11 00
do do 33 ft No 443 to 446		@	11 00
do do 33 ft No 447 to 450		@	11 00
do do 33 ft No 451 to 454		@	11 00
do do 33 ft No 455 to 458		@	11 00
do do 33 ft No 459 to 462		@	11 00
do do 33 ft No 463 to 466		@	11 00
do do 33 ft No 467 to 470		@	11 00
do do 33 ft No 471 to 474		@	11 00
do do 33 ft No 475 to 478		@	11 00
do do 33 ft No 479 to 482		@	11 00
do do 33 ft No 483 to 486		@	11 00
do do 33 ft No 487 to 490		@	11 00
do do 33 ft No 491 to 494		@	11 00
do do 33 ft No 495 to 498		@	11 00
do do 33 ft No 499 to 502		@	11 00
do do 33 ft No 503 to 506		@	11 00
do do 33 ft No 507 to 510		@	11 00
do do 33 ft No 511 to 514		@	11 00
do do 33 ft No 515 to 518		@	11 00
do do 33 ft No 519 to 522		@	11 00
do do 33 ft No 523 to 526		@	11 00
do do 33 ft No 527 to 530		@	11 00
do do 33 ft No 531 to 534		@	11 00
do do 33 ft No 535 to 538		@	11 00
do do 33 ft No 539 to 542		@	11 00
do do 33 ft No 543 to 546		@	11 00
do do 33 ft No 547 to 550		@	11 00
do do 33 ft No 551 to 554		@	11 00
do do 33 ft No 555 to 558		@	11 00
do do 33 ft No 559 to 562		@	11 00
do do 33 ft No 563 to 566		@	11 00
do do 33 ft No 567 to 570		@	11 00
do do 33 ft No 571 to 574		@	11 00
do do 33 ft No 575 to 578		@	11 00
do do 33 ft No 579 to 582		@	11 00
do do 33 ft No 583 to 586		@	11 00
do do 33 ft No 587 to 590		@	11 00
do do 33 ft No 591 to 594		@	11 00
do do 33 ft No 595 to 598		@	11 00
do do 33 ft No 599 to 602		@	11 00
do do 33 ft No 603 to 606		@	11 00
do do 33 ft No 607 to 610		@	11 00
do do 33 ft No 611 to 614		@	11 00
do do 33 ft No 615 to 618		@	11 00
do do 33 ft No 619 to 622		@	11 00
do do 33 ft No 623 to 626		@	11 00
do do 33 ft No 627 to 630		@	11 00
do do 33 ft No 631 to 634		@	11 00
do do 33 ft No 635 to 638		@	11 00
do do 33 ft No 639 to 642		@	11 00
do do 33 ft No 643 to 646		@	11 00
do do 33 ft No 647 to 650		@	11 00
do do 33 ft No 651 to 654		@	11 00
do do 33 ft No 655 to 658		@	11 00
do do 33 ft No 659 to 662		@	11 00
do do 33 ft No 663 to 666		@	11 00
do do 33 ft No 667 to 670		@	11 00
do do 33 ft No 671 to 674		@	11 00
do do 33 ft No 675 to 678		@	11 00
do do 33 ft No 679 to 682		@	11 00
do do 33 ft No 683 to 686		@	11 00
do do 33 ft No 687 to 690		@	11 00
do do 33 ft No 691 to 694		@	11 00
do do 33 ft No 695 to 698		@	11 00
do do 33 ft No 699 to 702		@	11 00
do do 33 ft No 703 to 706		@	11 00
do do 33 ft No 707 to 710		@	11 00
do do 33 ft No 711 to 714		@	11 00
do do 33 ft No 715 to 718		@	11 00
do do 33 ft No 719 to 722		@	11 00
do do 33 ft No 723 to 726		@	11 00
do do 33 ft No 727 to 730		@	11 00
do do 33 ft No 731 to 734		@	11 00
do do 33 ft No 735 to 738		@	11 00
do do 33 ft No 739 to 742		@	11 00
do do 33 ft No 743 to 746		@	11 00
do do 33 ft No 747 to 750		@	11 00
do do 33 ft No 751 to 754		@	11 00
do do 33 ft No 755 to 758		@	11 00
do do 33 ft No 759 to 762		@	11 00
do do 33 ft No 763 to 766		@	11 00
do do 33 ft No 767 to 770		@	11 00
do do 33 ft No 771 to 774		@	11 00
do do 33 ft No 775 to 778		@	11 00
do do 33 ft No 779 to 782		@	11 00
do do 33 ft No 783 to 786		@	11 00
do do 33 ft No 787 to 790		@	11 00
do do 33 ft No 791 to 794		@	11 00
do do 33 ft No 795 to 798		@	11 00
do do 33 ft No 799 to 802		@	11 00
do do 33 ft No 803 to 806		@	11 00
do do 33 ft No 807 to 810		@	11 00
do do 33 ft No 811 to 814		@	11 00
do do 33 ft No 815 to 818		@	11 00
do do 33 ft No 819 to 822		@	11 00
do do 33 ft No 823 to 826		@	11 00
do do 33 ft No 827 to 830		@	11 00
do do 33 ft No 831 to 834		@	11 00
do do 33 ft No 835 to 838		@	11 00
do do 33 ft No 839 to 842		@	11 00
do do 33 ft No 843 to 846		@	11 00
do do 33 ft No 847 to 850		@	11 00
do do 33 ft No 851 to 854		@	11 00
do do 33 ft No 855 to 858		@	11 00
do do 33 ft No 859 to 862		@	11 00
do do 33 ft No 863 to 866		@	11 00
do do 33 ft No 867 to 870		@	11 00
do do 33 ft No 871 to 874		@	11 00
do do 33 ft No 875 to 878		@	11 00
do do 33 ft No 879 to 882		@	11 00
do do 33 ft No 883 to 886		@	11 00
do do 33 ft No 887 to 890		@	11 00
do do 33 ft No 891 to 894		@	11 00
do do 33 ft No 895 to 898		@	11 00
do do 33 ft No 899 to 902		@	11 00
do do 33 ft No 903 to 906		@	11 00
do do 33 ft No 907 to 910		@	11 00
do do 33 ft No 911 to 914		@	11 00
do do 33 ft No 915 to 918		@	11 00
do do 33 ft No 919 to 922		@	11 00
do do 33 ft No 923 to 926		@	11 00
do do 33 ft No 927 to 930		@	11 00
do do 33 ft No 931 to 934		@	11 00
do do 33 ft No 935 to 938		@	11 00
do do 33 ft No 939 to 942		@	11 00

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SOLENTI PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch, Dated Washington, D. C., May 25th, 1875.

FOR WEEK ENDING MAY 11TH, 1875.

WAGON-BRAKE BLOCK.—George G. Beckland, Milton, Cal.

FREEDER FOR TRESHING MACHINES.—Byron Jackson, Woodland, Cal.

DISTRIBUTOR FOR FREEDING BELTS OF TRESHING MACHINES.—Byron Jackson, Woodland, Cal.

FOLDING OAR-LOCK.—Augustus W. Thornton, of Oakland, Cal., and Martin Vice, of S. F., Cal.

ROASTING APPARATUS.—Louis Duterte, S. F., Cal.

PAYMENT.—Louis Duterte, S. F., Cal.

SINGLE RAIL RAILWAY CAR.—Chandler McWayne, Colfax, Cal.

BROOM-HANDLE SOCKET.—John H. Pitts, S. F., Cal.

TRADE-MARKS.

FOR WHISKY.—Lilienthal & Co., S. F., Cal.

FOR WATCHES.—John W. Tucker (two cases), S. F., Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. NOTE.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific Coast inventors transacted with perfect security and in the shortest possible time.

General News Items.

The seat for Tipperary has been awarded to Moore, opponent of the late John Mitchell, on the ground that the latter was not entitled to an election, as he had forfeited his allegiance to the crown.

JEREMIAH HAMILTON, the well-known colored speculator of Wall street, formerly a slave in the West Indies, is dead. He was said to be the richest colored man in the United States—worth a million dollars.

PREDETERMINISM has found a new disciple in Daniel O'Leary, who has just finished, at Chicago, a walk of 500 miles, which he accomplished in the unparalleled time of 153 hours.

SENATOR Booth was serenaded at the Grand Hotel on Wednesday evening of last week and made a speech defining his political position.

PERMISSION has been granted the Southern Memorial Association to visit Arlington cemetery on June 1st, for the purpose of decorating the graves of the Confederate dead.

FRONDE, JAMES ANTHONY has been talking up South Africa and now the Government sends him out there on public service.

THE Nevada Bank of San Francisco, an outgrowth of the bonanza, has been incorporated, with a capital of \$5,000,000.

By a great fire at Osceola, Pa., last week, 400 families were rendered homeless and an immense amount of property was destroyed.

A DECREE affirming freedom of discussion and of the press, within certain bounds, has been promulgated in Spain.

THE Centennial of the Mecklenburg Declaration of Independence was celebrated in Charlotte, N. C., on the 20th inst.

A PROMINENT lawyer of Boston has disappeared with \$160,000 held in trust by him for different parties.

LIEUTENANT J. L. CLEM, known as "The Little Drummer Boy of Chicamega," was married to Miss Fitch, of Baltimore, last Monday.

A PLOT to arm the inmates of the Oregon State prison preparatory to a general escape has been frustrated.

GENERAL SHERMAN'S Memoirs, just published, are creating a decided sensation in military circles.

No developments yet as to the perpetrator of the Amador County Treasury safe robbery.

J. C. LAMAR, the oldest resident of Yosemite, died in his cabin in the valley last Monday.

ARTICLES of incorporation of the San Francisco News company have been filed.

HILL BEACHY, an old pioneer and well known on this coast died, last Monday.

PAUL BOYNTON is to make another attempt to cross the English channel.

The business portion of Milton was burned last Thursday night.

MRS. ABRAHAM LINCOLN has been committed to an insane asylum.

FOURTEEN lives were lost by the shipwreck in the Gulf of St. Lawrence.

THREE persons died of starvation in Cooper county, Missouri, last week.

A \$50,000 fire in Minneapolis, Minnesota, last Monday.

THE Pennsylvania miners' strike is practically at an end.

THE San Francisco Fire Petrol is now ready or duty.

Two earthquakes in Santa Berhere last week.

New Incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

SPRING CREEK DITCH & M. Co.—May 14. Trustees—P. H. Kramer, R. E. Brewster, E. Green, J. L. E. Kelly and Joseph Messinger. Capital, \$5,000,000. CON. COMPTON & S. M. Co.—May 14. Trustees—John Scario, Charles S. Peck, H. W. Plummer, F. W. Reynolds and Holland Smith. Capital, \$500,000.

CARDUETTER GAS MACHINE Co.—May 14. Trustees—Charles F. Webster, John O. Henderson, Marshall Pierce, F. E. Monteverde and D. P. Barstow. Capital, \$500,000. CON. COMPTON & S. M. Co.—May 14. Trustees—S. E. Holcombe, H. J. Craven, O. E. Bogert, W. W. Hickles and Dennis Heagerty. Capital, \$10,000,000.

HAMSTON M. Co.—Location: Eureka, Nev. Trustees—G. F. Lewton, S. P. Donney, Geo. F. Bragg, U. D. O'Sullivan and John A. Pastore. Capital stock, \$500,000.

KAN RIVER LAND AND CANAL Co.—May 20. Object: To construct a canal for water, more or less, and four feet deep, from a point on Kern river, near the railroad bridge, Kern county, extending thence to Tulare Lake, for irrigating, manufacturing, commercial and mining purposes; to buy and sell, lease and otherwise acquire lands and manage the same; to raise, buy and sell live stock, and generally to engage in every kind of business pertaining to canals, agricultural, timber, mineral or grazing lands. Trustees—W. H. Baxter, William Holden, J. P. Moore, O. P. Calloway, J. A. Robinson, Charles F. Brown and E. W. Scott. Capital stock, \$500,000; shares, \$100.

Scientific and Practical Books on Mining, Metallurgy, Etc.

Published or issued, wholesale and Retail, by DEWEY CO., MINING AND SCIENTIFIC PRESS OFFICE, S. F.

BY GUIDO KUSTEL, MINING ENGINEER AND METALLURGIST.

Roasting of Gold and Silver Ores, and the Extractions of their Respective Metals without Quick Silver. 1870.

This rare book on the treatment of gold and silver ores without quicksilver, is liberally illustrated and crammed full of facts. It gives short and concise descriptions of various processes and apparatus employed in this country and in Europe, and explains the why and wherefore.

It contains 143 pages, embracing illustrations of furnaces, implements and working apparatus. It is a work of great merit, by an author whose reputation is unsurpassed in his speciality. Price \$2.50 coin, or \$3 currency, postage free.

Concentration of Ores (of all kinds), including the Chlorination Process for Gold-bearing Sulphurets, Arseniurets, and Oold and Silver Ores generally, with 120 Lithographic Diagrams. 1867. This work is unequalled by any other published, embracing the subjects treated. Its authority is highly esteemed and regarded by its readers; containing, as it does, the most recent and successful methods of mining, Metallurgy, and other professional workers in ores and minerals, which cannot be found elsewhere in print. It also abounds throughout with facts and instructions rendered valuable by being clearly rendered together and in simple order. It contains 120 diagrams, illustrating machinery, etc., which alone are of the greatest value. PRICE REDUCED TO \$5.

Nevada and California Processes of Silver and Gold Extraction, for general use, and especially for the Mining Public of California and Nevada, with full explanations and directions for all metallurgical operations connected with silver and gold from a preliminary examination of the ore to the final casting of the ingot. Also, a description of the general metallurgy of silver ores. 1864.

As its title indicates, this work gives a wide range of information, applicable to all vein miners and workers in precious metals, affording hints and assistance of exceeding value to both the moderately informed and the most expert operator. Price, \$5 in cloth; \$6 in leather—coin.

BY OTHER AUTHORS.

The Quartz Operator's Hand-Book; by P. M. Randall. 1871. Revised and Enlarged Edition. Cloth bound, 175 pages. Price, \$2.

Sulphurets: What They Are, How Concentrated, How Assayed, and How Worked; with a Chapter on the Blow-Pipe Assay of Minerals. By Wm. M. Barstow, M. D. 1867. cloth bound, 114 pages. Printed and sold by DEWEY & CO., Price, \$1; postage free. The best written work, and most complete work on the subject treated. ANY OTHER BOOKS DESIRED will be furnished at the most reasonable rates by DEWEY & CO., Mining and Scientific Press Office, S. F.

The Large Circulation of the Mining and Scientific Press extends throughout

the mining districts of California, Nevada, Utah, Colorado, Arizona, Idaho, Montana, British Columbia and to other parts of North and South America. Established in 1860, it has long been the leading Mining Journal of the Continent. Its varied and reliable contents giving it a character popular with both its reading and advertising patrons.

PACIFIC RURAL PRESS,

A first-class 16-page Agricultural Home Journal, filled with fresh, valuable and interesting reading. Every farmer and ruralist should take it. It is immensely popular. Subscription, \$4 a year.

DEWEY & CO., Publishers, No. 224 Sansome street, SAN FRANCISCO.

SUBSCRIBERS are requested to examine the printed address on their papers. If mistakes occur at any time, please return them to this office. The last figures (at the extreme right) represent the year that your subscription is paid to. Next to these the day and month is represented. For instance, your subscription being paid to July 4th, 1876, it would be represented, viz: 7-4-76; or 4/176; or July 4, 76.

UNITED STATES

Mineral Land Laws, Revised Statutes, And Instructions and Forms Under the Same.

We have just issued a pamphlet containing the general mineral land laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1860; Mining Statute of July 9th, 1870. Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Register's Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Leases or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of MINING AND SCIENTIFIC PRESS, S. F.

N. B.—We have also added to the above publication, the REVISED STATUTES OF THE UNITED STATES, so far as relates to Mining Laws.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- J. L. THARP—San Francisco.
- B. W. CROWELL—California.
- A. C. ORAMPTON—Tulare, Fresno and Inyo Counties.
- D. J. JAMES—Auriferous Colonies.
- J. C. EWING—Contra-Costa County.
- JOHN ROBINSON—Merced County.
- W. C. QUINBY—Eastern and Western States.
- B. E. LLOYD—Nevada and Placer Counties.
- B. GOODWIN—California.
- A. C. KNOX, Southern California.
- C. W. MCGREW—Santa Clara county.
- L. E. MCCARTY—California.
- H. D. MORGAN—Santa Cruz County.
- J. W. RILEY—San Joaquin and Stanislaus Counties.
- ORAS. T. BELL—California, Oregon and W. T.

ANY PERSON receiving this paper after giving an order to stop it, may know that such order has failed to reach us; or that the paper is continued inadvertently, and they are earnestly requested to send written notice direct to us. We aim to stop the paper promptly when it is ordered discontinued.

RUSSELL'S OREGON PILE CURE.

To those suffering from Piles—External, Internal and Itching Piles: You can be cured, see hundreds of others have been. Send for Circular and see undoubted testimony. Will send sample bottle for \$2, or three bottles for \$5.

Call upon your Druggist, or address

DR. RUSSELL, No. 5 Post street, San Francisco.

Ames' Genuine Chester Emery

Has been reduced from seven cents to six cents per pound for grains in kegs, flour and fine flour remaining at four cents per pound, as heretofore. Important discounts to the trade. Send for circulars.

E. V. HAUGHWOUT & CO., 26 Beekman Street, New York.

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Have always on hand a large Stock of Bar and Bundle Iron, Sheet and Plate Iron, Boiler Plates, Gas and Water Pipe, Cast Steel, Plow and Shear Steel, Anvils, Cumberland Coal, Etc.

WM. MCCRINDLE, Manager, 23 & 24 Fremont St., S. F. m-2

Mining and Other Companies.

California Consolidated Mill and Mining Company.

Location of principal place of business, San Francisco, Cal. NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of April, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
Burke, T.	33	100	\$ 50 00
Burke, T.	34	50	25 00
Burke, T.	35	50	25 00
Hendy, Joshua.	84	70	35 00
Hendy, Joshua, Trustee.	73	24,550	12,275 00
Hendy, Joshua, Trustee.	73	2,116	1,058 00
Kendon, John.	80	50	25 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of April, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the company, 408 California street, room 10, on the 18th day of May, 1875, at the hour of 1 o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary. Office, Room 16, No. 408 California street, San Francisco, Cal.

POSTPONEMENT.—The above sale is postponed until Tuesday, the 15th day of June, 1875, at 2 o'clock P. M. By order of the Board of Directors. J. W. TRIPP, Secretary.

Carbon Coal Company—Principal place of business, San Francisco, California.

Location of principal place of business, Contra Costa County, California. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 1st day of May, 1875, an assessment of \$1.25 per share was levied upon the capital stock of the corporation, payable immediately, in United States gold and silver coin, to the Secretary, N. O. Fassett, No. 220 Clay street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the 14th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

N. O. FARRETT, Secretary. Office, No. 220 Clay street, San Francisco, California.

Cordillera Gold and Silver Mining Company.

Location of principal place of business, San Francisco, Cal. Location of works, Morelos Mining District, State of Chihuahua, Mexico. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 8th instant, an assessment of Ten cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, No. 321 Washington street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 15th day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the 30th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

HENRY R. REED, Secretary. Office, No. 321 Washington street, San Francisco, Cal.

Geneva Consolidated Silver Mining Company.

Principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, State of Nevada. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 18th day of May, 1875, an assessment of twenty-five cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, Room 14, 302 Montgomery street, San Francisco.

Any stock upon which this assessment shall remain unpaid on the 14th day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 30th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

L. T. MILLIKEN, Secretary. Office, Room 14, 302 Montgomery street, San Francisco, Cal.

Nevada Land and Mining Company.

Location of principal place of business, San Francisco, California. Location of works, Spruce Mountain Mining District, Elko County, State of Nevada. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 14th day of May, 1875, an assessment (No. 17) of Two cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, Rooms 3 and 6, No. 302 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on Saturday, the 19th day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Saturday, the 18th day of July, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.

WM. H. WATSON, Secretary. Office, Rooms 3 and 6, No. 302 Montgomery street, San Francisco, Cal.

Orleans Mining Company.—Location of principal place of business, San Francisco, California.

Location of works, Grass Valley Township, Nevada County, California. NOTICE is hereby given, that at a meeting of the Board of Trustees of said corporation, held on the 27th day of April, 1875, an assessment (No. 4) of one cent per share was levied upon the capital stock of said company, payable immediately, in gold coin of the United States of America, to the Secretary, at the office of the company, room 6, No. 315 California street, San Francisco, California.

Any stock upon which said assessment shall remain unpaid on Tuesday, the 1st day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Tuesday, the 22d day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

GEO. E. THURSTON, Secretary. Office—Room 8, No. 315 California street, San Francisco, Cal.

Silver Sprout Mining Company.—Location of principal place of business, San Francisco, State of California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the seventeenth day of February, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

NAMES.	No. Certificate.	No. Shares.	Amount.
George Hearst.	42	2000	\$ 100 00
George Hearst.	83	580	29 00
John J. Mountain, Trustee.	66	100	5 00
John J. Mountain, Trustee.	67	100	5 00
John Mullen, Trustee.	140	3250	162 50
S. Davis, Trustee.	32	5000	250 00
A F Benard, Trustee.	103	29	1 45
A F Benard, Trustee.	108	100	5 00
Hermann Toelken, Trustee	61	100	5 00
Henry Boyle, Trustee.	57	2000	100 00
Henry Boyle, Trustee.	112	224	11 20
Henry Boyle, Trustee.	113	356	17 80

And in accordance with law, and an order of the Board of Directors, made on the 17th day of February, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the salesroom of Maurice Dore & Co., No. 326 Pine street, San Francisco, Cal., on the 17th day of June, 1875, at the hour of 12 o'clock M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

T. B. WINDARD, Secretary. Office, Room 13, No. 318 California street, San Francisco, Cal.

Umpire Tunnel and Mining Company.

Principal place of business, San Francisco, California. Location of works, Big Cottonwood District, Salt Lake County, Utah. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 30th day of May, 1875, an assessment of Five (5) cents per share was levied upon the capital stock of the corporation, payable immediately, in United States currency, to the Secretary, at the office of the company, No. 531 California street, San Francisco, Cal., or to the Superintendent.

Any stock upon which this assessment shall remain unpaid on the 1st day of July, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 26th day of August, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

WM. S. MALL, Secretary. Office, Room 1, No. 531 California street, San Francisco, California.

Virginia Consolidated M. Co.—Principal place of business, San Francisco, California.

Location of works, Kearsarge Mining District, Inyo county, State of California. NOTICE is hereby given, that at a meeting of the Board of Directors, held on the 21st day of April, 1875, an assessment of Five (5) cents per share was levied upon the capital stock of the corporation, payable immediately, in United States gold coin, to the Secretary, at the office of the company, in San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 1st day of June, 1875, will be delinquent and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 26th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

T. B. WINDARD, Secretary. Office, No. 318 California street, (room No. 13) San Francisco, California.

Iron and Machine Works.

San Francisco Boiler Works,

(Will Remove about June 1st, to N. W. Cor.
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123 and 126 Beale Street.....SAN FRANCISCO

F. I. CURRY,

Late Foreman of the Vulcan Iron Works, Proprietor

High and Low Pressure Boilers of all
Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED
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All kinds of JOBBING and REPAIRING promptly
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INCORPORATED.....APRIL 30, 1868.
CAPITAL.....\$1,000,000.

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Manufacturers of Steam Engines, Quartz and Flour
Mill Machinery, Steam Boilers (Marine, Locomotive
and Stationary), Marine Engines (High and Low Pres-
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WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary
24v17-07

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HINCKLEY & CO.,

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Hayes' Improved Steam Pump, Brodie's im-
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Amalgamators, and all kinds
of Machinery.

N. E. corner of Tehama and Fremont streets, above How-
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MANUFACTURERS OF

STEAM ENGINES, BOILERS,
CROSS' PATENT BOILER FEEDER AND SEDIMENT
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Dunbar's Patent Self-Adjusting Steam Piston
PACKING, for new and old cylinders.

And all kinds of Mining Machinery.

Front Street, between N and O streets,
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SHEET IRON PIPE.

THE

Risdon Iron and Locomotive Works

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Are prepared to make SHEET IRON AND ASPHALTUM
PIPE, of any size and for any pressure, and contract to
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Standard sizes of railroad Car Wheels, with special
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wheels made in this State.

All kinds of Machinery made and repaired.

24v22-3m JOSEPH MOORE, Superintendent.

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Manufacturers of Quartz and Amalgamating Machinery,
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Steam Engines constantly on hand for sale. 9v28-ly

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PNEUMATIC DRILLING MACHINES,

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Randol and Wright's Quicksilver Purifying Apparatus.

For Description see MINING AND SCIENTIFIC PRESS, November 7th, 1874.

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Patented July 28th, 1874. See MINING AND SCIENTIFIC PRESS, September 19th, 1874.

FIEDLER'S QUICKSILVER CONDENSERS,

MADE OF IRON.

Patented February 24th, 1874. See MINING AND SCIENTIFIC PRESS, November 15th, 1873.

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Ira P. Rankin. Established 1850. A. P. BRAYTON

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Heavy Forging Boilers, Stationary
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MANUFACTURERS OF

Steam Engines and all kinds of Mill
and Mining Machinery.

Also manufacture and keep constantly on hand a
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Improved Portable Hoisting Engines,

From Ten (10) to Forty (40) Horse Power.

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cident and French Ranges, Burial Caskets, Grates and
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and DIES a specialty. Ornamental Fences in large
variety. 4v30-1yr.

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ALL KINDS OF Brass, Composition, Zinc, and Babbitt Meta
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and Gunpowder superior tone. All kinds of Cocks and Valves, Hy-
draulic Pipes and Nozzles, and Hose Couplings and Connec-
tions of all sizes and patterns, furnished with dispatch
AT PRICES MODERATE. V. KINGWELL

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BOILER MAKERS AND GENERAL MACHINISTS,

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Golden State Iron Works.

(CO-OPERATIVE.)

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19 to 25

FIRST STREET, SAN FRANCISCO,

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Iron Castings and Machinery

OF ALL KINDS.

Stevenson's Patent Mould-Board Pan

THE BEST IN USE.

QUICKSILVER FURNACES, CONDEN-
SERS, &c.

Having much experience in the business of the Re-
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The Phelps' Manufacturing Co.,

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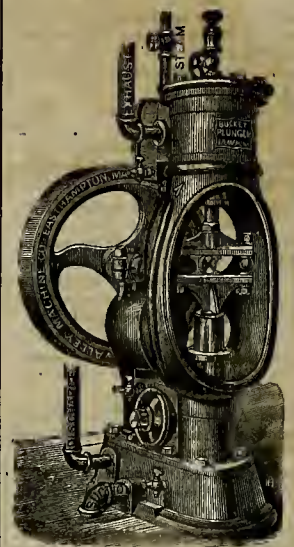
Of all sizes—from 2 to 60-Horse power. Also, Quartz
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310 California street, San Francisco



Sole Agents for WRIGHTS
BUCKET-PUNGER STEAM PUMP.
ALWAYS RELIABLE.

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IRON CASTINGS of all descriptions at short notice.

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Screenings.

NOTICE.—Particular attention paid to making Supe-
rior Shoes and Dies. 20v25-3m

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Rolling Mill Company,

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RAILROAD AND OTHER IRON

Every Variety of Shafting.

Embracing ALL SIZES of

Steamboat Shafts, Cranks, Piston and Con-
necting Rods, Car and Locomotive Axles
and Frames

— ALSO —

HAMMERED IRON

Of every description and size

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COMPANY, P. O. box 2022, San Francisco, Cal., will re-
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The highest price paid for Scrap Iron.

California Machine Works,

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BIRCH, ARGALL & CO.,

Builders of QUARTZ, SAW AND FLOUR MILLS

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THE ECONOMY HYDRAULIC HOIST FOR STONES,
And General Machinists. 25v28-3m

THOMPSON BROTHERS, EUREKA FOUNDRY,

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LIGHT AND HEAVY CASTINGS,

of every description, manufactured. 2v16cr

Miners' Foundry and Machine Works,

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Machinery and Castings of all kinds.

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Hydraulic Pipe,

AND

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Having the Latest Improved Machinery, we can make
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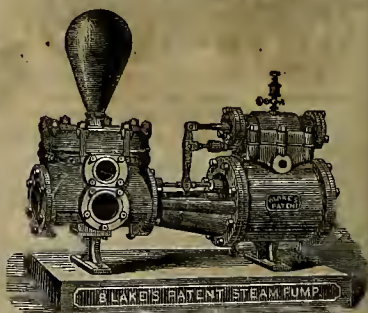
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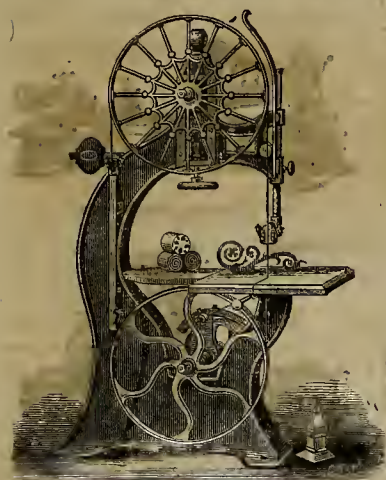
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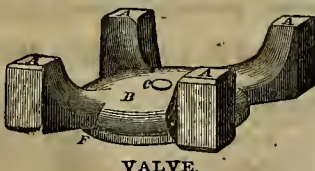
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JUNE 5, 1875.

VOLUME XXX
Number 23.

Short Lectures on Patents.

No. 7.—By Jno. L. Boone, of Dewey & Co's Mining and Scientific Press Patent Agency.

Caveats.

It is seldom that an inventor conceives an idea and at the same time conceives the best method of carrying it into effect. Usually the main idea comes first, and little by little the method of operation develops itself. The caveat is intended to protect the inventor during the period which ensues between the conception of the main idea and its embodiment in a practical form. Many inventors do not understand the real object and effect of a caveat and there are some persons who do not even pronounce it correctly. One person recently asked what it would cost to file a "cavis," another wanted to file a "cravat," and still another thought that he must file a "cavity" in order to secure his inventions. These Partingtonisms, however, are of rare occurrence.

A caveat is a document addressed to the Commissioner of Patents, giving notice that the caveator, or person who files the caveat, is engaged in experimenting upon a certain plan, method, system, device, machine or combination with a view to applying for a patent on the same when it is perfected, and the caveat must describe the manner in which it is proposed to accomplish the end, with sufficient accuracy to enable the office to understand what the caveator proposes to do, and how he proposes to do it. This having been done, the law provides that in case another person should, while the caveat is in existence, apply for a patent which would interfere with the rights of the caveator, the Commissioner shall suspend action upon the application, notify the caveator and require him to file his application for a patent within a specified time. The two applications being now on file, it is an easy matter to determine whether any conflict exists between them or not. If there is a conflict an interference is declared and the parties are required to produce proof as to when each one made the invention, and the one who proves priority takes the patent. To use a homely phrase, a caveat is a watch dog that barks when his master's rights are in danger.

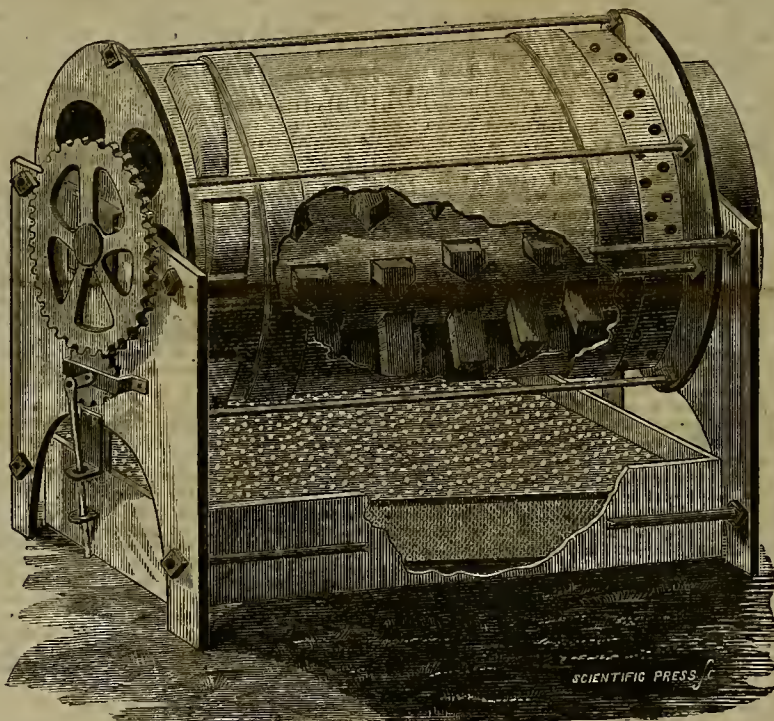
When a caveat is placed on file, no examination is made by the Patent Office as to the novelty or patentability of the invention. It is placed in a pigeon hole ready for reference, and if no conflicting application is filed during the year that it remains in force, it is never heard from afterwards. A person might file a caveat on a device that has been in use for fifty years; the Patent Office would take the fee, file the caveat and let it lie until it runs out. While a caveat is on file no one but the Examiners in the office, the caveator himself, or a person duly authorized by him, is allowed to examine its contents, hence it is called a secret paper. Formerly the caveator was allowed credit for a portion of the caveat fee when he applied for his patent, but this provision has long been abolished, and now the filing of a caveat entails an expense which is entirely separate from the application for a patent.

An impression seems to have obtained amongst a large number of inventors that they can secure their inventions by simply paying the caveat fee into the United States Sub-Treasury in this city, and receiving therefor a receipt, without any other formality, and that such a proceeding is equivalent to filing a caveat. The Sub-Treasury has nothing whatever to do with patents or inventions. The inventor may purchase Sub-Treasury certificates for the purpose of forwarding them to the Patent Office in payment of Government fees simply as a convenience, but the Patent Office prefers a postal order. In order to secure the protection provided by law, the inventor must file his caveat in the Patent Office, and nowhere else. The caveat does not begin to take effect until all of the papers are duly filed. The Patent Office returns to the inventor an official receipt sealed with the seal of the Patent Office and signed by the commissioner, and until this receipt is dated, the caveat does not begin to take effect. It some times happens

that an examiner overlooks a caveat and grants a patent on the same invention to another party while a caveat is on file. When this is done the caveator must apply for a patent within a reasonable time and demand an interference with the patent which has been granted. The Patent Office does not hold itself responsible for such oversights. Some times a caveat is on file in one department of the office while the substance of the invention is embodied in an application which is acted upon in another department. In such a case it would be impossible for the examiner in one department to know about the caveat in the other department, and the patent would be granted. When this is the case, the caveator, if he diligently files his application, will not be prejudiced by the prior application, and the interference will proceed the same as if neither party had a patent.

two countries in which a caveat system exists. In England they have a provisional protection, which only protects the inventor for six months, but which does not begin to compare with our caveats. Too many inventors take advantage of the privilege of filing a caveat to protect them after they have completed and perfected their inventions, and when they ought to apply for patents. In such cases a caveat is liable to do more harm than good, because the inventor must make oath, in order to file a caveat, that his invention is not complete. This would give a showing of priority in favor of any person who subsequently filed an application for a patent and produced proof that he had completed the invention prior to the filing of the caveat.

The office of a caveat being to protect a crude and imperfect invention, it requires considera-



McFARLAND'S PATENT DRY ORE CRUSHER.

"A caveator who neglects to apply for a patent for more than a year after another has obtained a patent for the same invention is presumed not to have completed it." (Com.'s decision, Hildebrand, 1869). The ground upon which this decision was made, was that the grant and issue of a patent was a public act, and the caveator was bound to take notice of it and to file his application within a reasonable time thereafter.

The law only provides for the filing of a caveat for one year, but it can be refiled one year after another by paying the proper fee, but each renewal is considered as a new caveat and not as an extension of the old one. If a caveator allows his caveat to run out and another party subsequently obtains a patent for the same invention, the right of the caveator to make use of his caveat in a contest for priority depends upon his diligence in making his application, for if he should not make immediate application, his caveat cannot help him. "A caveat is a secret proceeding which can only benefit the caveator if diligently followed up by the completion of his invention and the filing of his application." (Com.'s decision, 1869.)

The expense of filing a caveat is comparatively small and the legal requirements are few, so that it constitutes a cheap and ready means of protection to the inventor and experimenter. It relieves his mind of the fear that his discovery or invention will be appropriated by some one else, and leaves him free to experiment and direct his energies to the work of improving and perfecting.

Canada and the United States are the only

ble skill in its preparation. An improperly constructed caveat is inoperative, and is worse than nothing. It lulls the inventor into a feeling of security, and the confidence that he places in it is often "a cloud that hides the progress of his enemy." When properly employed and skillfully filed a caveat is the inventor's safeguard; without it he would be like the crow in the fable of the crow and the fox. Let him but open his mouth to explain and Reynard grabs up the prize and is off.

THE STATISTICIAN.—The May number of this excellent hand book contains one noticeable feature. We refer to the complete, accurate and admirably arranged list of postoffices in California, Oregon, the Pacific Coast Territories and British Columbia. By consulting this list the inquirer can ascertain at a glance the time of the arrival and closing of mails for any desired point. The other tables and the general fund of useful information it contains make the *Statistician* indispensable to the business man.

HEALD'S STRAW BURNING ENGINES.—Mr. J. L. Heald, of Vallejo, is building six straw burning engines of the following dimensions: cylinder, eight inches, twelve inch stroke, and sixteen-horse power; boiler nine feet six inches long, forty inches diameter, a twenty-four inch main flue, thirty-two two and one-fourth inch tubes seven feet long. Engine bolted on to side of boiler. Sheave governor and improved heater; adjustable exhaust. Some of the boilers of steel.

A New Style of Dry Ore Crusher.

The illustration on this page represents a new method of crushing dry quartz, which has been patented by J. M. McFarland, of Virginia, Nevada. The device is a novel one, the salient features of which may be seen by a glance at the engraving. A large horizontal iron cylinder is provided, through which a shaft passes, having its bearings in a suitable frame. Inside of this cylinder is another smaller iron cylinder which is bolted at each end to the ends of the main cylinder, both rotating simultaneously by means of the same shaft. The inner cylinder has slots cut in it at intervals, in which are inserted small peculiarly shaped stamps, or bars of iron with a stump head at each end. The cylinder is arranged a suitable distance from the outer cylinder, so as to give the stamps the requisite fall. The stamps as they approach the vertical line slide in the cylinder and strike a blow in the ore, and are then forced around by the cylinder and have a grinding effect. They strike two blows at each revolution. They are arranged as close together as they can be and work well, and strike a great number of blows to each revolution.

The outside cylinder is the ore holder into which the ore is fed at one end through the hopper shaped spouts and discharges through holes at the other end on to a screen, which is arranged to separate the fine particles and carry the coarse portion back to the head of the ore holder, to be delivered to it again for reworking if necessary. The cylinder has sufficient inclination to cause the ore to pass to the discharge openings.

The stamps consist of bars with steel heads, the bars and heads being considerably longer than the diameter of the cylinder which carries them, and arranged in diametrical holes or mortises in it, so as to project from the surface as close together as they can and slide freely to strike the blows. They slide endwise and fall into the ore in the bottom of the outer cylinder whenever they approach the vertical line; the end sliding down and striking the ore remains until it arrives near the top of the cylinder, when the bar slides again and the other end falls on the ore, and so on. A beveled shoulder on the stamp keeps it in position in its mortise until just at the proper moment, when it drops on the ore.

The screen shown under the apparatus has a shaking motion communicated to it by means of the device shown at the end of the machine. A toothed wheel engages with a smaller one which operates a crank and rod, giving a lateral shaking motion to the screen.

In the revolution of the cylinder the coarse quartz will constantly roll over the fine, and even without the aid of the stamps this will tend to finely pulverize it. The stamps, however, keep continually dropping on the quartz passes under them, and this, with the attrition of particles caused by the revolution of the cylinder, serves to pulverize the quartz thoroughly. As the coarse quartz constantly rolls over the fine the stamps will work on the coarsest quartz and have a better effect than if dropping into a mass of coarse and fine quartz. The friction of cams against tappets is entirely avoided in this device.

This machine is very simple in construction and operation. The stamps are made in such a shape as to be easily replaced. None of these machines have been made as yet, but the inventor thinks of making the outside cylinder five or six feet in diameter and eight or ten feet long, with stamps to weigh from ten to three hundred pounds each, with a drop of eight or ten inches. The inventor will make liberal arrangements with parties who purchase rights. After full investigation and practical tests, he will give a free right to proper parties to make the first one. Those interested can address J. L. Tharp, Mining and Scientific Press office, where the working model can also be seen.

This year the southern counties of California, principally Los Angeles, sent to San Francisco 5,380,000 oranges, 620,000 lemons and 80,000 limes. The consumption of California is about 10,000,000 oranges a year, and 5,000,000 are brought from Mexico and the Pacific islands.

CORRESPONDENCE.

Mineral City Mines.

EDITORS PRESS.—Thinking a few lines from here might be interesting to some of your readers, I take the liberty of sending the following few items. Just at this time we are having a remarkably dull and gloomy time, not a stroke of work being done in the camp.

Last fall the Hayes mine was shut down, and although the indications and prospects were good, yet up to the present time work has not been resumed.

The Ward Ellis closed their work about this same time, and although the mine is perhaps as good, if not the best mine in the camp, they have quite a large pile of good smelting ore on the dump, and can extract plenty more very easily. It is a great pity this company have not got a furnace of their own. The Watson company, after expending several months' time, and a large amount of money, on their own mines working them, it is generally understood here, under the direction of some spiritual medium in San Francisco, and assisted by an expert with a crooked stick, or some other device that was supposed to turn or indicate where the rich bodies of ore were, finally had to abandon their mines, or at least are not doing anything on them at this time. To add to the disagreeableness of the situation their mill was burned lately by some incendiary. Up to the present time, no one has been arrested for the act, but suspicion points very strong to certain parties as the cause, and to one certain party as having applied the match.

I hardly think the company will ever do any more work here, as their mines do not look very encouraging, and the camp is flooded with their now useless checks, and the chances not very brilliant of their ever being redeemed.

Judge Welsh, of this place, has had a lease of the furnace and mines of the Canton company, and has been working the mines and smelting the ore for nearly a year, and I think with fair results.

The mines are certainly looking splendid and show a large amount of good smelting ore, that will pay well in silver. One of the mines will average thirty dollars per ton in silver and gold, and is rich in lead. Another, the Altman, is rich in gold, averaging at least \$100 per ton. Smelting was resumed this spring, after about three months' idleness, and all things bid fair for a season of activity and prosperity, but when the furnace was started it was under the foremanship of a totally incompetent person—one who probably had never helped charge a furnace. As a natural consequence, the lining of the furnace did not last more than half as long as it should have done, and from 250 to 300 bushels of coal was burned unnecessarily every day; besides, not more than three-fourths the usual amount of bullion was made.

At Ward District,

Some twenty-five miles from here, the mines are looking splendid. The Martin White company, under the management of Lloyd Frizell, are developing some really valuable mines. They have quite a large amount of good ore on the dump, and have shipped ten tons to San Francisco, to be tested at Selby's reduction works. If the working proves satisfactory, shipments will continue to be made until the company can complete suitable reduction works of their own.

Take all our disappointments and bad luck into consideration, and then look at our mines, and I think when we get good, substantial and honest men interested in our mines and furnaces, we will have the best mining camp in Eastern Nevada.

Mineral City, Nev., May 20th.

Affairs at Panamint.

The Panamint News says: We have all along taken the ground that the times in Panamint would change for the better, and that we should have as lively and prosperous a camp as there is on the coast. We confess, however, that we did not think we would so soon be prepared to say—in view of the vast amount of mill work to be done, and the great delay incident to the introduction of capital into a new camp—that we were so soon to experience that which is so greatly to be desired. Our prognostications are about to be verified. Indeed there is already a vast change to be noticed which has taken place within the last two or three weeks. Previous to that time men were seeking employment and could not obtain it, and they would leave the camp. Now employers are seeking men, and they are not to be had to satisfy the demand. Although quite a large number have come in within the past week or ten days, still there is a further and large demand for them—that is, for good miners. Considering the number of new companies that have been started, those about to commence and the near completion of the S. V. M. & Co.'s twenty stamp mill, which will necessitate the employment of a large number of miners to supply it with ore; also the fact that the lower mill will soon be capable of reducing a large amount—to say nothing of the projected sixty-stamp mill of the same company, as soon as their other two are completed and the new mill of the Sunrise

company—we think there will be quite a large demand for miners and mechanics for some time to come. The Surprise Valley company do not now labor under the disadvantages they experienced at first. Their mines are opened to an extent that a large force can be advantageously worked. Other companies will soon have theirs in like condition, and altogether we think the bright time for Panamint is near at hand, and many miners who are now idle in other places will here find employment at good wages. In fact they are wanted now.

About Arizona Mines.

The general mining outlook of our Territory, and especially of this county, is cheering. From every section we hear of good mines, new and old developing, and frequently see and feel the metallic substance.

Thus far our miners have worked with little means and without machinery or furnaces, and yet we do not know of a single man who is not pleased with his prospects. It is only a little more than one year since the promised peace with the Indians has been believed permanent, and in that short time great enterprises have been undertaken and carried to a point where success is now regarded as certain. Shafts have been sunk, cuts made, and tunnels driven into the mountains, revealing bodies of ore that bear a world of riches. And this good work goes bravely on. Nearly every range of mountains is filled with hardy prospectors, turning over the treasure bearing rocks, bringing to light new veins and preparing for the day when extensive reduction works will enable them to receive a good return for their present labors.

The growth of mining countries, except where gold placers exist, is generally slow but certain, if good metallic veins are found. It takes years of patient toil to develop a mine so that it is ready for the machinery, and especially is this the case in a Territory so remote as Arizona is from the mining and monetary centers.

Had Congress granted us a railroad, our situation would have been second to none of the mining empires growing up on the Pacific coast. As it is, we must still work on hopelessly, saying that we may reap, knowing that we have in lavish abundance the elements of a golden future and that the better day so long hoped for is not so far away as many would have us believe.

The Ostrich mine will soon have its mill completed, and then we will have a goodly abundance of gold from that section. The small Mexican furnaces keep producing a quantity of silver bullion sufficient for necessary expenses, at the same time developing the mines.

Copper ores are shipped that pay over \$100 per ton profit, and are not these facts in themselves suggestive of what can and will be done when capital takes hold.

Very many sit down and indulge in gloomy thoughts, wondering why capital does not come, when it is barely possible that no effort has been made to make capital acquainted with the metallic wealth of the country—never wrote a word, sent a paper or a piece of rock outside the limits of their own horizon. It is to be supposed that capitalists learn by inspiration of the splendid opportunities for investments in mines, or are they to learn by the same channels of information in which we have been working for years? It is the duty of every person who desires the welfare of Arizona to send abroad by every conceivable source all we know of the vast resources of our Territory, and let it be known among every class and condition of men on the earth that Arizona is without a peer in her capacity for the production of the precious metals. There should be organized effort to publish plain truths of our fertile valleys, where large colonies could find pleasant homes; of our almost illimitable grazing facilities; of our matchless climate and our gigantic mines. When it is known, as we who live here know and understand it, there will be no more complaints of neglect by those who are seeking a place to put their money where it will do the most good. We need more money and more muscle to develop Arizona, and these we can have very soon if we publish more fully to the world what fortune lies within easy grasp in the near future. —Arizona Citizen.

THE GRAVE OF COMSTOCK.—We commend to the owners of the Comstock lode the following from the Bozeman Courier, and trust that it may meet with favorable consideration. A portion of their great wealth could not be more appropriately spent than in commemorating in marble or granite the man who made them great through his discovery, even though he died in Montana, a penniless wanderer. "The grave of Comstock, the famous discoverer of the great ledge in the State of Nevada which bears his name, from which over three hundred millions of dollars have already been extracted, and in which another three hundred millions is said to be 'in sight,' the grave of this great and now historic miner, is in a neglected spot, in the Bozeman cemetery, and unmarked by even a head-board. What say the owners of the great bonanzas to this? From the millions at their ready command, would it not be well for them to contribute a few thousand to place a commemorative stone over the renowned prospector's remains?"

The Santa Cruz Sentinel states that the surveyors have commenced operations at Half Moon bay for the coast narrow gauge railroad from San Francisco to Santa Cruz.

Calaveras Gravel Mines.

The Calaveras Chronicle says: A visit to the gravel mining enterprises in this vicinity furnishes ocular demonstration of the fact that unusual activity is being evinced in operations of that character. There is still no diminution of the water supply; and miners appear determined that a drop of the fluid shan't run to waste. Owing to the fact that much less than the usual quantity of snow fell in the mountains last winter, miners are haunted with fears of an early failure of water and are putting in their best "licks" while they have a chance. In the great Happy valley hydraulic work goes on uninterruptedly. Although a good deal of piping has been done the claim is not yet fairly opened, work, so far, being restricted to the purpose of putting the mine in proper shape for the extensive operations contemplated in the future. A vast amount of labor has been required in outfitting a lengthy ground-sluice, through solid bed rock, and laying about a mile of flume. All the preliminary work is now done with the exception of running a bed rock tunnel from the head of the ground sluice to the gravel bank, an undertaking that will be pushed as fast as possible. The tunnel will be three hundred and fifty feet in length, and its completion will put the mine in admirable condition for working. The claim is of sufficient magnitude to last for years, and the prospects are that it will prove very remunerative.

Cook & Co., proprietors of Sport Hill hydraulic, are pushing things with their usual energy and vim. The completion of a bed rock tunnel, for the reception of their flume, has given them plenty of fall and an excellent dump, and they are now trying to see how fast they can transfer the hill to the gulch below. The mine is skillfully managed, systematically worked, and, best of all, paying handsomely. The company have ground enough to keep them employed for years, rapidly as they are working it.

Moser, owner of Spring Gulch sluicing claim, is continuing operations with unvarying success. He has washed a hole through the immense deposit of tailings in the gulch as broad as the Apian way, and will ultimately clean the entire ravine out down to the bed rock. From two to three thousand inches of water are used in the operation, the supply being stored in a reservoir at the head of the gulch. The enterprise pays, about \$25,000 having already been taken out.

Veith, the enthusiastic Tunnel ridge annihilator, with a big head of water under an immense pressure, is literally making the gravel fly. The ridge is disappearing like a snow bank under a summer's sun. The gravel bank is so deep—115 feet—that it has been found expedient to use two streams of water, one for running off the top and the other for washing up the bottom. Water is brought to the mine in iron pipes, under a pressure of about 250 feet, and directed against the bank through "Little Giant" nozzles. The mine is also supplied with two strings of flume to accommodate the different streams of water used. At present attention is principally directed to running off the top, although a strong force of hands is engaged cleaning up bottom. The claim is one of the most extensive in the country. At the famous Duryea hydraulic, in Chille gulch, work is going on with that persistent continuity which has characterized operations since Mr. Duryea became proprietor of the mine. Three hundred inches of water, having a pressure of about two hundred and sixty feet, are daily used, and none of the appliances known in modern hydraulics are lacking. Although acres upon acres of the gravel deposit have been washed away, there is no diminution of the yield of the mine, and we believe it will continue to pay for years to come. There is probably no other gravel claim in the middle or southern mines whose aggregate yield equals that of the Duryea, and the amount total is being largely swelled at every "clean-up." We wish the county could boast of a dozen such claims as the Duryea hydraulic.

There are a number of smaller hydraulics along the ridge—Collins', Henry's and McCann's—in all of which work is actively going on with good results. The tunnel claims of Bracket & Co., Brown and Quere are also being steadily and remuneratively worked.

The Red Hill hydraulic, under the management of Mr. Hayward, is an enterprise entitled to take rank among our most notable gravel mines. It has required a considerable outlay of labor and money to get ready to work the claim, but it is now in full blast and we don't believe it will be behind any of the others in point of yield. Water is conducted to the diggings through an 11-inch iron pipe a mile in length, obtaining, at that distance, a pressure of 160 feet. The gravel is easily piped, and as a large head of water is used washing goes on rapidly. All the claims of which we have spoken are within a radius of two miles of Mokelumne Hill.

TIN IN POWDER.—A French journal gives the following method of preparing tin for tinning brass, copper, and iron: Melt the metal in a crucible which has previously been slightly warmed, and at the moment the metal begins to set, and when it is very brittle, pound it up rapidly, and when quite cold pass it through a sieve to remove any large particles that may remain.

The Petaluma Argus is informed that the Marin narrow gauge railroad has more business on the southern half of the line than it can perform with its present rolling stock.

A Mine in a Post Hole.

The Transcript, Nevada City, Cal., in speaking of the Schmidt mine says: About a mile or two from town, on the slope of Woods' ravine, embracing about twenty-five or thirty acres, is the ranch and mine of John Schmidt. This ranch was formerly owned by a Mr. Prescott, and in early days was known as the Rising Sun ranch. About three years ago Prescott sold it to the present owner for about a couple of hundred dollars. Mr. Prescott had planted about 2,000 grape vines, a number of fruit trees and blackberry bushes, and had a fine spring of water for irrigating purposes. Several acres were planted in clover, from which he ripened two and sometimes three crops a year. A comfortable house with three rooms made him a cozy little home, and the produce of the ranch made a good living for him. But Mr. Prescott was getting along in years, and feeling the infirmities of age stealing upon him, he disposed of his little ranch for a mere song, and went back to his friends in the Atlantic States, where he has since paid the last debt, and gone to his final reward; for he was a good old man, and had the respect of all who knew him. Shortly after the purchase of the ranch by Mr. Schmidt, who intended to move out there with his family, he employed his sons in digging holes and planting trees and vines. While engaged in this branch of industry, one of the boys, while digging a hole about two feet deep, struck upon a quartz ledge. More through curiosity than any expectation to discover a rich mine, the boy shoveled out the dirt, and picked out a chunk of the quartz, which, upon being examined, was found to be well sprinkled with gold. Calling his father he informed him of his discovery, and the work of taking out the rock was commenced in earnest. As piece after piece of rock was taken out, their hearts fairly danced within them to see such a rich pocket of gold and quartz. In a short time several hundred dollars worth of quartz specimens were extracted. Preparations for working the ledge in a proper manner were then commenced, and from that time to the present the ledge has been good paying property. Hoisting works have been erected, which have all been paid for, and we presume "Uncle Johnny" and his boys have a few twenties laid away for nest eggs. There are now sixty-six tons of first-class rock at the Pennsylvania mill waiting to be crushed, and several tons more are on the dump pile at the mine. The ledge at the bottom of the incline, which is down 120 feet, is about two feet thick, and shows quite freely in gold. The ledge runs nearly the entire length of the ranch before crossing on to other property, so it is a safe prediction that the Schmidt family have a good thing for a lifetime. How true is the old adage, "It is better to be born lucky than rich."

ORIGIN OF THE NITRE BEDS OF PERU.—The nitre districts of Peru form a plateau of a mean elevation of 7000 feet, fifteen to twenty leagues broad, and several hundred in length. Antony Guayard, in the *Monteur Scientifique*, proposes the following theory to account for its formation. He supposes that there has been an epoch when nitrogen compounds were disengaged from the volcanoes, just as there were porphyritic mountains, which have given rise to the beds of kaolin and other clays. In general, the saltpetre exists in the form of saccharoid deposits, composed principally of nitrate of soda and chloride of sodium, mixed with nitrate and iodate of potash, chlorides of magnesium, aluminum and calcium, sulphate of lime, magnesia and alumina. The earthquakes of these regions he considers to be subterranean electric storms. The author opposes the view that the nitre beds are derived from decomposed gneiss and the iodates from seaweeds. He has also shown that the coloring matter of the nitre beds is not of organic origin, the yellow being chromic acid and the violet manganic

A LIGHT WITHOUT FIRE.—In Paris, the watchmen in all magazines where inflammable or explosive materials are stored, use for purposes of illumination a light provided according to the following method: Take an oblong vial of the cleanest glass; put into it a piece of phosphorus about the size of a pea, upon which pour some olive oil heated to a boiling point, filling the vial about one-third full, and then close the vial with a tight cork. To use it, remove the cork, and allow the air to enter the vial, and then re-cork it. The whole empty space in the bottom will then become luminous, and the light obtained will be equal to that of a lamp. As soon as the light grows weak, its power can be increased by opening the vial and allowing a fresh supply of air to enter. In winter it is sometimes necessary to heat the vial between the hands to increase the fluidity of the oil. Thus prepared, the vial may be used for six months.

IMPROVED FREIGHT CAR.—The Banlet manufacturing company, Laconia, New Hampshire, have constructed a freight car which can safely carry two tons of freight to one of dead weight, the reverse of which is true of ordinary freight cars. The body of the car is supported upon one truck of six wheels.

AN EXHIBITION of all kinds of railway carriages in use throughout the world is about to be held in New York, with numerous drawings and models of everything appertaining to progression by steam.

SCIENTIFIC PROGRESS.

Sensations Produced by a Lightning Stroke.

A correspondent of the *American Artisan* furnishes the following with regard to the effects of a lightning stroke: Of the three, my wife only was "struck," and fell to the ground, my son and myself remaining erect, and all three retaining consciousness. For more than half an hour my wife lost the use of her lower limbs and left hand, both of which became rigid. From the feet to the knee she was splashed with rose-colored, tree-like marks, branching upwards, while a large tree-like mark, with six principle branches diverging from a common center, thirteen inches in its largest diameter, and bright rose-red, covered the body. None of us are certain of having seen the flash, and my wife is sure she saw nothing. As to the noise, my wife heard a "hollowing" sound and a "squish," recalling fire works; my son also heard a "hollow," while I seemed conscious of a sharp explosion. My wife describes her feeling as that of "dying away gently into darkness," and being roused by a tremendous blow on the body, where the chief mark was afterwards found. My son and myself were conscious of a sudden and terrific general disturbance, and he affirms that he received a severe and distinct electric shock in both legs. My left arm, shoulder and throat especially suffered violent disturbance, but I did not think it was electrical. As I turned to help my wife, who was on the ground, I shouted, as I thought, that I was unhurt, and hoped they were also; but it seems I only uttered inarticulate sounds, and my son, in his first attempt to answer, did the same. This, however, was only momentary; in an instant we both spoke plainly.

Neither of us referred the occurrence immediately to its true cause, but the idea of being fired at was present to all our minds; my wife, indeed, remained of the opinion that she was shot through the body, until she heard me speak of lightning. An infinitesimal lapse of time enabled my son and myself to recognize lightning; but I cannot say whether I did so before or after my first glimpse of the wreck on the ground. Neither of us saw or heard the mass fall, though it descended fifty feet, and fell on hard gravel close to us. My son and myself both experienced a momentary feeling of intense anger against some "person or persons unknown," further showing that we had primarily referred the shock to some conscious agency. I ought perhaps to add that neither of us felt any sensation of fear at the time; but we were all very nervous for several days thereafter.

DIAMONDS FROM SUGAR.—A French chemist has so succeeded in his experiments as to have reasonable hopes of producing at least black diamonds, if not colorless ones, from sugar. He has already obtained a carbon cylinder hard enough to cut glass, by exposing the perfectly burned sugar to a temperature of 1,800 degrees Fahrenheit in a closed vessel without access of air. It will be an interesting development, as far as regards the production of sugar-yielding crops; if this experimenter, shall succeed fully in his designs, and cane and beets come to be grown with a view to their final transformation into diamonds. Truly we are living in a wonderful age.

INTERESTING DISCOVERY.—Prof. Crookes had demonstrated that direct mechanical effect can be produced by light when luminous rays are allowed to fall upon one end of a most delicately balanced lever arm suspended in vacuum; the contrary has hitherto been assumed. Experiments suggested by this discovery have been made, tending to show the cause of the revolution of planets on their axes. Dr. Crookes has demonstrated by experiment that a number of discs, arranged in a certain manner in *vacuo* can be made to revolve by throwing upon them a pencil of light, and the rapidity of revolution is in proportion to the intensity of the light.

THE EVAPORATION OF METALS BY ELECTRICITY.—Mr. Hopkine describes an interesting experiment, which consists in passing a charge of electricity through a very fine thread of platinum, or other metallic foil, the thread being kept in place between slides of microscope glass. The effect of the heat from the electric discharge is to vaporize the metal, which is instantly condensed in a transparent layer upon the cold glass, which can then be studied by the microscope, and can be used in various ways to determine the character of the metal and the peculiarities of the discharge.

INTERESTING FACT.—A small elliptical ring of silver is heated to redness and then dipped in a beaker full of water; at first there is no sound heard, and for five or six seconds the silver remains visibly red hot under the surface of the water; suddenly there occurs a violent explosion, which sends the water in every direction, and usually breaks the beaker.

INTERESTING ARCHEOLOGICAL DISCOVERY.—An interesting discovery of what is supposed to have been once a pagan cemetery has been made in the sand hills of Finner, between Ballyshannon and Bundoran. The remains found consist of human bones (many of them corroded), ashes, skulls in good preservation, charcoal, and a cinerary urn.

Magnetism of Railways.

M. Heyl, engineer of one of the German railways, in a recent report upon the development of magnetism in the rails on railways, says: I have observed that all the rails are transformed at their extremities, after they have been placed in position a few days, into powerful magnets, capable of attracting and of retaining a key, or even a heavier piece of metallic iron. These rails preserve their magnetism even after they have been removed, but they lose it gradually. When in position, however, the magnetism is latent, only becoming free when the chairs are removed and disappearing again when they are replaced. Hence it is necessary to assume that two opposite poles come together at each junction, and that each rail is a magnet, the poles being alternately reversed throughout the line. This production of magnetism in the rails examined is undoubtedly attributable to the running of the trains and to the shocks, frictions, etc., thereby produced. The hypothesis of electric currents, induced or direct, must be rejected, since it is negated by experiments upon the subject made with suitable apparatus. Although the interest attaching to the fact above stated is at present purely scientific, it is not impossible that the magnetism thus developed may exercise an influence actually beneficial upon the stability of the roadway, increasing the adherence to the rails and the friction. It is possible, also, that the magnetic current may be stronger at the moment of the passage of the trains, than either before or after. If this be so, the observations may acquire a still higher practical importance.

A BOILING LAKE.—Mr. Joseph Sturge, of Birmingham, announces that a discovery of some considerable scientific interest has been made in the Island of Dominica. Drs. Freeland and Nicholls, Captain Gardner, and Mr. Watt, exploring the steep and forest covered mountain behind the town of Roseau, came upon a boiling lake about 2,500 feet above the sea level, and two miles in circumference. When the wind cleared away for a moment the clouds of sulphurous steam with which the lake was covered, a mound of water was seen ten feet higher than the general level, and caused by ebullition. The margin of the lake consisted of beds of sulphur, and its overflowing found exit by a waterfall of great height.

STEEL VS. IRON RAILS.—The *Railroad Gazette*, of New York, publishes a cent representing the wear on a steel rail, laid down in 1865, on the single main track in Clark street, Chicago, already alluded to in these columns, where nearly all the trains of the Chicago, Rock Island and Pacific and the Lake Shore and Michigan Southern railroads passed over it, and where engines were constantly shifting. Iron rails in similar positions were renewed as often as once in six months, the steel rails having outworn sixteen of the iron rail. The steel rail was gradually worn down on one side, but there was no splintering, as in iron rails.

UTILIZING WAVE POWER.—H. A. Bonneville, of London, England, has patented a new device for utilizing the power of the waves for propulsion of vessels and for other purposes. The invention consists of a series of floats distributed over a sea-going vessel, and connected with plungers of air pumps intended to compress the air in a receiver, the floats being raised or lowered by the action of the waves, and the air thus accumulated being used for the purpose of driving an air engine or as an auxiliary in driving a steam engine.

TRIUMPHS OF SCIENCE.—A candle 13,000 feet distant shines with a light twenty thousand times more brilliant than do some nebulae. Yet the constitution of the nebulae has been determined. They are found to consist of hydrogen and nitrogen. We know the nature of worlds situated at a distance inconceivable. And the relative ages of the stars we know. The white stars are the hottest and the youngest. The yellow stars, including the sun, are older; while the colored stars are not so hot, and are still older.

PROGRESS OF RUSSIA IN MANUFACTURES AND ARTS.—At the London International Exhibition, of 1872, the singular fact was made manifest that the Russian paper makers surpassed all others in the beauty, strength and variety of the products of their skill. In commercial printing and chromo-lithography, also, Russia stood at the head, showing that the military greatness of that nation is not its only title to respect.

HYDROGEN GAS IN IRON.—MM. Troost and Haufenille, of the Ecole Normale, who are studying the combinations of hydrogen with the metals, have observed that gas exists in ordinary pig iron to the extent of twelve volumes, and in manganese pig to the extent of twenty-seven volumes. M. Deville attributes the projection of sparks from molten iron to the jets of gas.

The meeting of the British Social Science Association will be held at Brighton in October next, and there will be an exhibition of appliances and apparatus relating to the sanitary and educational systems.

AMERICAN IRON SHIP BUILDING.—Twenty-three iron vessels were built in the United States last year, representing 33,097 tons—an average of 1,439 tons for each vessel.

MECHANICAL PROGRESS.

What Steel is.

Mr. Wm. Hackney has the following to say on this much beset question: Steel might then be defined as any variety of iron that was cast into a malleable mass; and the two parallel series, the irons and the steels, might be classified as follows:

PERCENTAGE OF CARBON.			
0 to 0.2	0.2 to 0.35	0.35 to 0.65	0.65 to 1.50 or more.
SERIES OF THE IRONS.			
Ordinary irons.	Granular irons.	Steely irons, or soft puddled steels.	Hard puddled steels. Cemented steel. Styrian steel.

SERIES OF THE STEELS.
Ex. soft steels | Soft steels | H' or S' steels | Hard steels

Steel was made by producing a melted alloy of iron, containing a smaller proportion of carbon or other hardening elements than cast iron. Practical steel making processes were of three kinds—(a) Fusion in crucibles, producing crucible steel. (b) Blowing air through melted cast iron, producing Bessemer steel. (c) Fusion on the open hearth of a reverberatory furnace, producing Siemens or Siemens-Martin steel. Fusion in crucibles was the simplest and oldest mode of making steel, and had been practiced by the Hindoos from a remote period. In the Hindoo process wrought iron was melted in small crucibles, with one-tenth of its weight of dried wood, producing a very hard steel, with upwards of 1.6 per cent of carbon.

Steel in Europe.

It did not appear that any mode of making true steel was known in Europe before the last century. Reaumur announced in 1722 that he had made steel by melting together from one-fourth to one-third of malleable iron with cast iron, in a common forge, and Huntsman, between 1750 and 1770, succeeded in making steel by melting cemented or converted bar iron. Since Huntsman's time the processes of crucible steel-making have been improved only in points of detail, and by the trial or practical use of all the different materials for melting that an advancing knowledge of chemistry had suggested as capable of producing steel. Malleable iron was melted by itself if it was of the hardness needed to produce the required quality of steel, or it was mixed with carbon or cast iron, if too soft, or with oxide of iron or of manganese, if too hard; and spongy reduced iron, or iron ore, was melted with carbon or with cast iron.

Experiments on Steel—Magnetism and Carbon.

At a recent meeting of the French Academy of Science, M. Treve communicated the result of the researches he had undertaken with M. Durassier on the relations which exist between the nature of steels and their coercive force. M. Durassier prepared fifteen bars of steel, divided into five series, differently carburized, of three bars, each one of which had been tempered in a distinct and especial manner. M. Treve magnetized these by saturation, and determined their magnetic force by the method of deflection. The bar docted with carbon to 0.95 per cent, and tempered with cold water, caused a maximum of deflection represented by 47. The bar containing the same percentage of carbon, but tempered with boiling water, gave 44. The bar containing the same amount of carbon, but tempered in oil, at 10 deg., centigrade (50 deg. Fah.) gave 43. The influence of the liquid used for tempering is, therefore, manifest. The influence of the percentage of carbon in each bar is not less, for the bar containing 0.95 per cent, gives a maximum of 47, while that containing 0.25 per cent, only gives 13. In preparing diagrams of variations for the different series of bars, the influence of the percentage of carbon and the tempering liquid became manifest. It was remarked, however, that, at the top of the scale in carbon, the nature of the tempering liquid no longer exerted a very marked influence; 47, 44 and 43 are very near one to the other; coercive force is but little manifest in steels whose percentage of carbon exceeds from 0.5 to 0.55 per cent. Another remarkable fact is the similarity of the magnetic curves and curves of elasticity of the bars. Carbon gives elasticity to the steel, and, at the same time, a capacity for magnetism.

TO PREVENT CARS JUMPING FROM THE TRACK. To prevent the numerous accidents to which railroad trains are liable from one car jumping the track, it is proposed to apply to cars a kind of shoe, consisting of a clamp-like arrangement which is affixed between the wheels of each truck. This runs about two inches above the rail, and if anything happens to throw the wheels from the track, the clamp at once grasps the rails, holds the car on the track, and brings the train to a speedy halt. Such a shoe will, it is claimed, prove a great saving of railroad rolling stock, and will add greatly to the strength of the truck, it being constructed of iron and weighing 500 pounds. It is found by experiments made with care provided with this device that the arrangement secures perfect safety against the class of accidents it is designed to meet, and it is also estimated that on account of this additional strength which each an attachment must necessarily supply, a car must last twice as long, on an average, with as without it.

Steam.

Steam, says Cassell's *Technical Educator*, in most of its properties resembles a gas, and, like any gas, expands on the application of heat to it. If, then, the steam be exposed to a high temperature, either its volume or its pressure will be increased, and a greater mechanical effect may therefore be obtained from it. Another advantage is also obtained by superheating the steam. Under ordinary circumstances, when the steam is not at a very high temperature it is partly condensed by contact with the cylinder and other working parts; and hence there is a deposit of water in them, and a corresponding loss of power. A few years ago the tendency was to superheat the steam as much as possible. It was found, however, that if its temperature be raised above 315°, the packing of the stuffing boxes is liable to become charred, and the oil or other lubricant used in the engine to be injured. The practice, therefore, seems to be gradually diminishing, and is not usually carried much beyond the degree that is requisite to render the steam thoroughly dry. Very many different forms of superheaters have been proposed and tried with varying degrees of success. The usual plan is to cause the steam to pass through a series of tubes placed at the lower part of the chimney, so that the heat employed is that which would otherwise escape with the smoke. It is not found that when fresh fuel has to be employed any advantage is gained by employing it in superheating the steam, instead of applying it to the boiler in the ordinary manner. In connection with the above we append the following in relation to the oil from exhaust steam from the Query department of the *Scientific American*: We have been thinking of using our exhaust steam by turning it into a tank containing cold spring water, thereby heating our supply water and saving fuel. We have been advised by experienced men not to do so, as they say we should burn out our boiler in a short time; they claim that the grease contained in the exhaust steam would form into globules, which would sink to the bottom of the boiler and prevent the water from touching the plates, thereby burning them out, and that they know this by actual experience with lake water in Chicago. With hard water or water containing much lime, it might be feasible; but with spring or soft water, it would be disastrous. Are these opinions sound? The journal addressed says in reply: There would not be much danger unless you use a very large amount of grease in the cylinder. In nearly all ocean steamers the condensed steam is used for feed water. With a proper oil cup, the amount of lubricant need in the cylinder is very small, and is as effective as a much larger quantity admitted carelessly. It is not well to use tallow in such a case.

MAGNET FOR IRON AND OTHER MATERIALS.—The following is the composition invented by M. L. Machabes, which is said to prevent iron from rust, and also to be applicable to other materials, such as stone or wood, used in conjunction with iron or other metal, in the formation of reservoirs or other works: Virgin wax, 100 parts; Galipoli, 125; Norwegian pitch, 200; grease, 100; bitumen of Judea, 100; gutta-percha, 235; red lead, 120; and white lead, twenty parts; all of which, says the inventor, have their special value. The materials are mixed in a boiler in the order in which they are given, the gutta-percha being cut up in small pieces, or rasped. The mixture must be well stirred at each addition, and when homogeneous is poured into moulds, and looks like chocolate. When used for preserving iron from rust, it is melted and laid on with a brush; but for stopping holes, etc., it must be in a pasty state. It may also be used as a glue, to fix a piece of metal over a hole. For certain purposes, such as stopping holes in large vertical metal surfaces, the composition is slightly varied, the Galipoli being reduced to 115, the bitumen to ninety, and the red lead to 100, while forty parts of gam oopal are added next to the gutta-percha.

CHANNELLED NAILS.—Nails made from round wire have always been complained of as breaking the wood, and a French manufacturer named Chelot has introduced an improvement in this article. He makes the nails of wire which is channelled, or polygonal, either by drawing or rolling, and their use has become considerable within a few months, they having been adopted in public works, after experiments made by the Government engineers. The report made by these gentlemen says that the weight of the channelled nails is from 12 to 15 per cent. less than those of the same gauge made from round wire; that the former hold 20 per cent. better in deal and 35 per cent. better in oak than the latter; that the former injure the wood much less. The economy is about 12 per cent., with the other advantages mentioned. The new nails, like the old, may be made from any kind of iron. The manufacture is about to be undertaken by a company, on a large scale.

CASTING STEEL.—At the steel works of Erment, France, the method adopted for steel castings is to connect the orifices of all the molds with a canal in which the molten metal is run from the furnace. The canal is furnished with doors or partitions, inserted lightly in the sand, which allow of the molds being filled successively, or as otherwise desired, by only removing the partition from one mold when the preceding mold is full.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

ALPINE.

TARSHISH.—*Alpine Chronicle*, May 29: We are glad to learn that the hitch in the negotiation for leasing the Tarshish mine and mill to New York parties has been unraveled, and that work will soon be resumed and the mine pushed to a development. The mill is being put in order by direction of Mr. Vance, the lessee, who is expected to arrive at Monitor on next Wednesday to take possession of the property.

BUTTE.

THE LAVA BEDS.—The Chinamen are again buying up whatever pieces of mining ground they can get hold of in the vicinity of the Lava beds, or about town. Tuesday, George Miller & Co. sold a small piece, just out of town and near the Depot house, 132 by 273 feet for the sum of \$2,000. J. M. Bart sold a small claim, of half an acre, for the sum of \$500; also another small claim of less than half an acre, for \$150. Five years ago it would have been a difficult job to get \$10 for all three of the pieces. Within the next few months quite a large number of claims will be sold at equally good prices. There is mining ground enough about town to last for years yet to come, and it will pay well for washing.

CALAVERAS.

FAVORABLE PROSPECTS.—*Calaveras Chronicle*, May 28: Messrs. Lewis & Fairchild, who some time since located a mine near Leavitt's ranch, in the Mosquito district, are obtaining the most favorable prospects. The shaft on the mine is sunk to the depth of about 70 ft., developing a vein of first-grade ore, averaging about 30 inches in thickness. They have about 50 tons of very rich rock now in the dumps, and are rapidly increasing the quantity by stoping. A crushing of the rock previously taken from the surface down to the depth of 20 ft. yielded an average of \$40 per ton. All indications point to the permanency of the ledge, and it is probable that the next crushing will make even a better showing than the first.

RICH QUARTZ.—Charles Rickman, who recently located a quartz ledge in the suburbs of the town of Mosquito, is taking out excellent rock. No great depth has yet been reached on the vein, but the quartz will pay handsomely from the top down.

SAN BRUNO.—Stoping has been commenced in the San Bruno mine at Mosquito gulch. Rock of extraordinary richness is being taken out, samples of which have been shown us. The ledge averages about two feet in width, all high grade ore. The machinery works first-rate and operations are being pushed forward with vigor.

WOODS MINE.—We hear very favorable reports of the Woods mine, located in Washington district, near Sheep ranch. The ledge is from 12 to 14 ft. in width, composed of quartz of extraordinary richness. There is a shaft sunk on the ledge to the depth of about 100 ft. Work is being pressed zealously forward. The rock taken out is hauled to a mill owned in connection with the mine and crushed, the average yield per ton being well up in figures.

WEST POINT.—Times were never livelier in West Point than at the present, nor the prospects for the future more flattering. Work upon all the principal mines in the district—the Champion, Josephine, Mina Rios, Lone Star, Good Faith, Anderson Flat and others—is being urged forward with encouraging results, and the area of development is being steadily enlarged. Capital is extending a liberal hand in promoting the mineral interests of the district, and labor is stimulated by the degree of success that is rewarding its efforts upon every hand. No other portion of the county is making so good a showing as West Point, so far as quartz mining is concerned, and there is no question but that the permanency of a number of promising mines in that district will be definitely settled within the present year. All the mills in the district are now employed to their fullest capacity, and the erection of others is in contemplation.

INYO.

PANAMINT DISTRICT ITEMS.—*Panamint News*, May 25: Our report this week is from notes furnished us by Mr. R. M. Wilson, a civil and mining engineer of much experience on this coast, who recently arrived here for the purpose of examining our mines and to make surveys for the Panamint Consolidated mining company. We gladly give place to his opinions, as having had several years' acquaintance with him, we know he is much more competent to judge of the merits or demerits of mines than we are. So far he has visited but three mines.

WYOMINO.—In all the levels and winzes which he went through and carefully examined, he finds that our description of that mine in last Tuesday's issue is remarkably accurate. The Crystal drift, he says, has greatly improved since that time. He traced the rich ore chert from the croppings down to the lowest level in the mine, a distance of 300 ft., and finds it continuous and unbroken, and feels confident that as the center of the ridge is approached a much larger body of ore will be found. The mine is now so well developed by levels and winzes that a large number of men can be put to work in stoping, and unlimited

quantities of ore can be extracted, as soon as they are ready for crushing.

THE HEMLOCK.—What struck him forcibly were its smooth and well defined walls, which are shown to a depth of 200 ft., without a break or fault, the vein being well charged with ore of a very high grade. He had heard some pretty big stories of the Panamint country, but was astonished to find such mines, and it is his opinion that the Wyoming and the Hemlock are of themselves sufficient to make a good camp.

THE JACOB'S WONDER.—The west winze, from Rich gulch, is now down over 85 ft. from the lower level, making a depth, from the highest croppings of the ledge, of 500 ft. At this depth a rich body of ore, over 4 ft. in width, is developed. A large amount of ore can now be stepped from the bottom to the surface in this winze. The walls show great regularity, and there is convincing proof that the Wonder is a true fissure vein, and he has not a doubt but that it will be developed into a first-class mine. Mr. Wilson is agreeably surprised both in the appearance and developments in these three mines.

NORTH STAR.—Since last report the tunnel on this mine has been run in some 20 ft. further, making a total distance of 70 ft., and cutting into the ledge about 6 ft.; this total width of the ledge, however, is not yet developed. The depth from the surface, in a vertical line to the ledge, is now 100 ft. Good ore is shown to the end of the tunnel; in fact it has steadily improved since work began.

PANAMINT CONS. MINING COMPANY are pushing ahead with their usual vigor, with very gratifying results. Their mines are still continuing to improve as they are developed. The company have purchased a mill site, and from present indications they will soon need a mill.

MARIPOSA.

HITE COVE.—*Mariposa Gazette*, May 29: From our worthy district attorney, Campbell, who has just returned from a visit to this mining locality, we gather many interesting particulars concerning it. It is situated on the South Fork of the Merced river, about twenty miles north of this place and sixteen from Yosemite. Mr. Hite located the mine in 1861 or 1862, and ran a tunnel into the mountain 1400 feet before striking the vein. Since that time it has been extended fully 3000 feet more, and has branches running in various directions. Mr. Campbell tells us that it is as well improved, and worked to a good advantage as any mine in the State. Mr. Hite has erected at a convenient distance a twenty stamp mill, run by water power, a good hotel, store and other buildings, and has a garden comprising two acres, in the highest state of cultivation, which produces every kind of vegetables. Water fountains play in every direction, and the whole scene is one of comfort and beauty. Great inconvenience has heretofore been experienced for the want of a good road from the top of the mountain, but that want is no longer felt, a first class one having just been completed to the head of the water ditch. The money employed in making these improvements has been all taken from this mine. Mr. Campbell is of opinion that no one can examine the works and improvements here without pronouncing Mr. Hite a man of extraordinary sense, as his head directed all. Contiguous to the Hite Cove mine are several others, which will pay well, when properly opened, viz: the Allen and Mooney mine, the Gibbs, the Georgia Point, and the Reynolds' Cove mine. This latter is an extension of the Hite Cove, just on the opposite side of the mountain. A tunnel is being vigorously pushed in toward the vein, and when reached big results are expected. Mariposa county, we again assert, is the richest in the State for mineral wealth, and the day will yet dawn (and in the not distant future) when this wealth will be developed. Whenever the Mariposa land and mining company shall determine to introduce water upon their possessions from the south fork of the Merced, a rush will be made in this direction that will remind people of the stirring times of '49 and '50.

FELICIANA MINE.—This mine is located twelve miles north-east of the town of Mariposa, near the village of Colorado. It has all the improvements of a first-class mine, consisting of a ten stamp mill, run by a thirty-horse power engine. It has an abundance of water and timber near it. A tunnel has been run, striking the vein 300 feet from the surface. It also has a shaft striking the vein at a depth of 300 feet. The width of this vein is five feet, and it has paid as high as \$300 per ton.

NEVADA.

EMPIRE MINE.—*Gross Valley Union*, June 2: Yesterday was retorting day at the Empire mine, and the product was \$26,000 for a run of twenty-three days. The old mine seems to be rejuvenating, and ready to enter upon a new and vigorous career. The increase has been regular for a number of months, and the above result is the highest figure attained for a month's run in several years. We are informed by David Watt, Esq., Superintendent, that the general underground appearance of the mine is quite encouraging. The tenth, eleventh and twelfth levels, the lowest, are all looking and yielding well. The lead has changed its former characteristics, as it occasionally showed pockets of remarkable richness, with a good deal of low grade ore; at the present time it furnishes no specimen rock whatever, gold seldom being seen in it, but pays well and with remarkable regularity. The working force at the present time, above and below ground, is 110 men.

NEW HOISTING WORKS.—The Omaha works have determined to erect steam hoisting works

upon their mine immediately, and to this end have purchased the engines, boilers and hoisting gear of the Enterprise gravel mine, at Buena Vista elide. Zeph Mansau has taken the contract for removing and re-erecting the machinery, and have it in working order in thirty days. The Omaha has been sufficiently developed to warrant the adoption of stronger and more permanent machinery than they have been using, and with their new power will be able to handle all the water, of which they have a considerable quantity, and to continue their main shaft, and open out the drifts, for several years to come. The mine is looking well throughout, and the dump pile continues to increase in fine rock, rich in sulphurets and free gold.

KENTUCKY MINE.—Our reporter paid a visit recently to the Kentucky mine and found it clear of water. The water was exhausted on Thursday last and men are now employed in fixing up the shaft and getting the mine ready for actual work. A six-inch pump is employed to keep the mine clear of water, but it has to be kept going at a moderate rate of speed to keep it in fork. A force of six or eight men are all that are now employed, but this will be increased shortly. The shaft is down 200 ft. A tub is used to do the hoisting with. A five stamp mill is erected close by, so that the Kentucky will do its own crushing. The prospects that this will be a dividend paying mine are good, and as it is in good hands we think it will soon prove itself to be such.

THE OCEOLA MINE.—We continue to hear rumors that this old mine, situated near Rough and Ready, is likely soon to be started up. The Oseola was at one time a mine of considerable repute, as some very rich rock was taken from it. A twenty-four stamp mill was also erected by the company; but they made the mistake of not getting depth upon the mine, and depended upon taking rock from a tunnel above the water line, much of which proved poor, and besides a difficulty was experienced in amalgamating the gold, which the experience and improvements of later years would now remedy.

YUBA MINE.—*Foothill Tidings*, May 20: Superintendent F. A. S. Jones passed through town on Thursday, and from him we learn that the mine is opening up finely. Both ledges are large and well defined, and the quartz coming out shows well in free gold and is rich in those promising adjuncts, galea sulphurets. The mill was started on Wednesday, and he says the plates look well. The Yuba, which it will be remembered is situated on the South Yuba river, above Washington, is undoubtedly a good mine.

RICH gravel and very extensive is the claim of the Manzsnits company, above Nevada. They have about 100 acres of ground that is thought to be as rich as that worked last year, which paid over \$35,000 to the acre. The earth or dirt of this land to the average depth of 130 feet is washed away by two hydraulic monitors, carrying 1300 inches of water under an immense pressure, and the gold saved in sluices and by all the various modern appliances below. About 50 men are employed during the mining season, which this year will be shorter than usual, though on account of the improvement in the channel the clean-up is expected to be much larger than heretofore.

The Pittsburg mine is looking splendid, and the crushing now at the mill promises to be the best they have ever had.

MINING AT SEBASTOPOL.—*San Juan Times*, May 29: The American mining company, at Sebastopol, commenced sinking a shaft into their new tunnel under construction on Tuesday of last week. They have put an additional number of men at work with a view of completing their tunnel and works in the shortest space of time possible. They anticipate washing through their new tunnel before the first day of May next. In the mean time they will continue to wash off top ground as usual through their old tunnels until the new one is completed. The top ground pays well and gives indications that the bottom ground will pay immensely.

NAPA.

MINING ITEMS.—*Calistoga Free Press*, May 29: The Kentuck mine is looking better and has a brighter prospect to-day than ever before. A large force of men is kept constantly at work running tunnels and sinking shafts. Thos. Cross is superintendent. Dickenson and Michael, of St. Helena, are now handling chrome iron from their mine and shipping it direct to Baltimore, Md., per ocean steamer, as ballast. They have some 5,000 tons on the dump, and 1,000 in St. Helena. Mr. Burke, superintendent of the Calistoga silver mine, informs us that they have made another rich strike in one of the tunnels. The ore being taken out now is about half and half, gold and silver. The last bar produced contained more gold than silver, which is good for the company. J. H. Parks has presented us with a splendid specimen of copper ore, taken from a claim about one mile north of the Mountain mill house, 10 miles from this place. The parties owning the mine are J. H. Parks, Dr. W. M. Michel, Matt Vann and Calvin Griffith. They have run one tunnel in the north side about sixty feet, and have commenced two other tunnels. The specimen we received is a very rich one, assaying, we believe, \$104 to the ton. The California borax company shipped 100 and the American mine 20 fasks of quicksilver through Calistoga in the week ending May 21. The Geyser Peak company are running a tunnel on one of their claims on Geyser peak. At a distance of 70 feet below the surface, a ledge was struck last

week hearing good looking silver ore. Superintendent Powning informs us that he is still at work on the Rocky Bar tunnel, Inyo district, but that the ledge is not yet reached. S. Foster, president of the Star company, has given us the results of milling three hundred pounds of ore from the Wandering Jew claim, Inyo district. Huhn and Luckhardt, of San Francisco, first made assays of the rock, which showed \$5.65 of silver and \$55.25 of gold per ton, and then milled the ore, getting at the rate of \$51.67 per ton. We have seen the small gold brick that came from this ore. The tunnel is now in 80 feet and is still running in the gold bearing rock that was struck several months ago.

PLACER.

STUCK IT.—*Placer Argus*, May 29: Mr. W. J. Meyer has struck very rich rock in the claim known as the Grass Valley and Panamint mine, situated between Gold Hill and Auburn, on Auburn ravine. He says it will pay \$60 per ton, but his wife says \$5,000.

BIO ENTERPRISE.—The *Placer Herald* gives a lengthy account of the operations of the Auburn gravel mining and ditch company, the publication of which we will defer until our next issue.

SONOMA.

LOCAL ITEMS.—*Russian River Flag*, May 27: The Geyser mine shipped 23 fasks of quicksilver Monday last. Owing to the low price of quicksilver, the Rattlesnake furnace will remain shut down for the present.

SAN BENITO.

COAL AND CINNABAR.—*San Benito Advance*, May 29: A day or two since Mr. J. A. Owens covered our table with rocky samples of coal and cinnabar which he found in Quien Sabe valley. The croppings of coal are from a ledge Herland and himself discovered in the foothills of the Mt. Diablo range about a mile from Mr. Owens' camp. The sample before us is the best we have seen in this county. We learn that its merits have been satisfactorily tested at Walberg's blacksmith shop. If as represented it will prove a valuable acquisition to this county. Messrs. Owens and Harland have also discovered several chimneys and a well defined ledge of cinnabar on the hills near Denverport's ranch about a mile west of Stanton's place.

NEW MINES.—*Hollister Enterprise*, May 29: The mineral wealth of San Benito county has just commenced to develop itself. The success attending the development of the Stanton mines in the Coast Range, a few miles west of Hollister, has stimulated prospecting in that direction. J. A. Owens and some other parties have lately discovered what promises to be an immense deposit of cinnabar on the slope of Shelly peak, a mile or so west of the Stanton mines. Large quantities of decomposed metal are found on the surface of the ground, and in spots where the finders have sunk a few inches they found unmistakable evidence of the existence of the pure metal. There is now scarcely any room to doubt that that section of the mountains is immensely rich in quicksilver. It promises to be the second New Almaden of the State.

TUOLUMNE.

RICH.—*Union Democrat*, May 29: Rock paying from \$100 to \$150 a ton is being taken out at the Sonlsby mine in great quantities.

TRINITY.

ANOTHER GOOD CLEAN-UP.—*Trinity Journal*, May 29: The W. D. & H. M. Co. cleaned up last week in the Ward mine on Oregon Gulch mountain, taking out \$2,700 for a run of about 100 hours. With steady water the Ward mine is good for \$500 per day, and can be worked at as little expense as any gravel mine in the State. Water having given out, work has been suspended for this season.

BONNEN.—J. C. Akers has bonded two-thirds of the Washington quicksilver mine, in Cinnabar district, to Jas. Johnson, of San Francisco, for \$4,000. John R. Stoddard has bonded the remaining one-third of the same mine to the same party for \$3,000. The coin is to be forthcoming December 1st.

Nevada.

WASHOE DISTRICT.

OPHR.—*Gold Hill News*, May 27: Daily yield, 150 tons of ore. This ore is mostly taken from the stopes on the 1465 ft. level. The character of the ore is good, and the yield amply sufficient to keep three mills steadily running. On the 1700 ft. level, east cross-cut Nos. 3, 4, and 5 are being pushed forward with all energy possible, to reach and prospect the ore vein on that level. The stone work of the foundation for the new incline machinery is about completed.

SIERRA NEVADA.—Sinking the new shaft is making rapid headway, the rock penetrated being of a much finer character than for some time past. There is no longer water to interfere, the shaft having apparently passed entirely through the vein of water encountered near the surface.

CONSOLIDATED VIRGINIA.—Daily yield, 600 tons of ore. The yield of ore has been considerably increased in order to create a larger reserve in the dump, the crushing capacity of the mills being no greater than for some time past. The mine is looking splendidly on all the levels, affording no new or important features at any point. The mills are running steadily, and its future prospects bright and flattering. The extension of the joint main east drift on the 1400 ft. level to the eastward, the face still in ore, furnishes another proof of the great width of this ore body and its almost incalculable

the value. Everything in and about the mine looking well.

Gouln & Cuatr.—The north drift on the 700-ft level to connect with the Best & Belcher, is making good progress, the rock in the face being still hard but blasting well. Preparations for the commencement of several cross-cuts on the 1700-ft level are being rapidly completed.

BOLLION.—This air on the 1700-ft level of the imperial shaft has greatly improved during the past week, so that the main north drift is being again extended northward, following the west wall of the ledge, and occasionally cutting benches of quartz and ore of a promising character. The east cross-cut from this drift is ore, and the development of paying bodies of ore seem no longer doubtful.

LARRY BRYAN.—The west and south drifts on the 330-ft level are being pushed steadily ahead through a very promising character of bluish-white quartz and low-grade ore.

COSMOPOLITAN.—Ore extraction from the topes, above the tunnel level, is going ahead at a lively rate as usual, about twenty-five tons being the daily yield, which keeps the Hope mill running steadily to its full capacity. Ore of superior richness has been met with during the past week in the northern topes.

CROWN POINT.—Daily yield, 550 tons of ore. There is no material change to report of the re-producing sections of the mine. No new developments to report on the 1600-ft level. Everything in and about the mine working finely.

CALIFORNIA.—Cross-cut No. 5, on the 1500-ft level, has penetrated during the week a body of richer ore than any that has ever been found in that portion of the mine. Cross-cuts Nos. 3 and 4 have also each cut into a richer character of ore than has been encountered for some time past. The face of cross-cut No. 2 east is showing a decided improvement, with evident indications of again cutting into rich pay ore. The point drift on the 1400-ft level is still continued, without yet having reached the east wall of the ledge. A winze has been started from this drift to connect with an up-ramp from the 1500-ft level. The winze is down eighteen ft, and the raise to meet it is up sixty-six ft, both being in good ore. The winze from cross-cut No. 3 on this level will be connected to-day or to-morrow with the 1500-ft level, having passed the entire distance between the two levels through fine ore. The O & C shaft is down 197 ft, in good sinking ground. Laying the foundations for the heavy hoisting and pumping machinery is making rapid progress, the stone work being nearly completed, ready for the reception of the bed-sills. Grading for the new mill is fast approaching completion.

CHOLLAS-POTOSI.—Daily yield, 75 tons of ore, the assay value of which is \$30 per ton. This ore is taken from the old upper workings, and cannot be relied on for a steady and permanent yield. Sinking the main incline is making steady progress. Driving the main south drift on the 1150-ft level is making good progress, the face still in porphyry.

FLORENCE.—The drift west on the ledge, at the 400-ft level is now in 40 ft. Stringers of quartz are beginning to appear, and the formation looks much better and more favorable than at the 300-ft level.

AMAZON.—The cross-cut at the 100-ft station is now in a distance of 40 ft, the face in ledge material of a very favorable character.

JULIA.—Sinking the main shaft is making splendid progress, the Burleigh drills at the bottom doing fine execution. It is now down 350 ft below the 1000-ft level. The flow of water is slight and does not at all impede the progress of the work.

BELCHER.—The main incline is down 34 ft below the 1600-ft station, the bottom still in hard blasting ground. The ore breasts are yielding well. Daily yield, 500 tons of ore. The air shaft is completed to the 1100-ft level. No change of value in any other portion of the mine. Everything working finely.

IMPERIAL-EMPIRE.—Sinking the main incline is making steady and favorable progress. Driving the main south drift on the 2000-ft level is also making rapid headway.

CALEDONIA.—Sinking the main incline at the old works is making fine headway. Sinking the new shaft is considerably retarded by the strong flow of water at the bottom.

ETAOPEA.—The ledge is looking splendidly, and gives high assays, but owing to bad air in the cross-cut east from the winze, work at that point is again suspended.

BALTIMORE AND AMERICAN FLAT.—The cross-cut on the 750-ft level continue to show a favorable improvement in the character of the ledge formation, and strong hopes are entertained that the 850-ft level will develop a fine paying mine.

SUTRO.—The rock in the face of the main drift is still gradually growing softer as the ledge is approached. The indications are excellent for finding ore on this level and considerable expectations are centered on the results. The flow of water is still light.

BUCKEYE.—The prospect for finding ore in the north drift on the 450-ft level is quite favorable.

SILVER HILL.—Everything in and about the mine is working finely. There is no change to note of either the second or third levels, except an improvement in the character of the ore in the north drift at the second station level.

ORIGINAL GOLD HILL.—Both cross-cuts in the south drift at the 340-ft level are in fair grade ore, and a large body of it seems to be opening out. The face of the north drift continues in good looking vein matter.

BEST AND BELCHER.—The Burleigh drills are making good progress in the south drift from the bottom of the winze on the 1700-ft level. No change in the character of the rock in the face of the drift.

SEASOAKEN GOLD HILL.—Cross-cutting actively at the 400-ft level, in good milling ore. A car track is being laid in the main drift, and the guides for the osse in the shaft are nearly finished.

NEVADA.—The stringers of quartz coming in at the face of the cross-cut are growing larger and more numerous, and the vein matter generally is softer than was met with last week.

MEXICAN.—Sinking the winzes in the north drift on the 1465-ft level is making fair progress, with some very favorable indications of yet finding a paying body of ore.

CORNUCOPIA DISTRICT.

MINING ITEMS.—Virginia Enterprise, June 1: Reports from the mines in Cornucopia during the present week have been meager. Work upon the Leopard is progressing as usual, but owing to the scarcity of timbers, in consequence of bad roads, the company has been contending with obstacles which, happily, are now removed. Last accounts report the arrival of timbers, powder and quicksilver, which will enable the miners to prosecute work in any part of the mine, and also furnish the mill with necessary material for working to its full capacity. The stage has brought down to Elko each trip two bars of bullion, averaging \$1,800 each, aggregating for the week six bars, valued at \$10,800.

REVELLE DISTRICT.

GOLD MINE.—The letter of the 24th of May gives the following information: The bullion receipts for May will approximate \$70,000. The south drift from the lower tunnel is yielding finely, the ore being of very high grade and the vein fully five feet in thickness. The drift is in 42 ft. The upper south drift is yielding large quantities of ore. Nine tons of first-class ore is being extracted daily.

EUREKA DISTRICT.

EUREKA CONSOLIDATED.—The weekly letter of the 29th says: Drifting has been commenced on the 8th level, Lewton shaft. The face of the 5th level drift looks favorable for striking ore. The ore body on the 6th level continues to improve as the drift is advanced. It is opening out very large. The main drift, 7th level, is in 527 ft, face in hard blue limestone. The prospecting drifts continue to develop good signs as they are advanced. The Windsail shaft ore body is holding out strong, and the ore body in the Champion ground is improving in quantity and quality.

ELY DISTRICT.

STRIKE.—Pioche Journal, May 23: We hear of the strike of a good ledge of milling ore about two miles west of town, in regard to which those who have been on the ground indulge in the highest expectations. This ledge is 18 inches thick, perpendicular and runs north and south. The ledge is known as the Victoria, and Wes Williams is one of the principal owners. Some of the leading mining men in Pioche have examined the ground and express good opinions of its prospective value.

Colorado.

GEORGETOWN BOLLION SHIPMENTS.—Georgetown Miner, May 29: The Stewart silver reducing company shipped for the week ending May 28, \$9,468. Judd & Crosby's reduction works shipped during same time \$4,779.

DOUGLAS TUNNEL.—We are glad to say that Mr. Goetzl's great enterprise for developing the hidden wealth of Douglas mountain bids fair to accomplish all that has been most sanguinely hoped for. At 600 ft the fourth lode or "mother vein," has been cut into, but the workmen are not yet through it. It carries mineral of a very high grade.

OWNERS OF LOW GRADE MINES carrying a high per cent. of galena, are now anxiously inquiring about the probabilities of the smelting works in the valley starting up this season. Fully a score of large mines are now lying idle, waiting the proposed market for their ores. The output of this district will increase 35 per cent. yearly when we can load this class of mineral on cars in Georgetown for Golden or Denver. We are assured that both establishments will soon enter the market, and the extension of the C. C. to the prospect of Georgetown is now more promising than it has been.

Idaho.

WAGONTOWN MINES.—Owyhee Avalanche: We continue to receive the most favorable reports from the newly discovered gold mines near Wagontown, which are two hours' walk or more from Silver City. Mr. Mays, an old prospector in this camp, has been down there the past two weeks, and he confirms the general opinion in respect to the abundance of rich ore in that vicinity. Mr. M. was working some valuable claims near town a month ago, but abandoned them for what he regards as a more productive field. All that is needed he says to work the new mines successfully is capital, which, with the requisite facilities, will, he predicts, accomplish wonders in that locality.

GOLDEN CHARLOT.—A letter of the 29th says: The new discovery is now opened by a drift over 50 ft in length, and the faces continue in ore. The drifts both north and south, and on the back of the level, show a continuous body of high grade ore. For this same body cross-cuts are being run from both the first and third levels. The ore from the winze from the ninth and tenth Minnesota continues very fine. All the other drifts continue in about the same kind of ground and ore as when last reported.

WAR EAGLE.—A dispatch of the 1st says: The 7th level is opening out fine.

Oregon.

CINNABAR.—Oregon Sentinel, May 29: We have within three miles of Jacksonville the largest cinabar ledge that has yet been discovered and which is now being thoroughly prospected. A cross-cut having been run eight feet in depth and ten feet wide, shows the ledge to be 60 feet wide from ceiling to casing. They have sunk a shaft in the cross-cut to the depth of 35 feet, and the ore looks very fair all the way down, and seems to be of a better quality the farther down they go on the ledge. Messrs. John Bilger, E. D. Foudray, West Manning, T. McKeuzie, M. Oston, E. D. Watson, J. H. Peun, J. B. Coates and H. K. Hanna, are the names of the gentlemen who compose the company. They are pushing the work vigorously forward in the shaft, and they expect in a few days to strike a very rich vein of ore, as the present appearance of the rock is very encouraging. We wish the gentlemen success in their undertaking, and trust they will realize a handsome profit for their investment, as certainly the energy and enterprise of these gentlemen in developing this lead is worthy of a flattering reward.

OREGON PLACED MINES.—Cor. Sutter Banner, May 29: A correspondent writing from Auburn, Baker county, Oregon, under date of May 10th, gives us a few items concerning the mining claims in that vicinity. He says: "The oft reported richness of the mines here are not over-rated; last week a nugget worth \$200 was picked up in one of the claims, and most of the claims will yield \$10 to the man."

He also says N. C. Haskell, formerly of the Banner, and Daniel Best are both there and in good health and spirits; the latter began piping in one of the gulches on the 3d inst., and is now washing out about 1,500 square yards of earth per day with a good clean-up in anticipation. He says the weather is very cold; from the 5th to the 8th inst. it snowed and hailed so hard that but little work could be done. He writes encouragingly of the prospects, and has no desire to return to his old familiar haunts.

MINING ITEMS.—Weekly Oregonian, May 29: They are passing around the hat for contributions to work up rock of the famous Yank ledge in Jackson county.

It is reported that the Eagle mining company has sold its black claim in Coos county. The terms are not made public as yet.

The big mining ditch at Eldorado, Baker county, owned by Carter & Packwood, is now furnishing 400 inches of water, and good results from the mine in that vicinity are anticipated.

MARSHALL & DEALEY, placer miners, Olive creek, Grant county, picked up from their "ground sluice" one day week before last, the sum of \$3,000 in nuggets, weighing all the way from half an ounce to six ounces.

POWEAS & CO., of Rye Valley, Baker county, made a clean-up from a short run in their placer claims, and had the proceeds run into a bar at the assay office in Baker City on Monday of last week. The bar was worth \$2,500.

Utah.

NEW TRAMWAY AT THE LITTLE COTTONWOOD CANON.—Cor. Salt Lake Tribune May 24: During the past week several San Francisco and New York capitalists have been here, discussing the practicability of building a Halliday patent wire tramway from here to the end of the railroad. The distance is less than six miles, and the cost is estimated at from \$250,000 to \$300,000. It would be set up on stations at least 20 ft above the ground, and would not be bothered with snow in the least. There is no doubt but that this would be a big paying investment, as all the up freight, passengers, etc., would pass over the line, and there would be at present from 250 to 400 tons of ore daily to go down, which amount would be very materially increased if transportation was reduced. As this camp contains hundreds of thousands of tons of low grade ore, which will not quite pay for working at the present rates of freight, this class of ore with cheap transportation would leave a nice margin. It now costs about 18 per cent. for sacking and shipping. A tramway company could make a nice thing at \$4, as the ore could be taken in bulk, and the expense of sacking dispensed with. It is thought this enterprise will be put through this season, and if so, it will be a great thing for this camp, and cannot fail to be a paying investment.

BULLION REFINING.—Dr. Linderman, Director of Mints, expects to be able by the 15th of July to refine and part all bullion produced in the country, instead of having one-half at least sent abroad for that purpose as has been the case heretofore, on account of insufficient refining capacities in the United States. The new refinery at San Francisco is thought will be ready by that time. The refining capacity of the United States assay office, in New York, will be trebled, and that of the Philadelphia mint considerably enlarged. The Director of Mints will leave New York about the 9th for this coast. On his way out he will stop at Cincinnati, Indianapolis, St. Louis, Kansas City and Denver, and on his return at Omaha and Chicago, for the purpose of determining what point in the West is the best located for the proposed new mint.

Another \$1,500,000 of the Consolidated Virginia mine bullion has been sold to the Government, to be paid for in gold coin from the office of the Sub-Treasurer in San Francisco.

Hints on the Washoe Process.

(Continued from last week.)

The Treatment of the Pulp in the Pans, Continued.

When each charge is withdrawn, it is well to wash out the pans with water, so as to get all the quicksilver possible out of the pan. There will still remain from thirty to sixty pounds in a flat bottomed pan (though this form is on other accounts to be preferred) under "and around the dies or the lower grinding surface; and there will be, also, more or less amalgam sticking in various places on the sides of the pan, the muller, etc. Charge the pan with the muller raised, and turn live steam directly into the pulp. This method is preferred because in this way the pan is heated much more rapidly than by a jacket, or double sides and bottom, filled with the exhaust steam; and little work can be done by the pan until the charge is heated. The pulp should also be heated, almost to boiling. The consistency of the pulp when the quicksilver is put in should be as thick as possible consistently with a good circulation in all parts of the pan; but, inasmuch as the pulp will be ground faster when thin, it is best to have it thin at first. To secure both objects, the pulp may be diluted to such a degree that, after grinding two and a half hours, it will have thickened to the proper consistency for recovering the quicksilver. If this condition is fulfilled, the quicksilver charged into the pan will, after its speedy division into small globules, occasioned by the grinding and heat, be diffused through the whole mass. A sample of the pulp taken out on a thin wooden spatula should show particles of uniformly disseminated quicksilver. Some of the globules will be microscopic; but from an ounce of the pulp, washed in a hour, a good sized globule of quicksilver may be collected by rubbing, etc. The pulp, if of proper consistency, will have a good motion, yet be thick enough to carry the quicksilver in suspension just to the surface, as the current rises from under the muller on the outside of the pan. On the other hand, the large globules of quicksilver will be able to gradually sink through the pulp. Thus the quicksilver describes a course distinctly its own, and a more intimate contact is attained.

If selt is used, it should be introduced as soon as the pan is charged. Sulfate of copper, if used, should be added as soon as the pan is heated up, which ought to take place in fifteen minutes. Then the steam should be shut off and the muller lowered, and grinding commences. The reason for not lowering the muller at the start is to save power, since the pan will grind but poorly, and that with difficulty, in the cold pulp. If the pan has a cover on it, (as all pans should have,) probably there will be no necessity for using the steam again till the charge is drawn and a new one put in, since sufficient heat will probably be retained to render amalgamation effectual.

It may be assumed as a fair average that the charge is run five hours. All the chemicals used, except those for saving quicksilver, are put in the pan at different times, and, after the last one is put in, there should be at least twenty minutes before the quicksilver is charged. I prefer to put in the quicksilver in the middle of the period, i. e., two and a half hours before drawing the charge, and at the rate of 200 pounds of quicksilver per 2,000 pounds of ore, or a larger proportion of quicksilver if required by the richness of the ore. Three-quarters of an hour before discharging, the muller is raised, since, if the pan is in good order, the charge should be by this time thoroughly ground, and raising the muller avoids further cutting up of the quicksilver by the grinding. At the time of raising the muller, the chemicals used for saving quicksilver may be added. Fifteen minutes before drawing the charge sufficient water is added to thin the pulp thoroughly. This prepares the charge to flow readily out of the pan, and also stirs up any pulp that may be moving sluggishly.

The range of these remarks being merely mechanical, the subject of chemicals (mainly salt and sulphate of copper) in pans will not be here discussed. Suffice it to say at present, that my practice and numerous experiments have disposed me strongly in favor of using chemicals, and using them largely. When only a low percentage is expected, and from a docile ore, there is often no need of any chemicals at all, though even then a judicious use of suitable re-agents will save some of the quicksilver. The more refractory the ore, the greater necessity for chemicals, and for high heating of the pans. From ordinary and docile ores eighty per cent. of the assay can in some cases be obtained readily, without use of chemicals, by enforcing all the small mechanical details, such as those I have referred to, and by keeping the quicksilver in perfect order. The additional percentage obtained, running up to ninety-five per cent. and over, which I myself have frequently obtained, on gold and silver ores, is only to be gained by the use of chemicals.

The most important point in the process is to keep the quicksilver always bright, clean, active, and in good order. In working an ore that fouls the quicksilver, if it is not practicable to keep the quicksilver clean in the pan, it should be at least put in perfect order before it is again used for another charge. In such cases it is important to keep the pan as free from quicksilver as possible during the first part of the process. For cleaning quicksilver, sodium amalgam, caustic potash, dilute acids, cyanide of potassium, etc., are used. Even in docile ores it is well to keep a cleaning mixture on the quicksilver under the strainers.

(To be Continued.)

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Fifteenth Lecture Delivered before the University of California College of Agriculture, on Tuesday, February 9th, by Prof. C. E. BESSEY.

(Reported and Illustrated for the RURAL PRESS.)

Improvement of Varieties.

When we consider plants and animals, we are apt to look upon them as existing as definite, and to a certain extent invariable species; but a critical examination shows them to us as varying with every varying circumstance.

In the ordinary agricultural and horticultural operations we have to deal with about 100 species of plants and sixteen species of animals, not including, of course, the many with which we have indirect relations, as for example the insects which destroy our crops, the vermin which attack our stores and the fungi which rot our wooden houses and barns.

I include only those which we grow voluntarily, and which give us the "products" of our farms and gardens, the trees which afford us lumber and fuel, and the wild shrub from which we gather it may be considerable quantities of berries, are left out. Here, then, we have 116 original species or forms, from which have been derived the animals and plants, bought, grown and sold by the farmer and gardener of to-day. These original forms, furnished by nature to man, were

The Crude Materials

Which he could modify, change and almost rebuild to supply his needs. Scarcely one out of the whole list of food plants but was originally almost inedible, and of the animals we have only to compare the Suffolk hog and the short-horn ox with their lean, lank progenitors, to see what necessity there was for an improvement upon the original wild species. I will select a few of the most prominent from my list. First the plants: The cabbage in its wild state was a leafy, long-stemmed plant, growing no head and furnishing only a small amount of coarse food. Now, under cultivation, that one poor form has developed into five or six species, each of which has again developed further into many varieties. Taking up one of the seed catalogues, I find sixty-nine varieties of the cabbage. They may be translated as follows: [See Figs. 1, 2, 3, 4 and 5.]

1. Sub-species *Acephala*, Kale or Boricole, eight varieties. 2. Sub-species *Bullata*. 3. Sub-species *Capitata*, common cabbage, twenty-eight varieties. 4. Sub-species *Carlo Rapo*, Kohl Rabi, four varieties. 5. Sub-species *Botrytis*, (a) Cauliflower, twelve varieties; (b) Broccoli, eleven varieties.

Each of these types may be considered as a center from which the varieties have diverged, as in the diagram.

Turn now to the apple, supposed by many to be a single species. By referring to Downing's Encyclopedia of Fruits and Flowers, I find that there are in America alone about 1800 varieties, differing enough from one another to be distinguishable. Examine the particulars of the variations and they will be found to relate to shape, size, color, texture and taste of fruit, with equal modifications of bark, stem, branch, twig and leaf and differences in habit, hardness, keeping qualities and time of ripening. Here we have a dozen or more characters, all of which are variable. Now, each variation of these characters may give us a new variety, so that the number of possible distinct varieties is practically limitless, and the number given before as described in Downing may be considered as but the beginning of a long list which is destined to grow larger and larger as long as man shall continue to grow the apple.

The pear, I need but mention to call to your minds what changes have been wrought upon the original wild and almost inedible fruit—to-matoes, potatoes, wheat, oats and maize are all among illustrations. The first, the tomato, has been grown in kitchen gardens for less than half a century, and yet we find in catalogues upwards of fifty varieties, exhibiting differences in fruit, stem, leaf, hardness and time of ripening. In the potato, varieties have run away up into the hundreds. In 1870, I grew in the gardens of the Iowa College of Agriculture upwards of eighty varieties, all of which had characters sufficiently well marked to enable anyone to distinguish one from another. Mr. Grunell, of Clayton, Iowa, has had on his list fully double that number, while Dr. Hexamer, of New Canaan, New York, advertises in his catalogue two hundred varieties, and there is no doubt that if all the kinds grown in different parts of the country could be gathered up and enumerated, the list would be more than doubled.

Let us now inquire what bearing this fact of the variability of species has upon agriculture and horticulture. As man has gone from one country to another he has naturally carried with him the plants and animals which he had been accustomed to have about him in his old home. But many a time, as he moved, the change of climate was so great that the old varieties could not be grown in the new locations. Sometimes the change was from a moist climate to a dry one, as in passing from the Atlantic States to the plains of the Mississippi

valley. Again, it was from a mild climate to one of great severity, as in passing from Europe to the east coast of America; or it was from one soil to another, as was the case in passing from the clays and sands of New England to the alluvial soil of the Mississippi valley.

What has been the Result?

Often after many failures to grow the more tender varieties, hardy ones appeared, so that now but little difficulty is found in growing them. In passing from the protected regions around the great lakes to Iowa and Nebraska many old varieties of apples had to be discarded. The old Rambo, the Rhode Island Greening, the Baldwin, the Bellflower, the Follawalter and many other old standards were found to be tender, and the result was to be seen in the many trees killed down each winter.

It may be said that in Iowa all the orchards first set out were killed because the varieties were too tender—and yet now it produces the finest apples east of the Rocky mountains. Another good illustration may be furnished by maize or Indian corn, which has produced varieties fitted to all the differences of climate



Fig. 1. Acephala.



Fig. 2. Bullata.

found in the United States. The tall, rank-growing sorts are found in the Southern States, where the summers are long enough to ripen the great mass of vegetable matter; but in New England and New York, where the summers are short, the small, eight-rowed, flinty kinds are grown. How is it that throughout all except the most northern of the United States we can grow the peach to perfection?

Look upon the map and note that Persia, the native country of the peach, lies mainly south of the center of the United States. Trace its isotherm of 70 degrees and you will find it to pass through Northern Africa, through Florida, Louisiana, Texas, Northern Mexico and the peninsula of Southern California—and yet from



Fig. 4. Carlo Rapo.

that warm climate the peach has spread, in its hardy varieties, northwestward into Europe and throughout all but the most northern of the United States and I have been informed on good authority that a German horticulturist, near Madison, Wisconsin, has recently grown peach seedlings which prove hardy even in that cold climate. I might go on multiplying instances—but these are perhaps sufficient to show that through its variations a species naturally suited to one climate may become fitted to endure the inclemencies of another.

If these variations of the original occur—and occur so opportunely for man—the questions which interest us are: First, whether varieties



Fig. 3. Capitata.



Fig. 5. Botrytis.

arise independently of man's labors, or, are due to something which he has done and second, if man has anything to do with the production of varieties, what are the causes of such variations, which lie within his control, in other words,

How Can Man Produce Varieties?

Dr. Gray, in the *Naturalist* for February, 1874, puts the first inquiry in this form, "Were the fruits made for man, or did man make the fruits?" and in answer says: "Some fruits were given to man as they are and he has only gathered and consumed them. But these are only minor fruits and such as have lately come within the reach of civilized man—or, are not thought worth his trouble; huckleberries and cranberries, persimmons and paw-paws are examples taken from this country. Whether even such fruits have or have not been under a course of improvement irrespective of man is another question. Others have come to man full flavored, and nearly all that he has done has been to increase their size and abundance, or, extend their season; currants and gooseberries, raspberries and blackberries, chestnuts and above all strawberries, are of this class. But most of the esteemed or important fruits

as well as the grains have not so much been given to man, as made by him. The gift outright was mainly plastic—raw material—time and opportunity." As to this second query—How man may produce varieties—in order that we may answer this, it will be necessary to discuss reproduction, prepotency or power of transmitting qualities, climate, culture and crossing—all of which are more or less under man's control, together with spontaneous varieties or sports and reversion, which come in as disturbing elements, if not understood; but which under skillful manipulation may even be made to aid the grower or breeder. These, then, will be the topics which we will consider in these lectures.

Coast Railroad Items.

The San Francisco Post, in speaking of the departure for Los Angeles of Col. Crawford, Chief Engineer, and Jas. A. Bitchard, Secretary of the Los Angeles and Independence railroad, says: This road is one of the most important enterprises ever projected in this State. Senators Jones and Stewart are determined to carry it through at the earliest day possible, not only for the benefit of their mining interests at Pausmint, but also in the hope of effecting a combination by which a direct rail route may be opened through to Ogden, independent of the Central Pacific. Jay Gould and Senator Jones have been in close consultation recently on the subject, and it is more than likely that something may come of it, as Mr. Gould is particularly anxious to reach the Pacific coast without coming over Stanford's line. The idea proposed is to extend the Los Angeles road from Independence, the present projected terminus, through the southern part of Nevada, striking Pioche and other important mining camps, and tapping the Utah Central railroad at or near Beaver, Southern Utah. Mr. Pritchard says there are vast coal beds at different points on the projected route which would prove a mine of wealth could they be opened up and their treasures brought to market. Mr. Jones will be here in about two weeks, when work on the Los Angeles road will be driven forward in earnest.

The Central Pacific people are preparing to push through the Woodland and Colusa railroad to completion. The crops from Berryessa valley, Napa county, will come over the Winters road, and large freighting facilities will now be needed at South Vallejo. The iron is being laid between Viscaville and the new town of Winters in Yolo county. The grading of the Berryessa wagon road will commence this week. An A 1 Baldwin engine and three coschees have been built for the railroad, which connect by the wagon road with the Redington and California mines.

According to the Nevada county papers, work is progressing rapidly on the Nevada County narrow gauge railroad. The grade is completed from Colfax to the deep cut near the Central Pacific railroad bridge, which crosses Long ravine. There are two gangs of men at work in the cut, and it is expected they will complete it within ten days. The bridge builders are preparing for work on the trestling and bridges across Bear river and Greenhorn. Work on the grade, between Grass Valley and Nevada, will be commenced in a few days.

The survey for the new road from Colfax to Forest Hill, in Placer county, by way of the North Fork of the American and Shit Tail canon, is now being made. Favorable grades are reported, and it is confidently anticipated that the road will be constructed at an early day. With this road all the travel and freighting of Eastern Placer will be done by way of Colfax, instead of through Auburn, as heretofore.

The new time table of the Southern Pacific railroad will be issued in a few days. The change will commence on Sunday—and cars will make six trips daily each way to and from School House station. One early train from Millbrae station will reach the city at 6:45—one noon trip to San Mateo—and a 6 p. m. trip to School House station. The fare will be materially reduced.

The Santa Barbara Press says that about thirty gentlemen, well known for their broad views, sagacity and enterprise, with ample means to carry out the project, held a meeting and resolved upon organizing to construct a railroad from that place eastward to Lyon's station, on the Southern Pacific route, with the intention ultimately to continue it on to Arizona.

The depot building at Caliente, the present terminus of the Southern Pacific, now completed, is about one hundred and seventy feet long by forty feet wide. A large platform is being built at one end as a transfer of heavy freights, such as mining machinery and building.

Work has at last been commenced on the Stockton and Ione railroad. On Monday eighty teams were employed in grading on Souma street, Stockton, and it is the intention of the new managers to push the work forward with dispatch.

Rollins stock for the Vacaville railroad is already on the spot. The new town of Winters is making a handsome beginning. Lots worth \$22,000 are already sold.

One thousand five hundred men are now at work on the Southern Pacific railroad at Tehichipe pass.

The annual meeting of the City railroad company will be held on the 21st of June.

Quicksilver Mining and Its Profits.

The present low price of Quicksilver has caused many who were accustomed to consider \$1.40 or \$1.55 something normal to think that the fall in value consequent on increased production was unremunerative and would probably result in the closing up of some of the newly discovered mines. That these fears have no foundation in fact, and that even a lower price would be remunerative is however the fact, the truth being that Quicksilver mining in proportion to the capital invested in it has yielded enormous profits—profits far out of all proportion to those made in any other pursuit or in any other instance, save perhaps, in some of the wonderful claims on the Comstock or in some of the diamond fields of Brazil.

Prior to 1874 the number of mines were limited to two in Europe and three in America—the total production was concentrated in a few hands, and this indispensable metal brought just what price the combination of mine owners pleased to put on it. That price in this city for 1874 averaged \$1.37 1/2 per pound, or about 87 1/2% higher than the average price for 25 years. That price was, taking into account the value of exports and that consumed on the coast, 50c per pound.

The total quantity produced in the State in 1874 was 34,154 flasks or 2,612,781 pounds, and the difference between the average price for years and the average price last year was as follows:

2,612,781 lbs at \$1.37 1/2 \$ 3,679,404.72

2,612,781 " " 50c 1,306,390.50

Extra Profit of 1874..... \$ 2,272,714.22

This of course, does not represent the whole profit, for the cost of extraction, etc., is not over 26c per pound. The extra profits made during the years 1871, 1872, 1873, and 1874 have been as follows:

1871.

2,438,896 lbs at 90c..... \$ 2,144,507.04

2,438,896 " " 50c..... 1,219,448.00

Extra profit..... \$ 1,195,059.04

1872.

2,318,409 lbs at 80c..... \$ 1,854,727.20

2,318,409 " " 50c..... 1,159,204.00

Extra profits..... \$ 695,523.20

1873.

2,087,900 lbs at 90c..... \$ 2,047,042.00

2,087,900 " " 50c..... 1,043,950.00

Extra profit..... \$ 1,003,092.00

1874.

2,612,781 lbs at 90c..... \$ 2,351,502.90

2,612,781 " " 50c..... 1,306,390.50

Extra profit..... \$ 1,045,112.40

Total in four years..... \$ 5,165,388.46

Divided amongst a comparative few, these are enormous profits in the short space of four years, but they are only part of the real profits, as the figures of gross value of Quicksilver sold and of cost of extraction stand thus:

Total value of Quicksilver..... \$ 9,905,380.96

" cost " 2,459,076.38

Net profit for four years..... \$ 7,436,304.58

This shows that for every dollar expended the owners of the mines have taken in over four dollars, which amount has come out of the pockets of the miner, mine owner, etc., etc., throughout the world. The total product since the mines were first opened have aggregated 683,979 flasks of 76 1/2 pounds each or 62,324,393 pounds, and the total profit made has been as follows:

62,324,393 lbs selling at an average of 50c..... \$ 31,162,196.00

62,324,393 " costing " 20c..... 12,464,878.60

Profit..... \$ 18,697,317.40

No wonder with such profits as these that there should be contests, such as that in which McGarahan is engaged, waged year after year with the expenditure of hundreds of thousands of dollars. The prize to either contestant is a princely fortune and the present holders of the mine could well afford to spend the profits of years when in case of success they had those for an illimitable period open before them.

It is therefore a great mistake to suppose that 65c represents the bed-rock price. At 40c a profit of 54 per cent. nearly would be made, and in the cheapness of this indispensable metal a chance would be afforded for the development of much of the mineral wealth of the coast that is now unworked and has from the high price of Quicksilver been unworkable with profit.—*Journal of Commerce*.

THE INVENTOR'S PARADISE.—"A thousand patents," says Haseltine, Lake & Co's London circular, "are granted every month in the United States for new inventions. This number exceeds the aggregate issue of all the European States, yet the supply does not equal the demand, and the average value of patents is greater in America than in Europe by reason of the vast number of new industrial enterprises and the higher price of manual labor. A hundred thousand dollars is no unusual consideration for a patent right, and some are valued by millions. The annual income from licenses granted on the Blake Sole Sewing Machine is over three hundred thousand dollars—and other patented inventions are equally profitable. Inventors are encouraged by the moderate government fee of thirty-five dollars, which secures an invention for seventeen years without further payment—the right of patents are generally respected by the public, and no National Legislature, with a single exception, has ventured to propose the abolition of a system which at once secures substantial justice to inventors and proves of incalculable advantage to the nation."

The annual meeting of the Sutter Street railroad company will be held on June 14th.

GOOD HEALTH.

Fetid Feet.

Some persons can be "smelled" a mile off, more or less; it is a misfortune, and a source of very great mortification to the refined and sensitive. It may be "born" with some; with others, if not all, it is the result of a diseased condition of the system, or of a neglect of personal cleanliness. There is a peculiar odor emanating from the feet, which is, perhaps, always the result of uncleanness. If daily washings do not remove these odors, a very efficient wash is found in red oxide of lead, one part to twenty-nine parts of the liquor of the sub acetate of lead; the first to be bruised in a porcelain mortar, gradually adding the latter; apply a few drops once a week, oftener in summer.

A specific odor escapes every one, and is peculiar to the individual; the dog knows it, and by it follows his master through any crowd of human beings, and never makes a mistake. A man's odor of smell is not thus acutely developed; still there are persons whose peculiar penetrating odor is readily recognized. This does not come from the "sweat" of the person, as no such odor issues from the hands, but from the arm-pits and other parts kept covered by the clothing, so that the air cannot penetrate; nor is the application of soap and water too frequently allowed. When the "sweat" remains in contact with the skin, it undergoes a chemical change, and it is this which disengages the peculiarly disagreeable odor, as to the feet particularly; thus this chemical formation is a kind of feid fat, which is absorbed into the pores of the leather, and there it is detained with fresh additions daily, for weeks and months, with increasing rancidity, as the smell of any old boot or shoe will demonstrate. Some persons wear stockings without change from the time they are first put on until they are worn full of holes. Very many do not wash their feet oftener than once a month; only a few as often as once a week. To be scrupulously clean, the feet should be washed every night before going to bed, and no stocking, boot, or shoe should be put on a second time, until it has had a whole day's sunning, at least by those who have an ambition to be and feel as sweet and clean as a dew drop on the rose of summer; or put two tablespoonfuls of the compound spirits of ammonia (hartshorn) in a basin of water, and wash the face, hands, arms, arm-pits and feet with it. The skin is left fresh, clean, and sweet; it is perfectly harmless, and costs but little.—*Hall's Journal.*

SALICYLIC ACID—THE NEW DISINFECTANT.—The powers of carbolic acid to arrest fermentation and putrefaction are well known. But its odor is to most persons decidedly offensive, and if taken internally, even in minute doses, it is apt to produce very serious results. According to the recent investigations of Professors Kolbe, Knap and others, salicylic acid possesses the same antiseptic power without the accompanying disadvantages. It is odorless, of a faintly sweet taste, and can be taken internally, even in relatively large doses, without injurious effects. It will, therefore, prove of great value in preserving meats, eggs, fruit, preserves, beverages, medicinal preparations, inks and a great variety of organic matters from mouldiness or putrefaction. One part of the acid is capable of preserving 26,000 parts of water from becoming tainted. Small traces of it prevent wines, malt liquors, etc., from turning sour in cask or bottle.

THE mental condition has far more influence upon the bodily health than is generally supposed. It is no doubt true that ailments of the body cause depressing and morbid conditions of the mind; but it is no less true that sorrowful and disagreeable emotions produce disease in persons who, uninfluenced by them, would be in sound health; or if disease is not produced, the functions are disordered. Not even physicians always consider the importance of this fact. Agreeable emotions set in motion nervous currents which stimulate blood, brain, and every part of the system into healthful activity; while grief, disappointment of feeling and brooding over present sorrows or past mistakes, depress all the vital forces. To be physically well, one must in general be happy. The reverse is not always true; one may be happy and cheerful and yet be a constant sufferer in body.

SUNFLOWERS FOR FEVERS.—Favorable mention continues to be made of the virtue of sunflowers as preventives of bilious fever, chills, fever, etc. A correspondent writing from a place in Alabama, which he says was peculiarly subject to fevers, gives the results of his experience on the premises, and in not a single instance where he planted sunflowers around his negro cabins did their inmates suffer from fevers, while his wife, two children and two house servants all had fevers, he not having planted any of the sunflowers around his dwelling, which, in his opinion, accounted for the difference in the results.

CURE FOR CHILBLAINS.—Glycerine, one ounce; carbolic acid, one-half a dram; mix, and apply night and morning. If the suffering is severe, soak the feet every night in a tea made of white oak bark. The remedy is said to be infallible.

Chloral In Sea-Sickness.

First, no person should take more than twenty grains of chloral, or its equivalent of two teaspoonfuls of the syrup of chloral, in one dose, without the advice of a physician. Secondly, the action of the drug will be much expedited by diluting the dose largely, say with half a tumbler of water. Thirdly, the remedy should be taken before the vessel is in motion, but not until every arrangement has been made which will insure the patient against being disturbed or roused during the passage. Fourthly, the patient should lie down, and—weather permitting—remain on deck. Fifthly, although chloral taken in the dose indicated will generally induce sleep, the patient may pass into a semi-conscious, dreamy state, quite as favorable for the purpose under consideration. The drug is, however, cumulative in its action, and must not, therefore, on a short passage, be repeated. More than two years ago I ventured to prevent a lady going to Ostend from taking a fourth repetition of what I ascertained to be a twenty-grain dose of chloral, which she had been told by a friend must be continued at short intervals till she slept. On arrival at our destination she was taken off the vessel in a perfectly unconscious state. In long voyages, however, as to America, I have advised with success two doses of twenty grains, taken at intervals of eight to ten hours, and afterward five-grain doses twice daily till the patient becomes accustomed to the motion of the vessel. Persons always have and always will use remedies without medical advice, and accidents will continue to occasionally result from such practices. It is the recollection of the many such misadventures which have already attended the use of chloral taken unadvisedly for the relief of pain, that induces me to think these precautions for its use in sea-sickness worthy of attention.—*Exchange.*

REMEDY FOR LOCKJAW.—Smoke the wound or bruise with the smoke of wool. Twenty minutes in the smoke of wool will take the pain out of the worst wound, and repeated once or twice, will allay the worst case of inflammation arising from a wound.

SORELET FEVER in a very dangerous form, is prevailing in Sacramento and vicinity, and has proved fatal in a number of cases. In some families two and three children have died.

Useful Information.

TO FORM PERFECT SQUARES.—Squares can be tested with the dividers by drawing two circles, one within the other, from the same center, of sixteen and twelve inches diameter respectively; then set the dividers to ten inches, insert one point in any part of the outer circle, and mark the point exactly where a circle (drawn with the dividers in this position) would intersect the inner circle; now draw a straight line through the center of the circles and through the point marked in the inner circle; and through the outer one, another line starting from the point where the dividers were inserted in the outer circle through the center of the circles, until the outer circle is reached. If this is done exactly, the points where those lines intersect the outer circle will form the corners of a perfect square whose side is 11.3137 inches. If the square is correct, it will fit the square thus formed and also the lines in the center, which divide the circle into four equal parts, and the angles must be ninety degrees. This is based on the rule for finding the hypotenuse of a right angled triangle, thus 6 square=36 and 8 square=64, sum 100, the square root of which is ten. This is sometimes called the six, eight and ten rule for squaring buildings.—*Ex.*

TO PRESERVE POSTS.—The *American Chemist* says that a Western farmer discovered many years ago that wood could be made to last longer than iron in the ground. Time and weather, he says, seems to have no effect on it. The posts can be prepared for less than two cents apiece. This is the recipe: Take boiled linseed oil and stir into it pulverized charcoal to the consistency of paint. Put a coat of this over the timber, and, he adds, there is not a man who will live to see it rot.

The expensive part of the Daniells battery is the copper plate, the cost of which can be reduced two-thirds in the following manner: Procure sheets of the ordinary sheet tin of commerce, brighten, and plunge into a very weak copper-plating solution, in connection with a voltaic battery of a very low quantity. In fifteen minutes a tenacious film of copper will have been deposited on the tin and the plate can then be bent into shape and used in the ordinary manner.

According to Botger, nickel is better adapted than any other metal for galvanizing iron, and it resists the action of oxidation much better than gold. The latter metal is very porous when it is in a thin layer; nickel, on the contrary, forms a thoroughly impermeable coating.

FRENCH papers speak of a newly invented texture, a kind of cloth manufactured of the down of chickens, ducks, etc. It is waterproof, and may be dyed in all the different shades. The experiments have met with great success.

ALCOHOL—CURIOUS CHANCE OF MEANING.—Dr. Richardson in a recent lecture gives some information, says the *London Medical Record*, on this much used word. He says that the first employment of the English word alcohol is obscurely recorded. Bartholomew Parr, one of the most learned of scientific classics, taking the usual derivation of the word from the Arabic Al ka-hol, a subtle essence, says it was originally employed to designate an impalpable powder, used by the Eastern women to tinge the hair and margins of the eyelids. As this powder, viz., an ore of lead, was impalpable, the same name was given to other subtle powders, and then to spirit of wine exalted to its highest purity and perfection. The earliest systematic and truly scientific use of the term that Dr. Richardson could discover is in Nicholas Lemert's "Course of Chemistry," published in 1698. Then the word is used as a verb, "to alcoholize," and the definition of this is said to be "to reduce to alcohol, as when a mixture is beaten into an impalpable powder." The word, says Lemert, is also used to express a very fine spirit, "thus the spirit of wine well rectified is called the alcohol of wine."

BALLOONING.—The following practical hints on ballooning are published by Donaldson the aeronaut, in a little paper edited by him and named the *Aerial*. The lifting strain of a balloon is principally upon the net. If a balloon will stand inflation, it is safe in mid-air. In winter, the atmosphere is warmer one mile above the clouds than it is at the earth's surface. The weight of a balloon to carry one man, including net and basket, should not exceed 80 pounds. A cotton balloon will last for about sixty ascensions. A balloon thirty feet in diameter undergoes a strain of 1½ pounds to the square foot of surface. Gas which at the earth fills the bag only half full, will, at an elevation of 3¼ miles, expand so as to fill it completely. One thousand feet of coal gas will raise 38 pounds. Gas which gives a poor light is the best for aerostatics. Kites can be used to steer by sending them up or lowering them into currents of air traveling in different directions from that in which the balloon is sailing.

WATERPROOF PAPER.—The French papers speak of a method of rendering paper extremely hard, and tenacious by subjecting the pulp to the action of chloride of zinc. After it has been treated with the chloride it is submitted to a strong pressure, thereafter becoming as hard as wood and as tough as leather. The hardness varies according to the strength of the metallic solution. The material thus produced can be easily colored. It may be employed in covering floors with advantage, and may be made to replace leather in the manufacture of course shoes, and is a good material for whip-handles, the mounting of saws, for buttons, combs and other articles of various descriptions. An excellent use of it is in large sheets for roofing. Paper already manufactured acquires the same consistency when plunged, unsized, into a solution of the chloride.

DETECTION OF BEEF FAT OR LARD IN BUTTER.—Mr. Stoddart gives the following method of distinguishing between butter and other fats of animal origin. A quantity, say fifty grains of butter, is put into an ounce bottle, half filled with ether, and the mixture is well agitated. If the butter be genuine, perfect solution of the fatty matter will take place, and salt and water will be separated, together with curd, which is occasionally present to the extent of eight or nine per cent. The salt and water may be readily recognized, and the curd may be proved such by heating a small portion on a slip of glass, when it will dry and fall to powder. If beef fat or lard be present, they will not dissolve in the ether, but fall to the bottom of the solution; by the application of heat, as in the case of curd, the fatty character of these substances is at once shown by their liquefaction.

PRAIRIE CHICKENS AND GRASSHOPPERS.—While naturalists and entomologists are puzzling over the discovery of some plan to prevent the recurrence of the grasshopper plague in the Western States during next fall, it would be well for them to take the immense yearly slaughter of the prairie chickens into consideration. The numbers of these birds which are slaughtered each winter by trapping after heavy snow storms, and find their way to the markets, are something enormous; and as the grasshoppers constitute a great part of their natural food, it seems not improbable that the disappearance of the former might exercise a very appreciable effect in the increase of the devastating insects.

The discovery of "plate glass," which was accidental, was made in the year 1688, by a man called Thevat. It is attributed to the breakage of a pot containing some of the melted material, a portion of which flowed under a large flag stone, which, when subsequently removed, was found in the form of a plate. This suggested the idea of casting it in plates; a patent was soon obtained, and works were established in Paris.

Every passenger-car on the Illinois railroads is by law compelled to be furnished with a woodman's ax, a sledge-hammer, a hand-saw and two leather buckets.

A SILVERING powder for coating copper consists of nitrate of silver 30 grains, common salt 30 grains, cream of tartar 3½ drachms. Mix, moisten with water, and apply.

DOMESTIC ECONOMY.

Hints for the Household.

A correspondent of the *Germantown Telegraph* furnishes the following "trifles" under the head of "Hints for the Household."

TRIFLES.—There are many little things in the household, attention to which is indispensable to health and happiness. The kind of air which circulates in a house may seem a small matter, for we cannot see the air, and not many people know anything about it; yet if we do not provide a regular supply of pure air within our houses, we shall inevitably suffer for our neglect. A few specks of dirt may seem neither here nor there, and a closed door or window appears to make little difference; but the little dirt and the little bad air are apt to sow the seeds of ill-health, and therefore ought to be removed. The whole of the household regulations are, taken by themselves, trifles—but trifles tending to an important result.

PREVENTIVE AGAINST MOTHS.—A very pleasant perfume, and also preventive against moths, may be made of the following ingredients. Take of cloves, caraway seed, nutmeg, mace, cinnamon and Tonquin beans, of each one ounce, then add as much Florentine orris root as will equal the other ingredients put together. Grind the whole well to powder, and put it in little bags among your clothes, etc. This will answer for furs also; but I never tried anything more certain as a protection against moths in furs than to first shake out or heat out every foreign substance before putting away for the season. Then wrap them up in a perfectly sound newspaper. What I mean by sound is that there shall be no holes or breaks in the paper. Make a bag of the paper by pasting; pack it and paste up the mouth of the bag. Put it in a drawer where it will not be disturbed. If well done not a moth will ever be found inside. Try it.

WASHING WOOLENS.—Professor Artus, who has devoted himself to the discovery of the reason why woolen clothing, when washed with soap and water, will insist upon shrinking and becoming thick, and acquiring that peculiar odor and feeling which so annoy housekeepers, says these evil effects are due to the decomposition of soap by the acids present in perspiration and other waste of the skin which the clothing absorbs. The fat of the soap is then precipitated upon the wool. These effects may be prevented by steeping the articles in a warm solution of washing soda for several hours, then adding some warm water and a few drops of ammonia. The woolens are then to be washed out, and rinsed in lukewarm water.

LEMON-PROPS FOR CHILDREN.—Squeeze the juice of six lemons into a basin; pound some lump sugar and sift it through a fine sieve; mix it with the lemon-juice and make it so thick that you can hardly stir it; put it into a stew-pan, and stir it over the fire for five minutes; then drop out of a teaspoon on writing paper and let it stand until cold.

TREACLE PIE.—Line a dish with thin paste, cover with treacle as for rolly-polly pudding, and continue alternate layers of paste and treacle till the dish is full, finishing with paste; bake in a moderate oven.

VIOLET POWDER.—Violet powder is made by scenting finely-sifted arrow root with a little orris root.

THE MOSAIC DIETARY LAWS.—It is strange that the Mosaic prescriptions for man's diet, chiefly taken from the tabernacle rites, have become, by common consent, the bill of fare of modern society, with variations, of course. In the cities, especially, the main articles of food are those which the laws of Moses recommend. When in former days people dieted largely on pork, many became hogs themselves, and many diseases, still raging among men, have been conveyed into the human system by the consumption of pork, rabbits, hares and other animal food which the law forbids.

Physiologists understand well enough the importance of diet, and yet none have gone to the trouble of giving the Mosaic dietary laws a thorough scientific examination. Here are the Jews, after 3,000 years, a healthy, intelligent, energetic and fertile race. Much is said about their longevity, temperance, charitable disposition, etc.; still no scientist has taken the trouble to examine the food on which this race lived and thrived. The point is certainly, scientifically, very important.

NEW METHOD OF CLEANING WOOLEN GOODS.—It is well known that wool when first taken from the sheep contains an innocuous secretion from the skin of the sheep called "yolk." This soapy substance contains potash, and can be washed out with water, with which it forms a sort of lather. In Elbeuf this yolk is employed with advantage as a substitute for fuller's earth in cleaning woolens. The raw wool is put in a large vat, and covered with water. Here it is left for three hours; then the water is let out into a second vat, and afterwards pumped back into the first vat for two hours longer. The operation is repeated two or three times, and then the wool is taken out of the vat freed of water. New wool is now put in the vat and manipulated as above, until the water is sufficiently soapy. The cloth is put in the fulling machine with a sufficient quantity of this liquor, and fulling for two or three hours. After washing it is found to be perfectly clean.



W. B. EWER..... SENIOR EDITOR.

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San Francisco:

Saturday Morning, June 5, 1875.

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Monthly List of Scientific Books.

[Published the first issue in every month.]

AUTHOR.	TITLE.	PRICE.
Fuchs (Prof.),	Practical Guide to the Determination of Minerals by the Blowpipe.....	\$2 50
Foye (James O.),	Tables for the Determination and Classification of Minerals found in the U. S.....	75
Johnson (F. H.),	Mechanics and Students' Guide in the Designing and Construction of General Machine Gearing.....	2 00
Jones (John),	Hand-railing Out Square to the Plank, without a Falling Mould.....	2 50
Sprague (J. T.),	Electricity—Its Theory, Sources and Applications.....	3 00
Evers (Henry),	Navigation in Theory and Practice.....	1 50
Vogel (Prof.),	The Chemistry of Light and Photography.....	1 75
Lakey,	Village and Country Houses.....	6 00
Whitney (Wm. Dwight),	The Life and Growth of Language.....	1 50
Stephenson (S. H.),	Boys and Girls in Biology.....	1 50
Galtion (Francis),	English Men of Science.....	1 00

The above list is compiled and the works are for sale by A. L. Banoroff & Co., Scientific Booksellers, 721 Market street, San Francisco.

The California clay manufacturing company own a tract of land on Cook's ranch, on the line of the California and Oregon railroad, one mile beyond Lincoln, where they are now preparing to work about two hundred acres of clay and coal lands. This clay is said to be of the best quality yet discovered on this coast, and the company think it will prove an important industrial addition to the State, and of great advantage to all pottery-makers. Examination of it has been made by H. G. Hanks, who speaks of it in high terms. He finds its character to be the very best for pottery work of all classes, and one quality excellent for fire brick.

The new steamer built at Marysville for the navigation of the Sacramento and Feather rivers, which is to run between San Francisco and Marysville, was successfully launched on the 29th ult.

During the month of May the mint in this city coined of double eagles, \$2,140,000; trade dollars, \$535,000; quarter dollars, \$119,000; total \$2,719,000.

Mining Education—Practice and Theory.

The art of mining must, to a large extent, be learnt at the mine, both underground and at the surface. The diligent student will however obtain much aid from external sources, and obtain considerable elementary knowledge of the principles and facts of mining from works which are suitable to teach young miners what to observe and how to interpret these observations. The young student should endeavor to add to his own limited experience the wider experiences of men in many countries, by reading as well as by conversation with those having more experience than himself. He should also accustom himself to make written notes of the peculiarities of all mineral deposits with which he may become acquainted, and of the construction, cost and comparative efficiency of all tools, machinery and materials which may come under his notice.

The common notion that practical mining can and ought to be taught in a school of mines, and the instruction that would be given in such a school should stand in lieu of practice in mining works, is, it is needless to say, erroneous. Only in a mine and in the midst of mining works can the student obtain that technical knowledge without which all that he can learn in a mining school is valueless to him in his profession. These schools are intended to add to the knowledge of the practical miner and to encourage him to study those branches of science which are almost indispensable aids to practice, but which cannot stand as substitutes for it.

It is a mistaken notion to think that the practical man is the only one whose knowledge is to be trusted; it is none the less a mistaken notion to think that the theoretical man is the only one whose knowledge of mining is worth anything. In mining more than anything else, practice and so-called theory go hand in hand. The truth is that in most cases the theoretical man are called so because they have a wider range of knowledge than the mere practical man can by any possibility gain, as his knowledge comes from experience alone, and he ignores the experience of others. The theoretical man stores in his mind the experiences of many practical men, and with these as a superstructure to the basis formed by the so-called "book learning," his knowledge is more full and ripened than that of the working miner. There is really no antagonism between the two classes, as each gains by the knowledge of the other. The fund of information possessed by the scientific man is enriched by contact with the practical man, and the experience of the latter becomes more valuable to him by learning the reasons for things which he has heretofore taken for granted without inquiring the why or wherefore.

To become proficient, therefore, in the art of mining, the student must have a thorough grasp for the foundation, and the basis consists mainly in a good knowledge of laboratory work, acquaintance with the rocks and minerals, and some general ideas of the principles and facts of mining. It will then be better for him, before proceeding to advanced studies, to go to the mines, become familiar with surface and underground work, learn the reasons why certain things are done and the results practically, study and watch the machinery and metallurgical details, compare the systems in use in different mines; and during all this time keep notes of all items of interest likely to be valuable to him.

After spending as much time as convenient in this practical work, he will be better able to comprehend the details explained to him in his books, and also gain a definite idea of the class of knowledge most important for him to attain. He will become, moreover, more interested in a business with which he has some practical acquaintance, and instead of his studies appearing mere dry facts they will be more energetically followed, as so much capital to be drawn on an occasion requires in active life. On his final retirement from scholastic duties, and his commencement of practical work, the young miner will find that his store of knowledge, both in theory and practice, can be wonderfully increased, and he will endeavor to increase it in both directions as rapidly as possible. Practice alone will fire one of the drudgery, and theory alone will show the student the difficulties he must eventually overcome; but a judicious intermingling of both theory and practice in mining education will make a good miner, one who is theoretical and practical at the same time.

At the Chollar Potosi mine the grading for the site of the new shaft is completed, and the erection of the heavy stone walls for securing the embankments have been commenced. The first set of timbers for the shaft have been framed, and are of the best character of red spruce, fourteen by sixteen inches square. It is intended that no other kind of timber shall be used in the shaft, as that is considered the firmest and best that can be obtained. The entire supply of timbers for the shaft will be brought from Alta and Blue canon, California.

In the anthracite coal counties of Pennsylvania 450 persons were killed and 1,312 more or less hurt in the mines during the five years ending with 1874.

Reworking Old Mines.

There is no more encouraging sign of the advancement of the mining interests of California than that afforded by reading the numerous notices of renewal of work on mines which have been abandoned in former years. It is not in a few isolated instances only that this has occurred, but it is becoming so frequent as to cause little comment. In all the old mining counties of the State there are hundreds of abandoned shafts and tunnels, which were left by their owners years ago when miners looked for what the surface afforded and did not care to sink very deep. Frequently these claims were abandoned because the owners found out suddenly that it required hard knocks to get out gold, and that it did not come in lumps as they had fondly anticipated in coming to California. Again, they were abandoned because the miners rushed for new excitements where they hoped to make their fortunes in a few days. In other cases the claims were left for want of capital and proper milling facilities to work them, and sometimes also because the owners became discouraged before striking the lead.

Of course no one can tell in any of these claims just how much work must be done before the investor gets his money back. Still there are now plenty of persevering men re-opening these abandoned mines, and in many cases they have struck it shortly after commencing work. Only this week we learned of an instance of this kind which occurred in Sierra county. A long tunnel had been run into a hill by former owners with the expectation of tapping a ledge low down. It was run much further than was originally intended, but as no ledge was found the miners came to the conclusion that there was nothing of it at that depth and gave up the enterprise. The claim laid idle some eight years, but recently a new company relocated the ground, cleaned out the tunnel, retimbered it and started work in the face. They had only run 40 feet when the ledge was struck, and struck rich, too. Instead of pitching at the angle calculated by the original owners, it pitched at a much greater angle. The present owners are now only waiting for a patent for their ground to commence operations on a large scale.

The Oroville Mercury of last week mentions another circumstance of the same kind, at the old Porter mine on Jordan hill, about five miles from Yankee hill. This mine is now owned by an English company, who are engaged in re-opening the old tunnels and drifts with a view of again having it worked. Last week the men in the tunnel struck the ledge at a depth of 250 feet and found it to be as rich as any of the owners could wish. There is an old 12-stamp mill near the mine that has not been used for some seven years, and the building is in a dilapidated condition, but now the owners will put it in good repair and prepare to crush the rock. The ledge formerly paid well, but pinched out. Now that they have struck it so deep they think it will last.

As a contrast to this abandonment of claims under discouraging circumstances, may be mentioned the perseverance of a miner, spoken of by the Plumas National. Some nine years ago a Frenchman, whose name we could not learn, started a tunnel into the face of the mountain in a place known as Brown's diggings, in the southern part of Plumas county. He was advised, as usual, that he "was fooling away his time," but persevered, and the sound of his pick could have been heard at almost any time since, as he made his slow way through the hard rock. About the first of last January he broke into gravel, and since then he has taken out about \$2,000, and his chance for a big fortune is reduced almost to a certainty. We like to chronicle the success of just such men as this Frenchman, who back their judgment with their muscle, and overcome the obstacles in their path by "hard knocks."

Memorial Day.

Memorial day was generally observed throughout the country—not a city or a hamlet but its flags were lowered and its people did homage to the memory of those brave souls whose bodies were offered a sacrifice to maintain the nation's honor.

There is something sadly beautiful in the idea of a nation dressing the graves of her dead heroes with mournful emblems of respect and love. The memories this day awakens are not all sorrowful. The knowledge that those we loved and lost fell in defence of a great and pure principle will heal the hearts that would bleed afresh, check the sorrows that would otherwise be incurable. One of the most cheering evidences of the truth of our country is found in the reports that come to us of the mingling and interchange of comrades among those who not more than a decade since stood opposed in mortal combat. Over the grave of their dead brothers, the Union and Confederate clasp hands and swear allegiance to a common cause, for

"Under the sod and the dew,
Waiting the judgment day,—
Love and tears for the blue,
Tears and love for the gray."

In San Francisco the ceremony of decorating the graves at the cemetery was attended during Saturday, under the auspices of the Grand Army of the Republic, and in the evening Pacific Hall was crowded to repletion with ladies and gentlemen who listened to an appropriate memorial address delivered by Governor Pacheco.

The Coming Exhibition.

As time draws on towards the date of opening the Tenth Industrial Exhibition of the Mechanics' Institute, we are glad to find our manufacturers alive to the importance of the event. The Secretary, Mr. Culver, reports a large number of applications for space already filed, and from present appearances the capacity of the pavilion will be taxed to its utmost to afford space for a proper display of the different articles. Up to the first of the week over 30,000 square feet had been applied for. In the list of noticeable applications is that of the managers of the Cornell watch factory, who propose to have their mechanics at work, that the public may see the whole process of making a watch. The Turbine windmill company will have one of their windmills in operation, the agitating power being furnished by a blower provided for the purpose. Mr. W. W. Hanscom, proprietor of the Hope iron works, will exhibit a steam yacht. He makes a specialty of this branch of naval architecture. Mr. L. W. Coe has engaged space for an exhibition of the practical working of his air compressor and rock drill. The California furniture manufacturing company will make a fine display of house and office furniture. The California silk company will show silks and ribbons of their own manufacture. The Kimball manufacturing company have applied for a large space, in which to make a display of carriages, light wagons, cars, etc. Messrs. Roman & Co. intend making a show of their varied stock of school furniture. Clark & Co., a new firm from Illinois, who have commenced the manufacture of organs in Oakland, desire space for introducing their instruments to the notice of the public. The portion of the building reserved for mechanics is being rapidly taken up, and we expect to see the best display in that line ever attempted in San Francisco.

As by this time most everybody knows, the exhibition will open on the 17th of August next. Application for space should be made direct to J. H. Culver, Secretary, No. 27 Post street.

A regular meeting of the Board of Trustees of the Mechanics' Institute was held on the 1st inst. President Hallidie, who returned from his European trip on Monday night, was in the chair. Mr. Hallidie has made a flying trip of one hundred days, and returns to work refreshed by his relaxation from business. At the above meeting, in connection with the annual election on next Monday evening, Charles H. Grønnehsen, Wm. Renny and John O. Hanscom were appointed Judges of Election; Geo. L. Hull, R. A. Marden and Wm. Freer, Clerks of Election; Geo. C. Hickox, H. J. Booth and J. R. Wilcox, Installation Committee. Messrs. Spiers, Wells and Davis were appointed a Committee for the general management of the election. The annual election will be held on next Monday, from 12 m., to 6 p. m., and from 7 p. m., to 9 p. m. The annual meeting of the Society is held June 5th, when the reports of the officers for the year will be presented.

Exhaust Steam and Draft.

A subscriber asks us how the action of exhaust steam in producing a draft in a locomotive chimney is explained. Colburn's Locomotive Engineering explains simply as follows: The exhaust steam escapes from the cylinders through one or two contracted openings or exhaust nozzles which point directly up the chimney or smoke stack. The exhaust steam escapes from this orifice with great velocity and expands as it rises, so that it fills the pipe and smoke stack. It thus acts somewhat like a plunger or piston forced violently up the chimney, and pushes the air up above it, and owing to the friction of the particles of air carried that which surrounds it along up the stack, from which it all escapes finally into the open air, thus leaving a partial vacuum behind in the smoke box. The external pressure of the atmosphere then forces in air through any and every opening in the smoke box, to take the place of that already drawn out or exhausted from it. As the only inlet is through the tubes, to which the gases of combustion have free access from the fire box, and as the external air can only pass through the fire box and through the burning fuel to reach the fire box, there is a constant draft of air through the grate as long as the waste steam escapes from the blast pipe and up the chimney. It is thus, that within certain limits, the more the steam is required the more steam produced; for all steam used in the engine draws in the air in its final escape, to excite the fire to generate more steam.

This is the most economical and convenient way of creating a strong draft, as locomotive engine boilers have to produce more steam in a given time, in proportion to their size, than is required of any other class of boilers (except, perhaps, those of steam fire engines), because the space and weight allowable for locomotive boilers is limited. So by creating a very strong draft of air through the fire and then passing the heated air and products of combustion through a great many small tubes surrounded by water, the heated gases are divided into small streams, and the steam generating capacity of locomotive boilers is increased above that of marine and stationary boilers.

Tea.

Cullivallon and Preparation for Market, and Extent of the Trade.

From the fortunate geographical position of the city of San Francisco, it is destined to become the future tea market of America and Europe. For America, it must be the great distributing center, because of its position with regard to China, and to America, North and South. The sea voyage to China and Japan is the shortest and best that can be made from the east of Asia to the west of America, and the parallels of latitude between which it lies are those in which the temperature and weather are best suited for preserving tea on a sea voyage. Further north or south, there is not only a longer voyage to be undertaken and rougher weather to be encountered, but there are either great tropical heats or cold wintry spells with their inevitable concomitant of sea damps to be encountered. This alone will prevent any large cargoes of tea from ever being taken to ports further north or south as depots for supplies, and will also neutralize to a great extent the effect which the opening of the route across the isthmus of Panama by the cutting of the proposed canal might entail. Then the great railroad which unites this city with the empire city of the East, brings us at once into contact with every great

planted to fresh ground. After the third year picking commences and, though the leaves are freshly picked each season, yet the plant thrives, and lives about as long as men usually do. It is never entirely stripped, but every spring those bright green leaves are taken which have just appeared on the top of the bush. The other leaves, and even those of simply the last year, are never gathered, except, perhaps, to make the cheapest kind of tea for poor folks. The finest quality of tea, and that which costs here several dollars a pound, is made up entirely of those delicate little shoots found at the tip end of the stems, just as the tiny leaf is in process of forming. These minute shoots are always carefully picked at first, and the leaves just below them are gathered afterward. The time to begin picking is usually in May, and it continues at various

process is repeated twenty times or more, and it is far more laborious than might ever be supposed. Gradually the leaves become dryer and darker in color, and after the last rolling they are spread on moderately warm pans for awhile, and then placed in large baskets. On an average one man will roll and dry in a whole day as many leaves as would fill an ordinary tea-chest.

[Conclude next week.]

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press American and Foreign Patent Agency, the following are worthy of mention:

FRUIT DRIER.—Levi A. Gould, Santa Clara,



PLANTING OUT IN THE THIRD YEAR.

intervals for two months, according as the new leaves make their appearance, the teas from the first being known as Garden or Bud teas. Our illustration shows women and girls employed in the work, which is light and pleasant. When the baskets are full they are taken to a long, low house, where several men are silently at work and where they are prepared

Santa Clara county, Cal. Mr. Gould's invention is intended for drying fruits, vegetables and other substances. A closed room, box or tank is supported above the ground or floor, so that a clear space will be left below, for the purpose hereinafter described. The interior of this box or drier forms a single chamber, but in order to permit the use of frames or trays of

trays and the trays arranged in the tracks, the air which is forced into the front end of the box, after becoming heated by the hot pipes, will be forced upward by the partition through the fruit which was last introduced through the doors. In its passage upwards the hot air will become saturated by the moisture abstracted from the fruit, so that by the time it has arrived at the top of the chamber it will be so heavy with moisture that it will begin to descend towards the rear of the chamber.

A short distance back of the partition openings are made in the floor of the chamber, and in the rear end of the box or room other openings are made near the floor. The hot air, heavily saturated with moisture from the fruit, settles directly down through the openings in the floor and passes away underneath the apparatus, while that portion which is less saturated with moisture passes out through the other openings in the rear. It will thus be seen that the dry, hot air is compelled to pass directly upward through the green fruit, so as to rapidly take away its moisture. It then descends at an angle through the portion of fruit which has been previously passed through the front portion of the chamber, disposing at once through the openings with the portion of air which is very heavily saturated with moisture, and allowing that portion which is less saturated to travel towards the rear end of the chamber. The inventor claims that this mode of applying the hot air to the fruit or other substance will take away the excess of moisture and at the same time leave the fruit in a thoroughly preserved condition, without cooking or burning it. It is desirable that the moist air in descending from the top of the chamber to the discharge openings should come as little in contact with the fruit as possible. The inventor therefore extends the side



Working the Leaves.

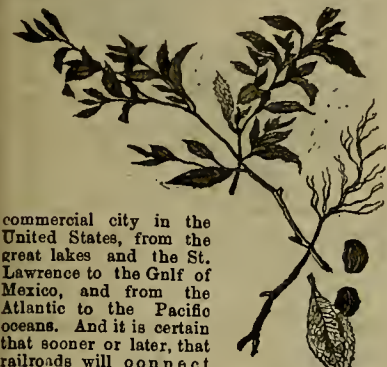
rails or strips of the trays a few inches beyond the rails, so that these openings will prevent the trays from coming together and thus provide a space of three or four inches between each two trays, through which the moist atmosphere can pass freely in its descent from the top of the chamber. The tracks on which the trays move should descend slightly from the front to the rear, in order to allow the trays to move easily. In making a small portable drying apparatus, a stove can be used for supplying the heated air. It will be noticed that the chief feature of this invention is the bridge wall or partition for directing the current of heated air up through the fruit, and the openings through which the moist atmosphere is discharged.

IMPROVED STUD FASTENING.—Salle Zacharias, San Francisco, Cal. This is an improved fastening for securing buttons, studs, and other articles of jewelry in button holes, and it consists of an arrangement by which the shank of the stud or button can be readily introduced into the button hole and fastened without stretching or distorting the hole or rumpling the material of the article of apparel in which the button or stud is secured. In a cuff button, for instance, the button has a



Cooling.

shank of the desired length to extend through the thickness of the article. On this shank is secured a rotating sleeve which has a wing upon opposite sides, so that the sleeve with its wings will fit in the button hole without unduly stretching it. On the outer end of the sleeve is secured an oval disk, and on the outer end of the shank is a corresponding oval disk, so that the sleeve with its disk can rotate on the shank between the button and disk, the two disks lying together. On the inner end of the sleeve is secured a spring which extends out along the under side of the button head until its extremity projects slightly beyond the rim of the button. A notch or equivalent catch is formed at each quarter of the head, so that the spring will be stopped by each one as the button rotates. By pressing the extremity of this spring down with the finger, the head can rotate so as to prevent the spring from entering any of the notches, but it can be stopped in either of the notches desired. To secure the button in the button hole the two disks are made to lie in the same direction, one upon the other, by changing the spring to the proper notch. The disks are then passed through the button hole, when, by depressing the spring with the finger, the button can be rotated one quarter of the way around until the spring drops into the next notch, so as to turn the disk on the opposite or inner end of its shank across the other disk and thus secure the button in place.



The Tea Plant.

commercial city in the United States, from the great lakes and the St. Lawrence to the Gulf of Mexico, and from the Atlantic to the Pacific oceans. And it is certain that sooner or later, that railroads will connect this city with every point on the continent of South America, and the voyage by sea to San Francisco, by rail to New York, and by sea again to any part of the Old World, is far preferable in the important item of preservation of quality and prevention of loss by shipwreck, to that by sea direct from China and Japan. By and by, doubtless, the tea trade of China with Europe, will be carried on over transcontinental railroads that shall straddle the Old World, but here this takes place a century must have elapsed; meanwhile the teas of Asia will reach Europe across the American continent. The tea trade of Europe and America is now over three hundred million pounds, worth one hundred and fifty million dollars per annum. San Francisco must become for China the depot and trade center of this vast commerce. In the not distant future, ere a quarter of a century has rolled over our heads, our tea business will be so vast that its docks, wharves and warehouses will occupy one entire section of



Sifting.

our city, and fleets constantly arriving and discharging will crowd our water front. Californians are therefore interested in information concerning tea, and we here present the first installment of an article, embodying a few general facts concerning tea culture and trade.

The illustrations accompanying this article are copied literally from original paintings by a Japanese artist. They show the various stages of tea culture in that country as described by Prof. Clark in the *Christian Weekly*, from the picking of the leaf under the shadow of the sacred mountain Fusi Yama, through all its curing processes, till it is ready for use and sale. The methods employed are described by Prof. Clark from personal observation.

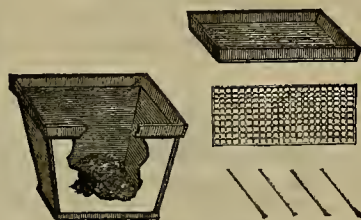
The tea fields are scattered throughout the country, ranged mostly along the hillsides, or, when found on more level ground, they are mingled among other forms of vegetation. The tea bushes are not more than breast high even at their full growth, and the young plants are quite small. When first set out they are planted in circles, the center of which are filled with manure, and in places where they are liable to be damaged by frost they are covered. At the end of the third year they are trans-



PICKING THE LEAVES.

for market. The work of preparation differs in different localities. Our illustration represents the placing of the leaves in small quantities upon a series of stout pasteboard trays or pans, set upon brick ovens containing smoldering embers of charcoal and straw. These queer looking pans are ranged in rows, and are

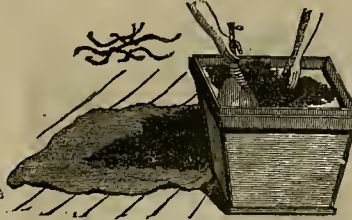
small size, the inventor frequently constructs two or more parallel tracks inside of the chamber, by securing upright posts at intervals through its middle, and to these posts is secured one rail of each track, while the opposite rails are secured to the walls of the chamber. As many tracks can be arranged, one above the



Oven and Pans.

maintained at various temperatures, so that the hand can barely be put on the hottest. In front of each of these pans represented in our illustration, stands a man working the leaves between his hands and spreading them back and forth, to keep them equally heated.

It is here that the real work of the tea-making process is seen. These men stand from morning till night over these slow fires, rubbing and rolling the leaves between their hands continually. The leaves are placed on the hottest pans first, and when they are moist and green; but after being rolled some time and partially dried, they are allowed to cool on straw mats, and then they are placed on a second pan and rubbed and rolled again. This



Heating on the Ovens.

other, as the height of the chamber will permit. The lowermost track or trays in the chamber are at least three feet above the bottom or floor of the chamber, thus providing a space between the floor and the lowermost tracks, across which a transverse partition extends about six feet from the front end of the room or box in the manner of a bridge wall. This partition extends from the floor to the lowermost track. Doors in front admit the trays and others in the rear allow them to be removed after passing through the chamber on the tracks. Below the tracks, in front of the partition, is a coil of steam or hot air pipes. Air is forced into the space in which the pipes are coiled. The fruit to be dried having been properly placed on the

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Magnesia.....	5.24
Soda.....	62.19
Alumina.....	
Ammonia.....	
Potash.....	27.38
Lithia.....	
Boric Acid.....	
Organic Matter.....	
Total grains.....	228.69

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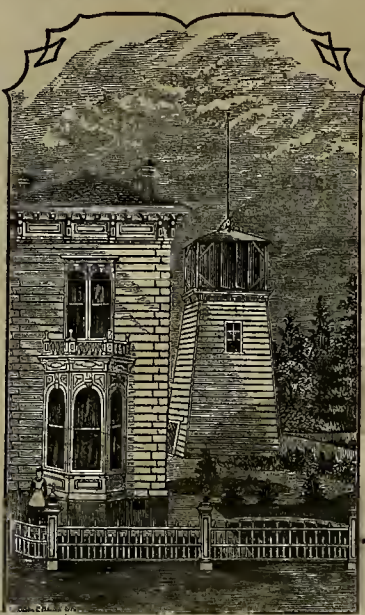
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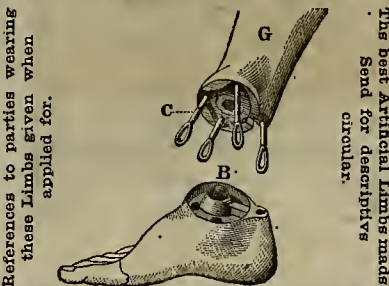
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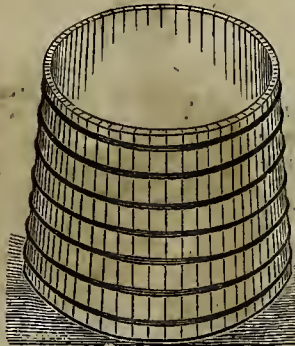
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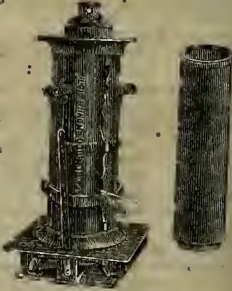
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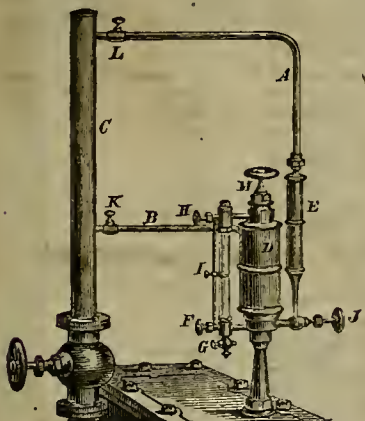
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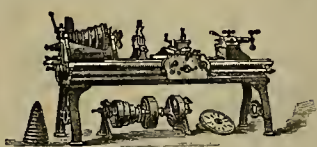
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Plans furnished for the most suitable process for working Ores.

Special attention paid to the Mining and Metallurgy of Quicksilver.

E. HUNN,

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Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS.

ADVANCES MADE

On all kinds of Ores, and particular attention

PAID TO

CONSIGNMENTS OF GOODS.

4v16-3m

Instructions in Assaying,

Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

HENRY G. HANKS

Will receive a few pupils at his new laboratory, 617 Montgomery street, up-stairs. TERMS MODERATE

LEOPOLD KUH,

(Formerly of the U. S. Branch Mint, S. F.)

Assayer and Metallurgical

CHEMIST,

No. 611 Commercial Street,

(Opposite the U. S. Branch Mint

SAN FRANCISCO CAL.

7v21-3m

J. & P. N. HANNA,

IMPORTERS AND DEALERS IN

WOODBERRY COTTON DUCK.

33, 36, 40, 42 and 45-inch Wide Duck; 8, 10, 12, and 16-ounce Duck.

Flax, Canvas, Ravens and Drills
Roofing, Sheathing and
Boiler Felt.

Ore Bags, Tents and Hose

Made to Order.

308 and 310 DAVIS STREET.

SAN FRANCISCO, CAL.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., June 1st, 1875.

FOR WEEK ENDING MAY 18TH, 1875.

MACHINE FOR REMOVING BROKEN DRILLS FROM HOLES.—John W. Platt, Mineral City, Nevada.

SASH BALANCE.—John J. Price, S. F., Cal.

WAVE POWER MACHINE.—Charles Buckner, Jr., S. F., Cal.

WATER VALVE.—Anthony Chahot (two cases), S. F., Cal.

TRAIN TELEGRAPH.—Alban N. Towne, S. F., Cal.

TRADE-MARK.

FOR MEDICINE.—Yerba Buena Bitters Company, S. F., Cal.

These patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

General News Items.

The Committee of the New York Board of Trade on postal affairs having received information from a large number of merchants in New York that the postal expenses on newspapers and letters under the new law have doubled, will soon confer with Postmaster General Jewell and the Postmaster of New York upon the measures necessary for the repeal of the obnoxious law.

A TERRIBLE calamity occurred at Holyoke, Mass., last Thursday evening. The Catholic church took fire during service, and 75 men, women and children were killed, either burned to death or trampled under foot by those who escaped from the building.

The total value of imports of silk manufacture at New York in May was \$1,315,039. During the same time 1,062 packages of raw silk were received, of which 856 were via Panama, 20 via overland routes, and 186 from Europe.

The express office of Wells, Fargo & Co., at Quincy, Plumas county, was entered on Monday night by parties unknown. The safe was taken from the office, cut open, and robbed of \$2,800 in coin and treasure.

They have an immigration bureau in Kern county.

GEN. COEY has been presented with a gold medal.

The huge, drastic, gripping, sickening pills, constructed of crude, coarse and bulky ingredients, are fast being superseded by Dr. Pierce's Pleasant Purgative Pellets, or Sugar-Coated Concentrated Root and Herbal Juice, Anti-Billions Granules—the "Little Giant" Cathartic or *Mulm in Parvo Physic*. Modern Chemical Science enables Dr. Pierce to extract from the juices of the most valuable roots and herbs their active medicinal principles, which, when worked into little Pellets or Granules, scarcely larger than mustard seed, renders each little Pellet as active and powerful as a large pill, while they are much more palatable and pleasant in effect.

Dr. Ira A. Thayer, of Baconsburg, Ohio, writes: "I regard your Pellets as the best remedy for the conditions for which you prescribe them of anything I have ever used, so mild and certain in effect, and leaving the bowels in an excellent condition. It seems to me they must take the place of all other cathartic pills and medicines."

LYON & MACOMBER, druggists, Vermillion, D. T., say: "We think they are going to sell like hot cakes as soon as people get acquainted with them, and will spoil the pill trade, as those that have used them like them much better than large pills."

Tenth Industrial Exhibition of the Mechanics' Institute, S. F., 1875.

PRELIMINARY ANNOUNCEMENT.

The Board of Managers of the Tenth Industrial Exhibition have the pleasure of announcing that an Industrial Exhibition will be held, under the auspices of the Mechanics' Institute, in the city of San Francisco, to be opened on Tuesday, the 17th of August, 1875, at 11 A. M., and to continue open at least one month thereafter.

In making this public announcement, the Managers desire that those who intend to exhibit should send in their applications for space as early as possible, so as to avoid the necessity of excluding, as has been the case heretofore, the many desirable exhibitors who are unusually tardy in making applications.

The forthcoming Industrial Exhibition will be the tenth held under the auspices of the Mechanics' Institute, and the Managers are justified in saying that it will undoubtedly surpass in completeness of detail and general arrangement any heretofore held.

The last Exhibition was attended by 700,000 visitors, attracted hither by the fame of these Industrial Fairs, and for the purpose of investigation, business and pleasure.

All the available exhibiting space was applied for several weeks before the day of opening, and the Managers were compelled to deny admission to many desirable exhibitors.

The Board of Managers desire particularly that the arts, the industries and natural products of the country should be well represented at the forthcoming exhibition, and no pains will be spared to make these classes of exhibits a special feature there.

The Exhibition will be held in the building constructed for that purpose in 1874, but it will be materially enlarged and improved in many details for this Exhibition of 1875.

The space under roof will cover 180,000 square feet, or about four and a half acres, exclusive of the Horticultural Garden, which will occupy 24,500 square feet additional.

The location of the Exhibition Building, on Eighth street, between Market and Mission streets, cannot be surpassed for convenience and accessibility, and can be approached from every part of the city by means of the various lines of street railroads, any of which bring visitors within two blocks of the entrance gate.

The utmost care has been exercised in providing for ample ventilation and light, and during the evening the building is brilliantly illuminated by over 5,000 gas lights.

The promenade avenues are broad, and 3,000 seats are provided for the comfort of visitors, and for convenience there is also an excellent restaurant, under the management of a first-class restaurateur.

Every afternoon and evening the best orchestra the city can apply will discourse excellent music under the direction of an accomplished leader.

The building is always well attended by visitors, and during the last Exhibition over 25,000 were daily admitted for admission and under no similar circumstances can the manufacturer, the mechanic, the inventor, producer or business man so advantageously place himself before the people of the Pacific Coast.

Persons desiring to obtain information, or to make application for space, should address "Managers of Tenth Industrial Exhibition, San Francisco, California," or make personal application to the Secretary.

It is expected that the various transportation companies will convey goods intended in good faith for exhibition, at half the usual rates.

Exhibitors from abroad, if they have no agent or consignee in San Francisco, can consign goods and mark the same to the "Manager of the Tenth Industrial Exhibition, 17 Post street, San Francisco," and they will be stored, if they arrive before the day of opening, free of expense; but no charges or expenses for freight or forwarding, etc., will be paid by the Managers.

In order to secure space, application should be made on or before July 20th, 1875.

Blanks will be furnished on application.

Medals will be awarded as follows, viz: 16 gold medals, 50 silver medals, Society Diplomas, Certificates of Merit and Special Premiums, as the Board may determine.

Blanks for space can be obtained at the Mechanics' Institute on application by letter or otherwise; and any information will be given, by applying to any member of the Board of Managers, as below:

A. S. HALLIDAY.....113 Pine street.
JAMES B. THAYER.....122 Battery street.
W. L. DAVIS.....421 California street.
D. E. HAYES.....213 Fremont street.
ASA R. WELLS.....Mechanics' Mill.
P. B. CORNWALL.....Cor. Spear & Harrison streets.
CHAS. ELLIOT.....516 California street.
GEORGE SPAULDING.....414 Clay street.
EDWARD SAVAGE.....139 Fremont street.
W. P. FROM.....504 Market street.
J. H. MACDONALD.....217 Spear street.
J. P. CURTIS.....320 Jackson street.
R. B. WOODWARD.....Woodward's Gardens.
JAMES SPIES.....311 Howard street.

To the Librarian of the Mechanics' Institute, or to J. H. OULVER, Secretary, 27 Post street, San Francisco.

Rules and Regulations of the Tenth Industrial Exhibition, Mechanics' Institute, S. F., 1875.

1. The Pavilion will be open for the reception of goods on Monday, August 2d. The exhibition will be open to the public on Tuesday, August 17th, at 11 o'clock A. M.

2. Applications for space must be made on or before July 20th, stating character of exhibit, amount and kind of space required—wall, table or floor. And if cases, state length, width and height of cases. Blanks will be furnished for this purpose, and a clerk will be in attendance at the Library of the Mechanics' Institute, every day from 12 to 1, and 7 to 10 P. M.

3. All persons presenting articles for exhibition must have them registered by the Receiving Clerk, who will give a receipt for the same, which receipt must be presented when the articles are withdrawn, at the close of the Exhibition.

4. Judges will be appointed by the Board of Managers, immediately upon the opening of the Exhibition, to examine all articles presented, in accordance with Article III, and the Managers will award premiums on such articles as the judges shall declare are worthy, which will be delivered as soon as they can be prepared. Due notice will be given of this announcement of premiums.

5. The mornings of each day, until 10 o'clock, will be appropriated to the Judges, and no visitors will be admitted during the time so appropriated, except at the special request of the Judges, or by permission of the Managers.

6. Articles intended for sale may be labeled accordingly, but cannot be removed until the close of the Exhibition, except by written permission of the Managers.

7. Steam power will be provided, so that machinery of all kinds may be seen in actual operation, and every facility possible will be given to exhibit working machinery to the best advantage.

8. The name of every article must be attached by the exhibitor to it.

9. Articles intended for exhibition must be entered and placed on exhibition on or before Saturday, August 21st.

10. Perishable articles will be received, or may be removed at any time during the exhibition, with the consent of the Managers.

11. The most efficient means will be taken, through the agency of the Police and otherwise, to guard and protect the property on exhibition; and it will be the purpose of the Managers that all articles shall be returned to the owner without loss or injury. Still, all articles deposited will be at the risk of the owners.

12. In case of any misunderstanding, application may be made to the Managers, who will at all times be in attendance.

13. The Managers are desirous that articles should be exhibited early. Those from abroad intended for exhibition, should be properly packed, and if not consigned to exhibitor's agent, must be marked, "MANAGERS OF TENTH INDUSTRIAL EXHIBITION, SAN FRANCISCO, CAL." All articles thus received, arriving too early, will be stored free of cost to the exhibitor, and the Managers will have them displayed in proper position for exhibition. No freight charges will be paid by the Managers; but exhibitors are notified that arrangements are being made with various transportation companies to repay freight charges on evidence of goods exhibited.

Information will be furnished by addressing MANAGERS OF TENTH INDUSTRIAL EXHIBITION, SAN FRANCISCO, CAL.

UNITED STATES

Mineral Land Laws, Revised Statutes,

And Instructions and Forms Under the Same.

We have just issued a pamphlet containing the general mineral land laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870; Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Registrar's Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvements; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. General Land Office Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of MINING AND SCIENTIFIC PRESS, S. F.

N. B.—We have also added to the above publication, the REVISED STATUTES OF THE UNITED STATES, so far as relates to Mining Laws.

Mining and other Companies.

California Consolidated Mill and Mining Company. Location of principal place of business, San Francisco, Cal.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of April, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Burke, T.....	33	100	\$ 50 00
Burke, T.....	34	50	25 00
Burke, T.....	35	50	25 00
Hendy, Joshua.....	34	70	35 00
Hendy, Joshua, Trustee.....	73	24,550	12,275 00
Hendy, Joshua, Trustee.....	78	2,115	1,057 50
Keardon, John.....	50	50	25 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of April, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the company, 408 California street, room 15, on the 18th day of May, 1875, at the hour of 1 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary.
Office, Room 15, No. 408 California street, San Francisco, Cal.

POSTPONEMENT.—The above sale is postponed until Tuesday, the 15th day of June, 1875, at 2 o'clock P. M. By order of the Board of Directors.
J. W. TRIPP, Secretary.

Carbon Coal Company—Location of Principal place of business, San Francisco, Cal.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of May, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Name.	No. Certificate.	No. Shares.	Amount.
J. W. Herker.....	Unissued	100	\$125 00
A. P. Bryerton, Jr.....	Unissued	100	125 00
J. Martenstein & Co.....	Unissued	100	125 00
L. A. Booth.....	Unissued	100	125 00

And in accordance with law, and an order of the Board of Directors, made on the 1st day of May, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the Secretary, No. 220 Clay street, San Francisco, on the fourteenth day of June, 1875, at the hour of one o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

N. C. FASSETT, Secretary.
Office—No. 220 Clay street, San Francisco, California.

Cordillera Gold and Silver Mining Company. Location of principal place of business, San Francisco, Cal.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 1st day of May, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Name.	No. Certificate.	No. Shares.	Amount.
George Hearst.....	42	2000	\$100 00
George Hearst.....	63	580	29 00
John J. McQuinn, Trustee.....	66	100	5 00
John J. Mountain, Trustee.....	67	100	5 00
John Mullen, Trustee.....	140	3250	162 50
S. Davis, Trustee.....	32	5000	250 00
A. F. Benard, Trustee.....	103	29	1 45
A. F. Benard, Trustee.....	68	100	5 00
Hermann Teiken, Trustee.....	51	100	5 00
Henry Boyle, Trustee.....	57	2000	100 00
Henry Boyle, Trustee.....	112	224	11 20
Henry Boyle, Trustee.....	113	356	17 80

And in accordance with law, and an order of the Board of Directors, made on the 17th day of February, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction, at the office of the Secretary, No. 312 Montgomery street, San Francisco, on the 17th day of June, 1875, at the hour of 12 o'clock P. M., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

HENRY R. REED, Secretary.
Office, No. 312 Washington street, San Francisco, Cal.

Geneva Consolidated Silver Mining Company—Principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, State of Nevada.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 24th day of April, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Bishop, Edgar.....	52	100	50 00
Cox, A. P.....	42	50	25 00
Cooper, Mrs. Mary E.....	10	25	12 50
Flannigan, Martin.....	110	75	37 50
Flannigan, Martin.....	111	100	50 00
Flannigan, Martin.....	112	100	50 00

Any stock upon which this assessment shall remain unpaid on the 14th day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Wednesday, the 30th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

I. T. MILLIKEN, Secretary.
Office, Room 14, 302 Montgomery street, San Francisco, Cal.

Martin & Walling Mill and Mining Company. Location of principal place of business, San Francisco, California.

NOTICE.—There are delinquent upon the following described stock, on account of assessment levied on the 24th day of April, 1875, the several amounts set opposite the names of the respective shareholders as follows:

Name.	No. Certificate.	No. Shares.	Amount.
Bishop, Edgar.....	52	100	50 00
Cox, A. P.....	42	50	25 00
Cooper, Mrs. Mary E.....	10	25	12 50
Flannigan, Martin.....	110	75	37 50
Flannigan, Martin.....	111	100	50 00
Flannigan, Martin.....	112	100	50 00

Name.	No. Certificate.	No. Shares.	Amount.
Gibbons, O. P.....	107	100	50 00
Hudgin, John D.....	11	50	25 00
Hudgin, John D.....	12	100	50 00
Hudgin, John D.....	13	100	50 00
Hudgin, John D.....	14	100	50 00
Hudgin, John D.....	15	100	50 00
Hudgin, John D.....	16	100	50 00
Hudgin, John D.....	17	100	50 00
Hudgin, John D.....	18	100	50 00
Hudgin, John D.....	19	100	50 00
Hudgin, John D.....	20	100	50 00
Hudgin, John D.....	21	100	50 00
Hudgin, John D.....	22	100	50 00
Hudgin, John D.....	23	100	50 00
Hudgin, John D.....	24	100	50 00
Hudgin, John D.....	25	100	50 00
Hudgin, John D.....	26	100	50 00
Hudgin, John D.....	27	100	50 00
Hudgin, John D.....	28	100	50 00
Hudgin, John D.....	29	100	50 00
Hudgin, John D.....	30	100	50 00
Hudgin, John D.....	31	100	50 00
Hudgin, John D.....	32	100	50 00
Hudgin, John D.....	33	100	50 00
Hudgin, John D.....	34	100	50 00
Hudgin, John D.....	35	100	50 00
Hudgin, John D.....	36	100	50 00
Hudgin, John D.....	37	100	50 00
Hudgin, John D.....	38	100	50 00
Hudgin, John D.....	39	100	50 00
Hudgin, John D.....	40	100	50 00
Hudgin, John D.....	41	100	50 00
Hudgin, John D.....	42	100	50 00
Hudgin, John D.....	43	100	50 00
Hudgin, John D.....	44	100	50 00
Hudgin, John D.....	45	100	50 00
Hudgin, John D.....	46	100	50 00
Hudgin, John D.....	47	100	50 00
Hudgin, John D.....	48	100	50 00
Hudgin, John D.....	49	100	50 00
Hudgin, John D.....	50	100	50 00
Hudgin, John D.....	51	100	50 00
Hudgin, John D.....	52	100	50 00
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Hudgin, John D.....	61	100	50 00
Hudgin, John D.....	62	100	50 00
Hudgin, John D.....	63	100	50 00
Hudgin, John D.....	64	100	50 00
Hudgin, John D.....	65	100	50 00
Hudgin, John D.....	66	100	50 00
Hudgin, John D.....	67	100	50 00
Hudgin, John D.....	68	100	50 00
Hudgin, John D.....	69	100	50 00
Hudgin, John D.....	70	100	50 00
Hudgin, John D.....	71	100	50 00
Hudgin, John D.....	72	100	5

Iron and Machine Works.

San Francisco Boiler Works,

Will Remove about June 1st, to N. W. Cor.
Harrison and Main.)

and 126 Beale Street.....SAN FRANCISCO

F. I. CURRY,

Late Foreman of the Vulcan Iron Works, Proprietor
High and Low Pressure Boilers of all
Descriptions.

SOLE MANUFACTURERS OF THE CELEBRATED
SPIRAL BOILER.

SHEET IRON WORK of every description done
at the Shortest Notice.

All kinds of JOBBING and REPAIRING promptly
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THE RISDON

Iron and Locomotive Works,

INCORPORATED.....APRIL 30, 1868.
CAPITAL.....\$1,000,000.

LOCATION OF WORKS:

Corner of Beale and Howard Streets,
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Manufacturers of Steam Engines, Quartz and Flour
Mill Machinery, Steam Boilers (Marine, Locomotive
and Stationary), Marine Engines (High and Low Pres-
sure). All kinds of light and heavy Castings at lowest
prices. Cams and Tappets, with chilled faces, guaran-
teed 40 per cent. more durable than ordinary iron.

Directors:

Joseph Moore, Jeece Holladay, O. E. McLana,
Wm. Norris, Wm. H. Taylor, J. B. Haggin,
James D. Walker.

WM. H. TAYLOR.....President
JOSEPH MOORE.....Vice-President and Superintendent
LEWIS R. MEAD.....Secretary
24v17-47

FULTON

Foundry and Iron Works.

HINCKLEY & CO.,

MANUFACTURERS OF

STEAM ENGINES.

Quartz, Flour and Saw Mills,
Hayes' Improved Steam Pump, Brodie's Im-
proved Crusher, Mining Pumps,
Amalgamators, and all kinds
of Machinery.

N. E. corner of Tehama and Fremont streets, above How-
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UNION IRON WORKS, Sacramento.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

STEAM ENGINES, BOILERS,
GROSS' PATENT BOILER FEEDER AND SEDIMENT
COLLECTOR

Dunbar's Patent Self-Adjusting Steam Piston
PACKING, for new and old Cylinders.

And all kinds of Mining Machinery.

Front Street, between N and O streets,
SACRAMENTO CITY.

SHEET IRON PIPE.

THE

Risdon Iron and Locomotive Works

Corner Howard and Beale Streets,

Are prepared to make SHEET IRON AND ASPHALTUM
PIPE, of any size and for any pressure, and contract to
lay the same where wanted, guaranteeing a perfect
working pipe with the least amount of material.
Standard sizes of railroad Car Wheels, with special
patterns for Mining Cars. These small wheels are made
of the best Car Wheel Iron, properly chilled, and can be
fitted up with the improved axle and box—introduced by
this company, and guaranteed to outlast any other
wheels made in this State.

All kinds of Machinery made and repaired.

24v22-3m JOSEPH MOORE, Superintendent.

G. W. PRESCOTT. W. R. EOWANT.

Marysville Foundry,

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PRESCOTT & ECKART,

Manufacturers of Quartz and Amalgamating Machinery,
Hoisting Machinery, Saw and Grist Mill Irons, House
Fronts, Car Wheels, and Castings of every de-
scription made to order.

Steam Engines constantly on hand for sale. 9v28-17

T. A. McORMICK. OSCAR LEWIS. J. McORMICK

McCormick, Lewis & Co.,

INDUSTRIAL IRON WORKS,
Manufacturers of Light and Heavy Castings. Partic-
ular attention given to Architectural Iron Work.

233 and 235 BEALE STREET,

Bet. Howard and Folsom Streets, SAN FRANCISCO.



PARKE & LACY,

SOLE AGENTS FOR THE

Burleigh Rock Drill Company.

—MANUFACTURERS OF—

PNEUMATIC DRILLING MACHINES,

AIR COMPRESSORS AND OTHER MACHINERY.

Also, Farmers' Dynamic Electric Machine and
Hill's Exploders for Blasting, Putnam Ma-
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DUNBAR'S WONDERFUL DISCOVERY.

BETHESDA MINERAL SPRING WATER Of Waukesha, Wisconsin.

We claim Bethesda to be a specific in all cases of Diabetes, Inflammation of the Kidneys, Inflammation of
the Neck of the Bladder and Urethra, Inflammation of the Bladder, Dropsy, Gouty Swellings, Stoppage of Urine,
Albumenuria, Ropy or Cloudy Urine, Brick Dust Deposit, Thick, Morbid, Bilious and Dark Appearing Urine,
with Bone Dust Deposits, Burning Sensation with Sharp Pains when voiding Urine; Hemorrhage of the Kidneys,
Pain in the Kidneys and Loins, Torpid Liver Indigestion, Calculus, and Female Weakness.

There is no remedial agent known to man that can cure the foregoing diseases as effectually as Bethesda
Water. This fact has been demonstrated wherever the water has been used according to directions, which can
be had at the General Agents' by application to them. The water is sweet and pleasant to the taste. It can be
drank at all hours. Why should any one suffer while this Water is so easily obtained?

DUNBAR, HENDRY & LAVERY, Sole Agents for Pacific Coast,

1b27-cow-bp-3m

107 STOCKTON ST., SAN FRANCISCO.

IRA P. RANKIN. Established 1850. A. P. BRATTON

Pacific Iron Works,

FIRST STREET, SAN FRANCISCO.

Geo. W. Fogg, Supt.

MACHINERY AND CASTINGS OF EVERY DESCRIPTION.

Heavy Forging Boilers, Stationary
and Marine.

JOBGING AND REPAIRING WORK OF EVERY
KIND. SPECIAL ATTENTION GIVEN
TO MINING AND HOISTING
MACHINERY.

Sole Manufacturers and Agents of

PRATT'S PATENT STEAM PUMP.
GODDARD & CO., Props.

WM. HAWKINS. T. G. CANTRELL

HAWKINS & CANTRELL,

MACHINE WORKS,

210 & 212 Beale St.

Near Howard. - - - SAN FRANCISCO.

MANUFACTURERS OF

Steam Engines and all kinds of Mill
and Mining Machinery.

Also manufacture and keep constantly on hand a
supply of our

Improved Portable Hoisting Engines,

From Ten (10) to Forty (40) Horse Power.

N. B.—Jobbing and Repairing done with Dispatch.

Empire Foundry,

Nos. 137, 139 and 141 FREMONT STREET, SAN FRANCISCO.

RICHARD SAVAGE, Proprietor.

Heavy and light Castings of every description. Horse
Fronts, Mining and General Machinery estimated and con-
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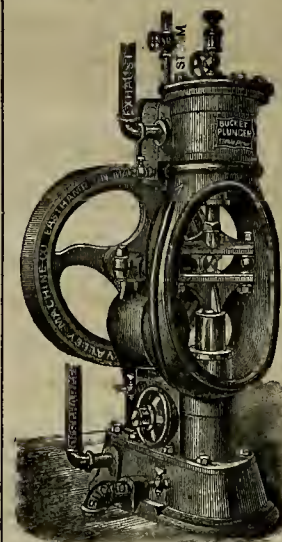
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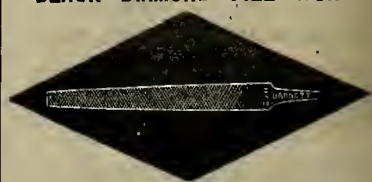
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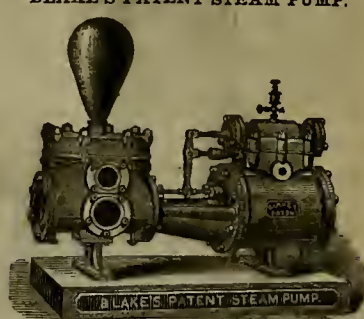
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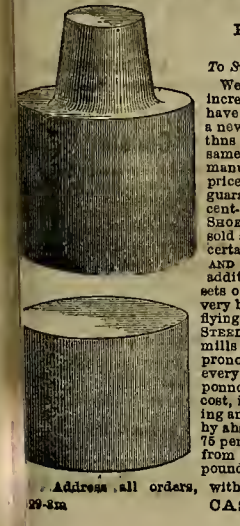
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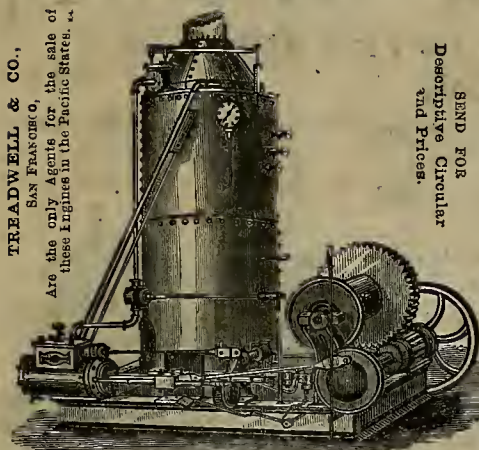
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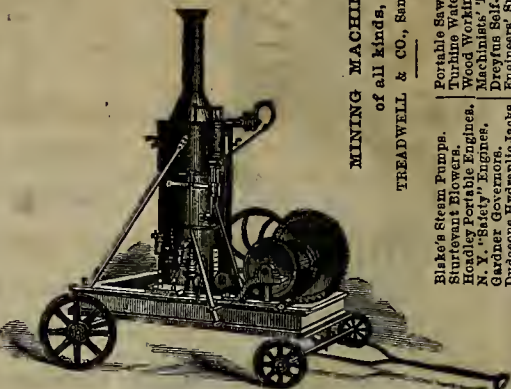
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
Patent Solicitors.

SAN FRANCISCO, SATURDAY, JUNE 12, 1875.

VOLUME XX
Number 24.

Improved Vacuum Pump and Air Compressor.

The simple form of pump herewith illustrated may be used either as an air compressor which is capable of producing an enormous blast at a trifling cost of power, or as a pump for raising water. By producing a vacuum in one of its receivers, and compressing air into the other, both of the above capabilities may be utilized simultaneously—that is, a bellows can be had at one end of the machine and a water pump at the other at the same time. Also, a bellows can be had at each end, or a water pump can be had at each end at the same time, as may be desired.

The whole machine is constructed of metal. The coiled tube, axle and receivers, of a solid metal and of the fluid metal mercury, which flows inside the coiled tube; hence its durability. A, is a spiral tube coiled about, and the ends of which are in communication with the hollow axial shaft, B. C, C, are hollow supports for the latter, and, at the same time, supply conduits, the water passing therefrom into shaft, B, by the inlet valves at D. E, are the exhaust valves, and at F is a partition which divides the shaft, B, into two compartments, so that through its axis there is no communication between the ends of the coiled tube, A. A portion of the coil is filled with mercury, as indicated by the broken away section on the right, the height of the column of mercury being any height desired greater than twenty-eight inches, so as to overbalance atmospheric pressure. One column twenty-eight inches in height compresses one atmosphere. Two twenty-eight inches in height compress two atmospheres and so on. Every atmosphere compressed gives a pressure of fifteen pounds to the square inch.

When the coil is turned by the action of the belt pulley or by hand, in the direction of the arrow, the mercury flowing along the spiral tube from one end to the other will create a vacuum in its rear, while compressing the air before it. In so doing, it will draw water or air through the valve, D, at one end of the shaft, and expel the air before it from the valve, E, at the opposite extremity. If the motion be reversed when the mercury has traversed the length of coil, A, the same takes place with the other pair of valves, while of those first affected, the inlet valve now closes and the outlet valve opens. A moment's inspection of the diagram will show that a continuous suction and exhaust is thus maintained.

If the positions of the inlet and outlet valves be changed, the valves, E, being inlet, and the valves and D, outlet, the apparatus may be used as an air compressor, of which the tubes, C, may be conduits to the reservoir. And a tube may lead from reservoir (not shown in engraving) to furnace or forge. Other tubes than those of C may be used as conduits to the reservoir if desired. In either such cases, valves, E, which, as represented, open outside the shaft, would open inwardly, while the valves, D, now opening inside the shaft, would open into the reservoirs. Water may be raised thirty-three feet. The amount of compression obtained is dependent upon the height and the weight of the mercury column in the tube, and the diameter of the tube. If the coiled tube be fifteen feet in diameter, the air will be compressed at least six times.

The diameter of the tube, the diameter of the coil and the number of coils may be increased as desired. The receivers may be made of any desired size, and the reservoir into which the receivers may discharge themselves may be of any given size, and also the pipes leading from the reservoir to furnace or forge. Attention is particularly called to the small quantity of power necessary to rotate this machine. The mercury and atmosphere being on a balance when a column of mercury only twenty-eight inches in height is used, it is evident that the friction on the journals above has to be overcome (the friction of the mercury and air inside the tube being merely nominal,) in order to raise water and compress the air one time. By increasing the height of the column of mercury the friction on the journals is increased, but it is to be remembered that the power obtained is also greatly increased in

the air compressed. By a small amount of power expended, a great blast can be had. The uses of this machine are many. Besides those mentioned, it may be used for ventilating mines or steamships.

Patented November 24th, 1874. The inventor desires to sell rights or an entire patent. For further particulars address the patentee, Daniel L. Cameron, at Madison station, Madison county, Mississippi.

New Process of Refining Base Bullion.

We have received an addition to our collection of subjects appertaining to metallurgy, in the shape of two little silver bricks, and four bottles containing silver in its various forms and crystallized sulphate of copper (bluestone). These articles are to illustrate the new process of refining base bullion, for which F. H. Bonfield, assayer at the Swiss-American Bank, has

Lead.

[Written for the Press by HENRY G. HANES.]

Metallic lead has a bluish gray color. It is usually tarnished, in which case it has no luster, but when freshly cut shows a surface highly metallic and brilliant. It is a soft metal, very malleable, easily fusible, and volatile at a white heat. It is scarcely acted on by hydrochloric acid or dilute sulphuric acid; but moderately dilute nitric acid dissolves it, more readily if heat is applied.

The presence of lead in any substance containing it may with certainty and ease be determined by heating the sample on a piece of well burned willow charcoal, in one portion of which—nearest the flame—a small cavity or depression has been made, in which the assay

Carbonate of soda produces a white precipitate of basic carbonate of lead, when added in solution to the solution of any lead salt. This precipitate is not soluble in excess of the precipitant nor in cyanide of potassium.

Hydrochloric acid or the soluble chlorides produce in solutions of the lead salts, if concentrated, a heavy precipitate of chloride of lead, which is soluble in a large quantity of warm water.

Sulphuric acid and sulphates throw down from lead solutions a heavy precipitate of sulphate of lead, which is nearly insoluble in water and dilute acids, but dissolves readily in solution of citrate of ammonia.

Chromate of potassa when added to solution containing lead throws down a beautiful yellow precipitate of chromate of lead, which dissolves in potassa, but which is nearly insoluble in nitric acid.

It should be understood that the above reagents are in solution, and are to be added in every case to solutions of substances containing lead.

Lead occurs in nature in a variety of forms, but most of the metal furnished to commerce is from galena or sulphuret of lead. Native lead is reported as occurring in globules at Alston Moor, and at the mines near Caribagena, Spain, but never in sufficient quantity to work, or even to furnish specimens for the cabinet of the mineralogist.

Galena, the most abundant ore of lead, has a metallic luster. Its color and streak are pure lead gray. When broken it is still oblique in form, even when reduced to the finest powder. It always contains silver and sometimes selenium, zinc, cadmium, manganese, gold, antimony, copper and iron. Even platinum is said to be found in galena in France.

It is a mistake to suppose that any external appearance indicates the quantity of silver in a sample of galena.

There is a variety of galena which is called supersulphuretted lead. The excess of sulphur results from the decomposition of a portion of the galena, setting the sulphur free.

There are several minerals which resemble galena, and may easily be mistaken for it. The most common is micaceous iron, a variety of hematite. The resemblance of this mineral to galena is sometimes so striking as to deceive the inexperienced. It may, however, be distinguished by the following tests: When heated on charcoal it gives off no odor of sulphur, nor can it be fused before the blow-pipe. No metallic beads are formed when carbonate of soda is added. After strong heating it becomes red, and on cooling is found to be attractable by the magnet.

Galena in Missouri and Illinois has been extensively worked. The largest deposits in the world are in the Western States, and that ore is there found associated with limestone, blende, carbonate and sulphate of lead, pyrites, and often an ore of copper and cobalt.

The lead region of Wisconsin comprises sixty-two townships, eight in Iowa, ten in Illinois, being eighty-seven miles in diameter, from east to west, and fifty-four miles from north to south. Throughout this region there is scarcely a square mile in which traces of lead may not be found. From a single spot not exceeding fifty yards square, three million pounds of ore have been raised, and in one of the townships two men have raised 18,000 pounds in a day. The mines of the upper Mississippi afford about 760,000 pigs annually, and those of Missouri about 150,000 pigs.

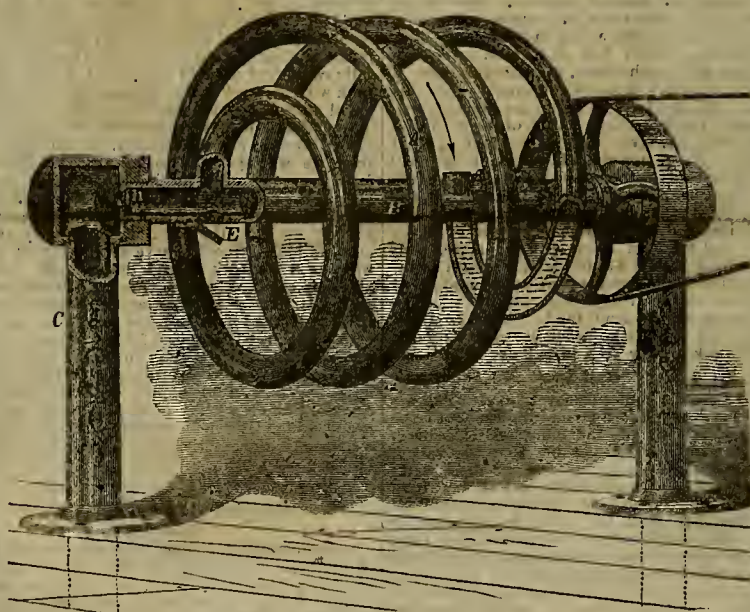
In 1874 the production of lead in California more than doubled, while in the same year that of England decreased 17,000 tons.

For making white lead Eastern corrodors prefer the Missouri lead to any other.

To give the reader some idea of the production of lead in the United States, the following statistics for the year 1874 have been compiled:

	TONS.		TONS.
Missouri.....	15,000	Chicago.....	2,200
California.....	8,000		
New York.....			46,500
Newark.....	6,500		
Philadelphia.....			
Iowa.....		Imported.....	18,000
Illinois.....	5,600	U. S. Sales.....	4,000
Wisconsin.....			
Omaha.....	5,800		68,500
Salt Lake.....	3,500		

In 1874 the Union Pacific railroad carried East 3,500 tons refined lead and 15,000 tons blillion, by which is meant lead carrying more or less of the precious metals.



AIR COMPRESSOR AND PUMP.

recently obtained a patent through the MINING AND SCIENTIFIC PRESS Patent Agency.

No. 1 of the specimens is the bullion as it ordinarily comes from an assay office in the shape of a bar, and is stamped silver, 410 fine, and has a value per ounce of \$0.53.

No. 2 is the metal as above prepared by the patent process and granulated.

No. 3 is the granulation after oxidation.

No. 4 is the metal deprived of its baseness, ready for fusion into pure bars, or ultimate parting, should the original alloy have contained gold.

No. 5 is the extracted copper in the shape of sulphate (bluestone).

No. 6 is a neat little bar obtained by this process, having a fineness of 993 in silver and .002 in gold, and a value per ounce of \$1.32.

The process which these samples are intended to illustrate is eminently simple and economical, and necessitates no actual waste of acid, as is the case with all other processes of humid refining. As the pure metals are never dissolved there is no danger of loss by breakage, etc.; and, should necessity require, they can be collected and utilized at very short notice.

The advantages of using this new method of concentration at the mine, where much sulphate of copper is constantly used, and where freight in bullion embraces both value and weight, are too manifest to need enlarging upon. The new process is a valuable addition to economic metallurgy.

MINING PROPERTY FOR SALE.—The attention of capitalists and miners is called to the advertisement of the Nevada mill and mine, situated on Deer creek, Nevada City, Cal.

may be placed, a little carbonate of soda added and the flame of an oil lamp or large candle turned upon it by means of the mouth blow-pipe. The direction of the flame at first should be downwards until the assay begins to melt, after which it should be blown softly and nearly horizontally across the charcoal. If lead is present in the assay a coating will form on the charcoal which is lemon yellow when hot, and sulphur yellow when cold. Other volatile substances which may be present will also form coatings, but they will be distinct, and at distances more remote from the assay, nor will they be the same color. Zinc, like lead, gives a yellow coating, which to the inexperienced might lead to mistakes, but if the charcoal is allowed to cool the zinc coating will become white, by which reaction it may be distinguished.

The following are the reagents used in the determination of lead in the wet way, and the reactions which occur:

Hydrosulphuric acid or sulphide of ammonium added to solutions of lead salts gives black precipitates of sulphide of lead which are not soluble in cold dilute acids, alkalies, alkaline sulphides or cyanide of potassium, but the precipitate may be decomposed by boiling nitric acid. The acid must be dilute or a part of the lead will be changed to the sulphate and remain insoluble.

Soda, potassa and ammonia throw down basic salts of lead in the form of white precipitates which are insoluble in ammonia. The exception is solution of acetate of lead, from which pure ammonia (free from carbonate) does not immediately produce a precipitate, a soluble triacetate of lead being formed.

CORRESPONDENCE.

Geological Formations.

There appears in the Press of May 15th an interesting article under the caption "Geological Formations—Quartzite," by Mr. William Teal, of Bingham, U. T., in which he sententiously asks, "What is quartzite?"

The query is a relevant one at the present juncture, seeing that its proper constituents are so little understood, notwithstanding the increased and increasing spread of geological information. The subject is one that admits of a wide range of discussion, because there are no two miners of this coast who probably would be found agreeing in their estimate regarding the nature of quartzite. Some define it as belonging to the order of sandstones, and where composed of pure quartz, sandy particles, as a species of silicious sandstone, which has been at some remote period in the earth's history "firmly consolidated" by the action of great heat, the same as crystallization has been produced in other rocky substances.

Quartz.

We know, is pure silica, of which there are many varieties, differing in form and color, and easily distinguished from all the other minerals by its hardness, infusibility, insolubility, and entire absence of cleavage. Quartz is also granular, but this is not one of the characteristics of the variety of quartzite most commonly met with in the mining districts of Nevada. The massive or solid and vitreous structure are the distinctive features of the kind that is most frequently encountered in this State, though one occasionally meets with a laminated vein or belt, but this structure is found more often at and above the outcrop wherever it rises to any great height in vertical stratifications above the surrounding formation. There are many of the varieties of this rock that are regarded as of igneous origin, while none of them can be said to be, in the strict sense of the word, as belonging to the metamorphic family of rocks.

Quartzite

Is not, that I am aware of, usually considered as a metalliferous bearing rock, and is not, as far as my experience has extended, the chief ingredient or constituent of the geological formation of any of the mining districts of Eastern Nevada. It is, however, often seen running in immense belts, ranging from a few feet to one hundred feet or more in thickness, and rising to a great altitude in huge, irregular shaped masses above the outline of the hills. It is, however, associated with many of our most valuable mines, in the character of either the foot or hanging wall—chiefly the former. Such is the case at Reveille in this county, and such too, I am informed, is the case at Pioche, in the Raymond & Ely and other mines. At Eureka it is entirely non-metalliferous, limestone being the prevailing formation, though a quartzite gangue is often found in place with the ore, but this peculiarity is noticeable only wherever the lode is broken or at fault, or wherever the mineral is poor. Here lime and porphyry are the chief rocks, though the former is the actual geological formation. The G mine has a silicious lime hanging wall, and a porphyry foot wall. The latter is also the hanging wall to the Gila mine at Reveille, while the foot wall is a semi-greenish and semi-vitreous quartzite, which at the apex of the lode has a standing or shelving dip to the east. Below this point it extends smooth and unbroken, while the porphyry of the foot wall is largely impregnated next the ore with talc, manganese and the red oxide of lead and iron. The quartzite belt is, as I said above, over or about one hundred feet thick and has a longitudinal course of several miles, or from north to south terminations of the district, which embraces a space of eight by four miles. The porphyry dikes run aside by side, and is distinguished by its bold projections as the other. While the lime formation runs parallel to both at the east and west sides.

Geological Formation

Does, of course, afford some index to the practical or experienced miner, whereby he is nearly always enabled to arrive at a just or partially just opinion of the mineral attributes of the section of country over which his peregrinations may sometimes extend in his search after the mineral wealth which nature has scattered with no niggard hand throughout the vast area of Nevada.

There are, however, no two districts alike in any respect, so that no parallels can be constructed where there are no common conditions found to exist. The order of venous formation also differs in different districts, and in some instances I have found the mines of the same district to differ just as widely, and this too with regard to the proper method of developing them. There are also many embossments caused in metallic mining by the displacement of lodes. These occurrences are most frequent in limestone formations, and from a variety of causes known to the trained miner and skillful mineralogist. Experimental mining can alone determine the structures of lodes by tracing them in their various stages of development,

from their incipient conditions to their fullest expansions, and is also the only sure method of measuring the quantity and value of their ores. These things are, of course, facts that are within the knowledge of every experienced, intelligent miner. But to turn from this subject for the present, I will give a glance at the state of our mineral resources at

Tybo.

The past delightful weather has been very generally taken advantage of by prospectors and others. In consequence there have been very many promising discoveries made in this and adjoining sections within the last two months. The ore is of the milling kind and quite rich. The chief locations are worked by T. J. Bell & Co., Wagner & Rosenthal and Garrett & Co., the two former parties to the east at entrance of canon, and the former in the hills to the west of the

Two G Mine

In which some valuable lode deposits of very fine argentiferous ore have been lately brought to light. I have on former occasions given accurate descriptions of this fine property, and therefore I need now only say that its value and permanence are no longer matters of doubt. The former was established long since, but recent explorations have shown more largely than heretofore that the latter attribute is also placed beyond suspicion.

The Mill

Is progressing towards completion, though it will be a while yet before the music of its twenty stamps will greet our expectant ears. When it does, we will exhibit some evidences of our capability to add to the metallic stream that is beginning to flow oceanwards from this section of Nevada.

A twenty-stamp mill and a twenty-five-ton furnace will do some execution in the reduction here. It is also expected that we are soon to have another company in here, negotiations being now, it is said, pending with some San Francisco parties for the sale and transfer of some of our mines.

Reveille

District, twenty-eight miles southeast of here, of which I wrote some time ago, is at present attracting well merited attention. The Gila is proving the accuracy of my former statements, and it is not yet more than in the infancy of its greatness. Rarely has there been turned out by any mine in the State, in so short a time, a larger quantity of more uniformly rich ore than there has been by this mine since it was opened last February. Much of the ore being extracted has given assay values ranging from \$200 to \$7,000 per ton. It pulps at the mill \$300, and this without being sorted. The mill is a two-stamp dry crusher, and has turned out \$55,000 in bright bullion bars from the lot to the 24th instant, and the remaining six or seven days will result in about \$16,000 more, thus aggregating about \$71,000 for the month's run, while the whole expenses will not be more than \$10,000, thus leaving a clear surplus of \$61,000 to go to dividend fund. There is about \$16,000 or \$17,000 shipped hence by Wells-Fargo each week to New York in hullion. The

"West Side"

Is the name of a new discovery made some six months ago, and its name indicates, to the west of the Gila on the mountain side overlooking and easily accessible from the valley. There is a five-stamp mill and excellent water privileges go with this mine, and all have been recently purchased by J. M. English and J. B. McGee of the Gila, the former the president of the Gila and the latter a director and large owner in some mine, and manager of the Tybo Consolidated mining company, of here. The West Side promises to become equally as valuable as the Gila, its ore, of which there is an abundance in eight, assaying \$300 to \$600 per ton.

J. D. P.

Tybo, Nye county, Nevada, May 26th.

AN OREGON GOLD BAR.—The *Weekly Oregonian* says:—One of the largest and consequently most valuable gold bricks ever brought to this city was on exhibition yesterday at the store of Millard & Van Schuyver, on Front street. The brick was brought down from Baker City, having been taken from the Virtue lode, near that place. This huge chunk of precious metal was the result of seventeen days' run by the Virtue mining company, which will serve to indicate the extreme richness of the lode. Pause, gentle reader, and ponder while you read. This brick weighs thirty-five pounds avoirdupois, or 505 14-100 ounces Troy weight. Its fineness is 903, and its value \$9,455.29. In size it is but a fraction smaller than an ordinary clay brick. It was kept under a glass case, and during the day was the center of attraction. To gaze on that solid mass of auriferous metal was quite enough to make the eye water and the palm itch, of even the most stolid. We were allowed to handle the brick, and never in all our extended reporter's career were we seized with such a desire to slip the hammers in our left vest pocket and run for life. Had it not been for the strict surveillance of the gentleman who was kindly looking after the welfare of the brick, we might possibly never have framed this paragraph. The brick is on its way to the mint at San Francisco, and is soon to be transformed into bright twenty dollar pieces.

AN EXHIBITION of all kinds of railway carriages in use throughout the world is about to be held in New York, with numerous drawings and models of everything appertaining to progression by steam.

Placer Mining in Oregon.

A correspondent of the *Bedrock Democrat* says: With the melting of the snow and the rush of water came busy times, which forced me for a time to discontinue my description of the mines and mineral wealth of Grant county. I will now resume where I left off, namely, at Robinsonville. From there we will pass through a low "saddle" in the mountains to Burnt river; the first mining we find there is at Parkerville, where, for two or three years, not much has been done, though in times past some very rich ground has been worked in this vicinity, with the probability of more of the same kind remaining. Messrs. Parker & Gleason are at work in the main gulch, with pipe and good head of water. Their prospects are good. This place is the over night station of Grier & Kellogg's Canon City line of stages. Mrs. Newton is the landlady, and if you ever stop at her house and fail to get what you would call a No. 1 meal, just give notice in your paper that 7-UP is no judge of grub.

From this place the next camp is Bennett creek and Winterville. Through this section is some of the heaviest deposit of gravel in Oregon, with more or less gold all through it. Further on we find Pine creek, Westfall Basin, Gimlet and Jack Knife, all good gravel deposits, but very short of water. In this region is one of the best chances for capitalists to invest in a ditch that can be found in Eastern Oregon; an extensive supply of water would develop the entire section of Burnt river that now lies idle and unproductive, throwing tens of thousands of dollars in circulation among us, that now reete buried in Mother Earth.

While our capitalists and financiers are working to get the railroad through Eastern Oregon would it not be well for them to look at the chances of increasing the wealth and prosperity of our country in other ways? Now stop! Don't jump on me and go to kicking me for opposing the railroad, for I am in favor of it, and other roads if needed, but I am strongly in favor of pressing the subject of the mineral wealth and resources of our country upon the public, thereby trying to retain our capital and muscle among us instead of sending it on such tips as to South mountain while we are needing it here to add to our prosperity and help build roads and other permanent improvements. Some twelve years' residence and observation in the mineral regions of Eastern Oregon has fully convinced me that this country will yet rank with the best in the amount of precious metal produced—we have it now, all we want is capital and expert prospectors to bring it forth. But, to my description: From Burnt river we will go back to Olive creek. Here, for some seven miles, mining is carried on, not only in the main creek, but also in nearly every gulch coming into it. About twenty companies are at work in the different parts; they are mostly Chinese, though several companies of white men are working and doing well. The principal ones are Messrs. Howard, Chittenden & Co., L. Farmer and Carpenter & Co. The latter took out about a mule load last year, with just as good prospects for the present season. The water privilege on Olive creek is middling; the upper main gulch with its tributaries has a working supply until the last of August, while the lower end of the creek has a head through the entire season. There is still a chance in this section for prospecting and taking up ground.

Douglas County Mines.

The superiority of Douglas county over most of the other counties of the State as an agricultural region has tended to point all our attention in that direction, to the exclusion of the mining interests, which have centered in the vicinity of the "great bonanza." South of us are the Alpine, Benton, Cerro Gordo and Panamint mines, stretched along in one continuous range, and north of us is the great Comstock, all on the eastern slope of the Sierras. Within the bounds of our county are the Bismarck, Pine Nut, the old Sierra claim, besides several others, in all of which the indications are good, and would be extensively prospected if located anywhere in the neighborhood of the Comstock. The Silver Lake company worked their claim to some extent last summer, and here is the result, as taken from the sworn statement of the superintendent, John B. Winters, as given to the County Assessor:

Receipts, exclusive of freights on 225 tons of ore sold Teconia company, Truckee, Cal.,	\$8,000.00
Expense of producing the same,	5,079.23

Which, it will be seen, leaves a profit of \$2,920.77, or about \$13 per ton. This ore was transported a considerable distance on the backs of mules, which was an extraordinary expense.

With rich mines both north and south of us, numerous indications of good mines in our midst, Douglas county certainly merits some attention from mining men; and we feel confident that if only one of the already ledges discovered can be made to become dividend-paying, there will be no difficulty in finding capital to develop others. As stated above, the Winters mine, out in Pine Nut district, has demonstrated that their ore will more than pay for mining and working even in the most expensive manner. When this company get their new furnace in operation and the mine opened so as to work it to the best advantage, we may reasonably expect one good paying mine at least, and through this encouragement the discovery of many others. Let us hope.—*Carson Valley News.*

The Great Union Shaft.

The *Virginia Enterprise* gives the following description of what the combined efforts of the Savage, Hale & Norcross and Chollar-Potosi mines, on the Comstock, are doing and expect to do: During the last days of February a number of men were set at work preparing to grade a railroad track from Tunnel No. 2, between Virginia and Gold Hill, along the rough sides of the hills east of the city to a point three-quarters of a mile almost directly east of the Hale & Norcross works. For two weeks the body of men did little except shovel snow along the line of the intended track. At length work was commenced in Tunnel No. 2. The northern entrance was widened nine feet, and ten new sets of timbers were put in between that point and where the grade ran out. In the meantime work had been extended to different points along the line of the intended grade. Not only was it necessary to grade and lay down a track for the cars, but

A Wagon Road

Must be made the entire length of the grade also. The railroad grade is finished, with trifling exceptions, the ties placed and the iron laid for more than half the entire distance. In fact, this part of the work would have been completed, but that the material on hand which was available for the purpose gave out. There are three fills and four cuts along the line, one of which cuts was made through hard blasting rock and to a depth of eighteen feet. The fills required all the debris from the cuts, with trifling exceptions. The wagon road, which winds around the railroad track, is nearly finished, it only remaining to cut around some of the fills and prepare crossings. Along the line of the railroad are three culverts for letting the surface water pass under the grade. One of them is made of an eight-inch pump-column, the others being of 3x3 plank. To conduct off the surface accumulations around the site of the future works, a culvert has been placed in position which is 2x3 feet in the clear, and amply sufficient for the purpose.

The Site of the Works

Commands a most beautiful view of the city and surrounding country. The city lies like a painted panorama, with Mount Davidson for a background, and lies to be seen at a glance, from the water works on the Divide to the extreme northern limit. To the east, the works will look down on Sutter tunnel shaft No. 4, and out over the beautiful, though rough and rugged, country between them and the Carson river. As to availability, the place for the works which are to be constructed has been selected with much care and forethought, and an admirable situation it is. There is to be an upper and lower grade. The railroad track leads to the upper, where will be located the works proper, wood-pile, etc. The second grade is run in from the bank, thirty-five feet below, and from this the shaft is to be started. A wall five feet in thickness will be built from the lower grade to the upper, and immediately east of the shaft. The landing will be upon the lower grade, which is sufficiently high to enable tracks to be run around to the east side of the hill, so that there is dump room enough there for all time. The ordinary gallow's frame will be dispensed with. The sheaves will be placed upon the wall before mentioned, with just frame enough to hold the pulley wheels in place. These wheels will be of sufficient size to carry the cable over to the center of the shaft.

The Shaft Itself

Is to be of four compartments and will require a "hole in the ground" at least 9x30 and probably 16x30. Three of the compartments will be each 5x6 in the clear, while the fourth or pump shaft will be 5x7 in the clear. These compartments are to be surrounded by timbered 14x14, with 3x12 splines. The entire work of grading and everything ready for the commencement of the shaft will be finished by the middle of next week, and then the shaft will be started. The rocks and dirt, which are loosened up in the same manner as was mentioned in yesterday's article on the California mill, are being removed by eighty men, seven cars, three cars, four wheelbarrows, and at the rate of 3,600 cart loads per day. A double-headed donkey is on the way and the work of sinking will be pushed rapidly forward at the same time that the construction of the works, and the placing of the machinery is going on. The size of the works, etc., has not yet been decided upon, but it will be ample. The blacksmith shop will occupy the lower grade and be south of the shaft.

The Intention is

To make preparations and put in machinery to sink at least a mile, if desirable. To this end nothing will be left undone which can contribute to ultimate success. The machinery will be more ponderous than any yet placed on the Comstock. Everything will be of gigantic proportions, such as will comport with and contribute to the gigantic ends in view. The movements along the line of the Comstock have been with its dip, toward the east, and toward the east everything has gravitated. The wisdom of the combination is patent, in that a leap over intervening obstacles has been made, the ground secured and an abundance of it, and a foundation commenced firmly and of immense proportions and promise. Everything is in keeping with the undertaking, and will be pushed to completion with the same energy and ability which has characterized its early developments. Thus far the grading has been under the supervision of Mr. A. Perrin, foreman of the Chollar-Potosi.

CUTTING GLASS WITHOUT A DIAMOND.—An easy method of breaking glass to any required form is by making a small notch, by means of a file, on the edge of a piece of glass; then make the end of a rod of iron red hot in the fire, apply the hot iron to the notch, and draw it slowly along the surface of the glass, in any direction you please; a crack will be made in the glass and will follow the direction of the iron. Round glass bottles and flaske may be cut in the middle by wrapping round them a worsted thread dipped in spirits of turpentine, and setting it on fire when fastened on the glass.

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from Advertisements in the Mining and Scientific Press and other S. E. Journals.

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS.

<i>Company.</i>	<i>Location.</i>	<i>No.</i>	<i>Amt. Levied.</i>	<i>Delin'g't.</i>	<i>Sale.</i>	<i>Secretary.</i>	<i>Place of Business.</i>
Belmont M Co	Nye Co Nevada	5	00	June 14	June 14	O B Bogart	402 Montgomery st.
Caledonia C M Co	Washoe	12	300	M'ry 10	June 1	R Weger	414 California st.
Cheriot Mill & C M Co	San Diego Co Cal	3	25	April 17	June 22	F Swift	414 California st.
Dayton C & S M Co	Washoe	8	100	June 1	June 5	W D Dean	419 California st.
Empire M & S M Co	Washoe	13	00	May 28	July 1	W J Peck	419 California st.
Gold Mt & G M Co	Washoe	5	8	June 3	June 8	C R Kibbe	308 California st.
Huhn & Hunt S M Co	Bear Valley Cal	5	50	May 1	June 5	J P Cavalleri	613 California st.
Ida Elmore M Co	Ely District	11	50	May 7	June 15	T L Kimball	409 California st.
Ida Elmore M Co	Idaho	17	100	April 28	June 4	O B Higgins	402 Montgomery st.
Ida Elmore M Co	Washoe	1	10	May 13	June 4	W J Peck	419 California st.
Jacob Little Cone M Co	Washoe	1	10	May 31	June 10	C R Kibbe	330 Pine st.
Julia G & S M Co	Washoe	22	200	May 12	June 15	A Noel	419 California st.
Klickerhocker L M Co	Washoe	12	30	April 22	May 29	J H Sayre	Stevenson's Bldg.
Little Flora M Co	Washoe	7	70	May 10	June 10	C R Kibbe	419 California st.
Lyevathan M Co	Washoe	1	50	May 29	June 6	F E Lutz	507 Montgomery st.
Mint G & S M Co	Washoe	10	20	May 12	June 18	D A Jennings	401 California st.
Nevada G & S M Co	Washoe	20	200	June 1	June 27	Joseph Maguire	419 California st.
New York Land & M Co	Elko Co Nev	17	70	June 1	June 1	Wm J Peck	332 Montgomery st.
New York Cons M Co	Washoe	13	00	April 22	May 25	H O Kibbe	419 California st.
New York V M Co	Washoe	4	100	April 22	May 25	H O Kibbe	419 California st.
Opit S M Co	Washoe	23	200	April 26	May 17	J M Townsend	308 California st.
Original Gold Hill M Co	Washoe	3	50	June 4	June 9	J M Townsend	419 California st.
Pioche S M Co	Ely District	9	100	May 3	June 10	W M H-man	401 California st.
Rock Island G & S M Co	Washoe	1	100	May 31	June 21	O E Elliott	419 California st.
Sage M Co	Washoe	8	500	April 27	May 31	R Weger	418 California st.
Sierra Nevada S M Co	Washoe	41	100	May 3	June 24	E B Holmes	419 California st.
Silver Cor M Co	Idaho	9	100	April 24	May 31	R Weger	414 California st.
Silver Hill M Co	Washoe	2	200	June 1	June 21	O B Higgins	402 Montgomery st.
Union M Co	Washoe	10	200	June 1	June 9	W J Peck	419 California st.
Washoe	Washoe	10	200	June 1	June 9	W E Dean	419 California st.

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

Alhambra Q M Co	Sonoma	1	5	May	10	June	10	R Von Pfister	Merchants' E	
Benjaminia M & Co	Lyons Co Nevada	2	1	April	14	May	22	L Leavitt	401 California	
Champion Cons & S Co	Nebraska	2	1	May	1	June	1	C W Livingston	402 Montgomery	
Colorado Blue Gravel M Co	Cal	3	1	5	April	23	June	9	O C Bogart	
Chrysothrips G & S M Co	Washoe	10	1	May	7	June	10	A Noel	419 California	
Coe G & Co	Grass Valley Cal	1	5	May	18	June	18	A Broadwell	431 California	
Combination G & S M Co	Inyo Co	6	1	April	22	May	27	B D Bredford	432 Montgomery	
Conner M M & M Co	Nev	3	20	April	23	May	26	D F Verdant	405 California	
Cordillera G & S M Co	Mexico	1	10	May	8	June	18	Henry R Reed	321 Washington	
Edith Q M Co	Cal	4	25	June	3	July	19	Wm Starn	119 Leidsdorf	
El Dorado Silver Co	Cal	1	1	April	36	May	1	Wm Elina	418 Montgomery	
El Dorado W & D G M Co	Cal	9	10	July	8	July	8	H R Elise	415 Montgomery	
Empire & Middleton Cons Q M Co	Cal	1	1	10	April	17	May	28	J K Riley	432 Montgomery
Enterprise Cons M Co	Calaveras Co Cal	3	10	May	24	June	10	F R Hermann	418 Kearny	
Equable Tunnel & M Co	Cal	1	1	May	19	June	30	J J Healy	414 Market	
Flora M & Co	Humboldt Co Cal	2	1	10	May	15	June	10	J B Davis	320 Montgomery
Geneva Cons S M Co	Nevada	25	25	May	13	June	14	T I Milliken	307 Montgomery	
Gold Run N Co	Washoe	12	15	June	5	June	30	O O Palmer	414 Market	
Golden Gravel M Co	Utah	1	1	April	28	May	1	Wm Elina	418 Montgomery	
Holmes Central M Co	Inyo Co Cal	1	1	June	4	July	3	D C Cook	331 Montgomery	
Ilmo	Idaho	3	75	May	21	June	21	R H Brown	402 Montgomery	
Lake C Quicksilver M Co	Cal	6	10	May	10	June	18	Andrew Baird	316 California	
Los Prietos M Co	Cal	5	25	June	2	June	2	Wm Elina	418 Montgomery	
Martin & Walling M & M Co	Cal	5	30	April	24	May	25	B F Hixox	403 California	
Minnie Tunnel & M Co	Utah	1	5	April	28	June	1	H S Osgood	Merchants' E	
North Carson S M Co	Cal	1	25	May	12	June	16	Nathan Leigh	416 California	
Northern River View Hill M Co	Cal	2	1	May	1	June	1	Wm Livingston	311 California	
New York Cons M Co	Washoe	13	1	April	22	May	25	H O Kibbe	419 California	
Omega Table Mt M Co	Cal	6	1	April	30	June	5	D Wilder	Merchants' E	
Omega Table Mountain M Co	Cal	6	5	June	8	July	13	David Wilder	316 Merchants' E	
Oreline M Co	Grass Valley Cal	5	2	May	6	June	6	Wm Elina	418 Montgomery	
Oreline M Co	Grass Valley Cal	4	1	10	April	27	June	1	Geo E Thurston	315 California
Pioneer Cons M Co	Eureka Nev	3	1	10	May	18	June	23	O S Neal	419 California
Rod Jacker M Co	Idaho	7	5	May	21	June	25	Wm Willie	418 California	
Rocky Bar M Co	Washoe	3	1	April	22	May	18	John Lora	415 California	
Sagehen Cons M Co	Washoe	25	25	May	26	June	30	J R Spinney	320 California	
Silver Central Cons M Co	Washoe	1	5	May	10	June	15	L H Hermann	330 Pitt	
Silver Spurr M Co	Cal	5	5	Feb	17	April	17	T B Wingard	316 California	
South Overman S M Co	Washoe	2	2	May	1	June	1	J H Pope	Merchants' E	
Star Hill S M Co	Elko Co Nevada	11	25	May	21	June	18	L Karler	Merchants' E	
Table Mountain Alpha M Co	Cal	1	1	June	5	July	18	Lander Leavitt	401 California	
Empire Tunnel & M Co	Utah	4	5	May	20	July	1	Wm Small	331 California	
Union Gravel M Co	Nevada Co	1	10	10	April	21	May	4	C W Livingston	320 California
Virginia Cons M Co	Inyo Co Cal	1	1	10	April	21	May	4	T B Wingard	318 California
Weaverville D & H M Co	Cal	6	1	10	May	4	June	7	F H Rogers	330 Pitt
Wm Penn Cons G & S M Co	Washoe	3	8	May	19	June	23	J H Pope	421 Montgomery	
Wyoming G M Co	Nevada Co Cal	6	35	May	11	June	12	Wm Livingston	311 California	
Yuba Cons M Co	Cal	1	1	April	27	June	2	L F Hermann	Merchants' E	

MEETINGS TO BE HELD

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Alpha Cons M Co	Washoe	Wm Willis	414 California at	Annual	June
B oaks G M Co	Washoe	J T Miltken	302 Montgomery at	Annual	June
Chrysalis G & S M Co		Called by Directors	419 Calif r iast	Special	July
Crown Point G & S M Co	Washoe	E E Elliot	419 California at	Annual	June
Gover M Co		W O Wilson	402 Front at	Annual	June
Lady Bryan M Co	Washoe	Called by Trustees	419 California at	Special	June
Mahogany M Co	Idaho	Called by Trustees	402 Montgomery at	Special	June
Manzanita S M Co	White Pine Co Nev	D A Jennine	401 California at	Annual	June
Mineral Fork M & S Co	Utah	R B Noyes	419 California at	Annual	June
Miser's Dream S M Co		W F R - chindler	535 California at	Annual	May
Mosses S M Co		Chas Hecolay	Monte v i st Bx	Annual	June
M u n e m e n t a l M Co	Butte Co Cal	R R Townsend	330 Pine at	Annual	June
Pauper M Co	Idaho	Called by Trustees	402 Montgoy at	Special	July
Pride of Washoe G & S M Co	Washoe	Called by Directors	419 California at	Special	June
Renton Coal Co	Washington Ter	S A Sanderson	421 Montgomery at	Annual	June
Silver Hill W Co	Washoe	W E D an	419 California at	Annual	May
Star Cons M Co	Nevada	R S Spinsky	320 California at	Annual	June
Union S M Co			235 California at	Annual	June

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable
Belcher M Co.	Washoe.	H. C. Kihns.	419 California st	\$ 300	Jan
Black Bear Quartz	Cal	W. L. Oliver.		25	May
Chandler M & M Co	Cal	Frank Swift	419 California st	10 00	Nov
Chas Virginia M Co	Washoe	Chas H Fish	401 California st	2 00	Jan
Crown Point M Co	Washoe	C E Elliott	414 California st	2 00	May
Diana M Co.		N. C. Jones	220 May st	1 00	Jan
Empire M Co.	Cal	D J Jennings	401 California st	1 00	June
Eureka Consolidated M Co	Nev	W W Traylor	419 California st	12 00	April
Excelsior M & M Co		Frank Swift	419 California st	1 00	June
Jefferson S Co		O A Sanky	331 Montgomery st	1 00	June
Leopard M Co		R H Brown	419 California st	1 00	June
Manhattan S M Co	Nevada	Chas S Newell	409 California st	50	May
Manhattan S Co	Nevada.	D F Verndal			

have yet seen. The soapstone is cased in soft granite. The ledge is about three feet in width. Blocks of any desired size can readily be procured. Messrs. Schraak and Robinson are the discoverers, but we are not informed where the deposits are located.

WEST POINT DISTRICT.—A mule train is packing a lot of rich ore from Briggs & Co.'s mine to the crest of North Fork ridge, whence it will be hauled to custom mills. Some 60 tons of ore from the Champion has been hauled to Carlton's mill. It is reported that very favorable developments have been made in the Mina Rica. The Enterprise mill is running pretty steady. The Anderson Flat mine is turning out very rich ore, which is 18 inches wide. The ore is heavily sulphuretted but every particle of it shows free gold. A shaft is being sunk on the Good Faith which will connect with the main tunnel for the double purpose of ventilation and to facilitate stoping. The width of the ore in the Josephine has not been ascertained yet. The ore now being crushed exceeds the expectation of the owners by at least 25 per cent.

CONTRA COSTA.
GOLD AND SILVER MINE.—Contra Costa Gazette, June 5: It is reported that rock containing gold and silver has been found near Lafayette; but, as the assay shows only some \$14 or \$15 per ton value in the rock, it will not be likely to encourage very expensive prospecting unless the mine promises to afford a large body of ore, of which we believe there is no assurance.

EL DORADO.
DITCH PROGRESS.—*Mountain Democrat*, June 5: Operations on the new ditch are progressing.

MINING SUMMARY.

THE following is mostly condensed from journals published in the interior, in proximity to the mines mentioned

California

LIVERMORE COAL MINE.—Livermore Enterprise, June 5: The prospects at the Livermore coal mine are increasing more and more each day as work is pushed ahead. A large winze for the purpose of ventilation, has been sunk, and only a few feet further will be required to connect it with the main shaft. The latter has reached the depth of 300 ft, and the timbering is being done preparatory to running side drifts and stoping. A fine sump remains at the bottom of the main shaft. We expect to report next week the shipment of coal to market.

CALAVERAS.

Tmolus—Good Rock.—Calaveras *Chronicle*, June 5: Thirteen and a half tons of rock taken from the Tmolus mine, in the Jeane Maria district, yielded 59 ounces of amalgam. That is an average of something over \$30 per ton, pretty good considering that the rock was taken from a depth of only about 50 ft. The ore was packed on mules to the mill on the Anstrutia mine to be worked. If a less expensive method of transportation could be devised, or a mill erected on the mine, the Tmolus would prove very remunerative.

LATE VALUABLE DISCOVERIES.—There can be seen at this office samples of pure asbestos and soapstone which are of the finest texture and

FRIDAY, A. M., JUNE 4. | AFTERNOON SESSION.

20	Alpha	184	300	Alps	1
115	Belcher	28	305	Anderson	1
120	Bell	48	310	Arctic Flag	1
130	Bell & Bell	10 46	340	Belmont	20 34
155	Bulli	46 43	350	Conlor	14
205	California O. N.	15	360	California	1
12 0	Calif. n. n.	60 59	380	Cosmopolitan	40 48
100	do	h 30 61	390	Eureka Con	51 60
180	do	h 50 67	400	do	h 30 61
190	do	h 58 67	420	Empire I. S.	2
145	Con Virginia	420 04 10	440	Gila	3 24
10	do	h 10 45	450	Golden Gate	h 30 3
100	do	h 10 45	460	Golden Gate	h 30 3
50	do	h 10 45	480	Ida Ellmore	28 03 34
50	do	s 30 32	545	Jackson	2 26 03 34
15	Dayton	h 5 33	550	Edison	2 26 03 34
20	Con. Mill	1	570	K K Con	17 6
75	Gould & Wry	17 21	60	Ko-uth	14
355	Hale & Nor.	39 01	430	Leopard	1 24 21 01
190	Imperial	110 05	450	Golden Valley	25 05
140	do	110 05	485	Manstead	25 05
150	Kentuck	140 13	1150	Mahogany	12 01 10
60	do	h 30 14	1160	Maryland	10 10
150	do	h 30 14	1170	Michigan	10 10
235	Lady Bryan	34 31	1310	Phoenix	21 24
2650	Mexican	21 24 11	140	do	h 30 21 24
40	New York	28	110	Pioche	h 30 21 24
2190	Cphir	57 55	350	Prussian	30 33
10	do	h 5 57 55	370	Prospect	34
9	Overman	75	400	Rocky Mts	34
100	Overthorpe	75	410	Poo Man	34
5	Sac. Re cher.	85	50	Raymond & Ely	42 03 12
125	S Hill	85 06 36	30	S Oroho	24 24 24
100	Shelton	106 36	110	Thornton	4
280	Si. Ra Nevada	114 41	1250	Tiger	28 34
210	Sierra	106 33	230	War Eagle	28 34 28 34

50 ..do..... 5.64
275 Utah. ... 5 3/4 @ 6
630 Woodville 3 1/4 @ 3 1/2

200	du.....	h 30.33	95	Alpha.....	173
100	.....	h 39.36	195	A Flat.....	173
70	Yellow Jacket.....	16.61	210	Beicher.....	2.62
AFTERNOON SESSION.					
610	Alps.....	1	250	Best & Belcher.....	45.20
50	American Flat.....	215	50	.....	h 5.40
630	Bonds.....	42.63	415	Baltimore Con.....	4.40
630	Belmont.....	2.64	225	Bullion.....	42.64
50	Condor.....	176	20	Cholar.....	7
50	Cople.....	176	290	Crown Point.....	31.52
100	Cosmopolitan.....	50.65	10	Cur Virginia.....	3.40
270	Eureka Con.....	14.13	1008	California.....	57.62
200	El Dorado South.....	1	100	.....	h 10.50
115	Empire I.....	62.31	100	Daney.....	1
100	Empire II.....	62.31	180	Dart & Carr.....	3.40
180	Golden Chariot.....	14.10	83	Lloyd & Carr.....	3.40

100	do.....h	30	1/2	30	Hale & Norcross	39@38
180	Ida Ellmore	3	3/4@23	40	Imperial	

855 Jackson.....	263/4	5 Justice.....	9
860 Jefferson.....	60	60 Julia.....	87/4@
865 Jones.....	65/2@	65 Kate.....	10
90 Kosuth.....	12	265 Keauk.....	11@13/3
185 Leopard.....	12 1/2@12 1/2	165 Lady Bryan.....	24
200 Lewis.....	15 1/2	140 Mexican.....	18 1/2
280 Meadow Valley.....	15 1/2	50 do.....	h 5.18
250 Mansfield.....	40 1/2@42 1/2	20 1/2 New York.....	h 5.18
470 Manohany.....	10 1/2@11	15 Occidental.....	15 1/2
250 Marquette.....	10 1/2	155 Overman.....	15
250 Mint.....	20 1/2	170 Ophir.....	41 1/2@43 1/2
20 Maryland.....	90c	100 do.....	h 40.47 1/2
5 No Belle.....	20	50 Overmont.....	10
300 Nevada.....	60	50 S Nevada.....	11 1/2
200 Niagara.....	60c	35 Sag Belcher.....	8
1500 Phoenix.....	2 23/4	100 do.....	10
600 do.....	h 30.25	115 S Hill.....	8 1/2@8 3/4
400 do.....	h 30.25	515 Union.....	7@6 1/2
410 Pauper.....	21 1/2@22 1/2	100 Utah.....	10
370 Prussian.....	30 1/2	5 Y Jacket.....	76 1/2@75
419 Poor man.....	9 1/2@9 3/4		
600 do.....	h 10.4		
130 Raymond & Ly.....	42@43 1/2		
50 do.....	h 30.43 1/2		
100 do.....	h 30.43 1/2		
100 St Patrick.....	12		
270 South Chariot.....	2 1/2@2 1/2		
350 S ord.....	35@36		
300 Sord.....	35@36		
330 Tiger.....	75@76		
500 Wells-Fargo.....	15 1/2@16		

SATURDAY, A. M., JUNE 5.

275	American Flat.	.33@.23
115	Belcher.	.26@.27
90	do	h 5 .28
485	Best & Balcher.	.45@.44
298	Bullion.	.46@.44
145	C. Con.	.46@.44
30	Crown Point.	.32@.33
80	do	h 10 .33
8-5	California.	.57@.58
120	do	h 10 .58
30	Caloedonia.	.15@.15
270	Can Virginia.	.05@.12
5	Danoyon.	.25@.33
200	Eureka.	.72@.70
260	Empire Mill.	.72@.70
5	Edison.	.25@.33
120	Gould & Curry.	.17@.17
140	Hill & Nor.	.23@.29
250	Imperial.	.72@.70
40	Julia.	.10@.10
10	Justice.	.10@.10
90	Kelly.	.10@.10
215	Knickerbocker.	.35@.34
95	Kenuck.	.13@.14
190	Lady Bryan.	.35@.23
115	New Valley.	.35@.23
500	Mexican.	.20@.20
40	do.	b 30 .20
80	New York.	.32@.34
20	Occidental.	.32@.34
1715	Ore.	.82@.82
150	Overman.	.82@.82
335	Rook Island.	.45@.45
235	Ry & Kly.	.45@.45
180	Silver Nevada.	.11@.11
35	Silver Hill.	.63@.64
190	Union.	.63@.64
350	Utah.	.63@.64
100	Yellow Hills.	.63@.64
20	Yellow Jacket.	.63@.64
100	do.	h 10 .64
50	do.	h 10 .64
50	Jackson.	.72@.72
340	Jefferson.	.72@.72
10	K K Coa.	.6% @.6%
50	Kosuth.	.72@.72
30	do.	h 10 .72
30	Lady Washington.	.72@.72
110	Meadow Valley.	.68@.68
350	Mohogany.	.15@.15
120	Montezuma.	.22@.22
350	Manesfeld.	.22@.22
24	Mint.	.20@.20
70	Marland.	.27@.27
10	Belie.	.27@.27
50	Norfolk.	.27@.27
50	Nisgara.	.82@.82
150	Phoenix.	.25@.25
150	Ploche.	.25@.25
150	Plover W.	.25@.25
150	Panther.	.72@.72
190	Pooruan.	.94@.94
150	Prussian.	.72@.72
150	Quincy.	.72@.72
35	Raymond & Ely.	.12@.11
250	St Patrick.	.12@.11
100	S Cord.	.72@.72
100	Shasta.	.72@.72
30	S California.	.72@.72
300	Tiger.	.37@.37
55	War Eagle.	.72@.72
1150	Wells-Fargo.	.20@.20

WEDNESDAY A. M. JUNE

30	Alpha.	.17@.17
200	Am Flat.	.72@.72
126	Belcher.	.22@.22
60	B & Belcher.	.48@.50
10	do.	.15@.15
20	Sullivan.	.15@.15

20	Baltimore Cou...	44.00
90	Chollar.....	77.00
100	Crown Point...	22.00

14	Alpa	.....	174	123	Con Virginia	.....	324
45	Am Flat	.....	434	59	do	.....	h 30
470	Balcher	.....	26	590	California	.....	593
230	Bel	.....	26	100	do	.....	h 5
100	do	.....	h 30	40	do	.....	h 30
110	Bullion	.....	43	80	Dayton	.....	40
215	Baltimore Con	.....	43	270	Empire Mill	.....	44
210	Br Virginia	.....	43	519	Gould & Curry	.....	18
670	Crown Point	.....	33	519	Gravel	.....	80
70	Caolla	.....	16	500	Imperial	.....	67
915	California	.....	56	303	Julia	.....	10
100	do	.....	5	33	Justice	.....	3
200	Calcutta	.....	5	35	Knicknocker	.....	15
50	Dacey	.....	50	15	Knuck	.....	15
100	Day-on	.....	4	200	Lady Bryan	.....	5
590	Empire Mill	.....	4	270	do	.....	5
5	Empire	.....	4	519	Int	.....	1
80	Gould & Curry	.....	18	31	do	.....	h 30
123	Hale & Nor	.....	3	300	New York	.....	10
200	Imperial	.....	h 30	50	Occidental	.....	1
5	Justice	.....	3	50	Odor	.....	h 30
25	Kentuck	.....	13	30	Overman	.....	61
35	Knicknocker	.....	3	120	Poli Sheriffan	.....	62
65	Knuck	.....	Br	200	Sage and	.....	10
65	Ly Wash	.....	1	20	Savage	.....	10
1560	Mexican	.....	18	190	Silver Nevada	.....	11
180	do	.....	h 3	500	S Hill	.....	14
240	do	.....	h 30	3	See Belcher	.....	14
300	dw York	.....	h 30	575	Union Con	.....	10
30	Occidental	.....	3	55	Utah	.....	3
960	Upbir	.....	49	615	Woodville	.....	3
275	Overman	.....	40	40	Yellow Jacket	.....	75
114	do	.....	40				
130	Sierra Nevada	.....	11				
8	Savage	.....	100				
100	Sen for	.....	7				
4	Se-lcher	.....	1				
170	Si cor	.....	1				
145	Silver Hill	.....	8				
515	Union Con	.....	5				
100	do	.....	h 3				
100	Upbir	.....	49				
1275	Woodville	.....	50				

SALES OF LAST WEEK AND THIS COMPARE

THURSDAY, A.M., JUNE		THURSDAY, A.M., JUNE	
50	American Flat. 31	265	American Flat. 30
100	Andes. 18	270	Andes. 18
130	Alto. 31	275	Alto. 31
190	Alph. 41	280	Alph. 41
200	Baltimore Con. 41	285	Baltimore Con. 41
220	Bolton. 28	290	Bolton. 28
240	Bullion. 41	295	Bullion. 41
25	California. 16	300	California. 16
60	Cholla Potosi. 71	305	Cholla Potosi. 71
682	Crown Point. 30	310	Crown Point. 30
70	Danby. 87	315	Danby. 87
200	Don Virginia. 41	320	Don Virginia. 41
280	Eclipse. 16	325	Eclipse. 16
215	Gould & Curry. 16	330	Gould & Curry. 16
220	Hale & Norross. 31	335	Hale & Norross. 31
100	Imperial. 21	340	Imperial. 21
21	Justice. 10	345	Justice. 10
10	Knicknacker. 20	350	Knicknacker. 20
100	Kentuck. 10	355	Kentuck. 10
150	Madison. 18	360	Madison. 18
45	La B. Bryan. 30	365	La B. Bryan. 30
		370	La B. Bryan. 30
		375	La B. Bryan. 30
		380	La B. Bryan. 30
		385	La B. Bryan. 30
		390	La B. Bryan. 30
		395	La B. Bryan. 30
		400	La B. Bryan. 30
		405	La B. Bryan. 30
		410	La B. Bryan. 30
		415	La B. Bryan. 30
		420	La B. Bryan. 30
		425	La B. Bryan. 30
		430	La B. Bryan. 30
		435	La B. Bryan. 30
		440	La B. Bryan. 30
		445	La B. Bryan. 30
		450	La B. Bryan. 30
		455	La B. Bryan. 30
		460	La B. Bryan. 30
		465	La B. Bryan. 30
		470	La B. Bryan. 30
		475	La B. Bryan. 30
		480	La B. Bryan. 30
		485	La B. Bryan. 30
		490	La B. Bryan. 30
		495	La B. Bryan. 30
		500	La B. Bryan. 30
		505	La B. Bryan. 30
		510	La B. Bryan. 30
		515	La B. Bryan. 30
		520	La B. Bryan. 30
		525	La B. Bryan. 30
		530	La B. Bryan. 30
		535	La B. Bryan. 30
		540	La B. Bryan. 30
		545	La B. Bryan. 30
		550	La B. Bryan. 30
		555	La B. Bryan. 30
		560	La B. Bryan. 30
		565	La B. Bryan. 30
		570	La B. Bryan. 30
		575	La B. Bryan. 30
		580	La B. Bryan. 30
		585	La B. Bryan. 30
		590	La B. Bryan. 30
		595	La B. Bryan. 30
		600	La B. Bryan. 30
		605	La B. Bryan. 30
		610	La B. Bryan. 30
		615	La B. Bryan. 30
		620	La B. Bryan. 30
		625	La B. Bryan. 30
		630	La B. Bryan. 30
		635	La B. Bryan. 30
		640	La B. Bryan. 30
		645	La B. Bryan. 30
		650	La B. Bryan. 30
		655	La B. Bryan. 30
		660	La B. Bryan. 30
		665	La B. Bryan. 30
		670	La B. Bryan. 30
		675	La B. Bryan. 30
		680	La B. Bryan. 30
		685	La B. Bryan. 30
		690	La B. Bryan. 30
		695	La B. Bryan. 30
		700	La B. Bryan. 30
		705	La B. Bryan. 30
		710	La B. Bryan. 30
		715	La B. Bryan. 30
		720	La B. Bryan. 30
		725	La B. Bryan. 30
		730	La B. Bryan. 30
		735	La B. Bryan. 30
		740	La B. Bryan. 30

300 Lady Wash.....	1 1/2	2650 Uphr.....	49 1/2
50 Leo.....	75c	50 do ..h 5...	49 1/4
100 Mint.....	20c	100 do ..h 8...	8 90

115 Mexican	220 21%	200 Overman	614 4%
120 New York	234 24%	100 Occidental	.....
120 Occ dental	..... 3	450 Rock Island	.....
100 C Hill	..... 2	180 Savane	.....
100 C Hill	..... 2	200 Sierra Nevada	.....
135 Overman	60 2%	35 Seg Schlor	80 1%
150 Rock Island	665 5%	95 S Hill	..... 9%
20 Silver Hill	834 49%	110 Union Con	67 2%
20 Sucker	..... 1%	130 Woodville	..... 2%
20 Sucker	..... 1%	15 Yellow Jacket	10 2%
20 Savage	102 1%		
20 Sierra Nevada	113 1%		
5 Tyler	..... 6%		
380 Union Con	747 4%		
50 Diah	.....	
280 Wo-dville	332 3%		
20 do	..... h 10 3%		

30 Yellow Jacket.....79

AFTERNOON SESSION. AFTERNOON SESSION.

300	Alps	57% ¹ / ₂	250	Belmont	4
250	Belmont	2% ² / ₂	250	Cherry Creek	1
250	Campolinet	45 ⁰ / ₀	1170	Cosopolitan	1
250	Campolinet	14	200	Eureka Con.	53%
250	Cornopsis	14	51	Dorado St.	1
750	London	1% ² / ₂	124	Empire I.	1
24	Eureka Con.	6% ⁰ / ₁	404	Golden Chariot	3
150	Empire	2% ² / ₂	1070	Golden Chariot	1
2205	Golden Chariot	34 ² / ₂	200	Glen-Is Cen.	2
325	Gila	84 ⁰ / ₈	2	K K Con.	2
250	Golden Chariot	6	8	K K Con.	6
1155	Jefferson	10	200	Madison	1
2700	Jefferson	14 ² / ₂	50	Manhagan	5
100	K K Con.	6	820	Manhold	1
100	K K Con.	12% ² / ₂	100	Madison Valley	1
710	Manhagan	16 ⁶ / ₁₀	400	Niagara	1
10	Madison Valley	6%	640	Phoenix	1
40	Manhold	50 ⁰ / ₈	600	Prospect	1
250	Niagara	20 ⁰ / ₆	100	Poorman	1
1100	Prospect	44	170	Rav & Fly	1
200	Poorman	1	55	Rye & Fly	2
200	Poorman	3	200	Sacramento	1
200	Prusian	34 ⁰ / ₁₀	450	S. Chariot	1
645	Phoenix	14 ¹ / ₂	300	Tiger	1
120	Fauper	24 ² / ₂	150	War Excie	24
600	Fauper & Elv	4	150	Wells-Fargo	15
6	Ray Patch	2			
670	Silver Gord	1			
60	St. Patrick	1			
100	South Park	1			

500	Tiger.....	6'@5c
715	War Eagle.....	3¼@3½

Mining Stocks.

The mining stock market this week exhibits rather a falling off in strength than an advance. It was expected that dividend declarations and the opening of the new stock board would perhaps raise prices a little, but these circumstances have failed to do so. There was a lull in Ophir, California and Consolidated Virginia on Wednesday, but this was probably only temporary. There is considerable opposition between the three stock boards now in operation in this city, but it has not seemed to help prices at all. At the session of the "Old Board" on Wednesday, under the regulation increasing the membership from eight to one hundred, Wm. Sharon, J. P. Jones, C. Flood, R. F. Morrow, J. D. Fry, Wm. O'Brien, Alexander Austin, G. M. Pinney, C. Hooker, C. N. Felton and H. H. Scott were elected.

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killed to-day. The usual formality of a new was dispensed with, the Secretary casting vote. Each one of these gentlemen pays \$400 for his place. George M. Pinney is a member of the Exchange, and as there now two in the board who are members of bodies, some action will doubtless be taken the older organization on the matter. The change is indifferent about the subject, will let the old board take the initiatory s Latest dividends and assessments can be by reference to our 'Shareholders' Directors and latest prices of stocks, by referring to stock tables.

NEW INCORPORATIONS.

The following companies have filed certificates of incorporation in the County Clerk's office at San diego:

EAST OPHIR S. M. Co.—June 7th. Location: O county, Nevada. Trustees—Alphous Bull, O. M. Chisler, J. Collins, J. F. Atwill, and H. R. West. Capital, \$100,000,000.

CALIFORNIA RIFLE ASSOCIATION.—June 7th. To encourage rifle practice, to promote a system of firing, drill, and target firing among the National of the State, and to provide a suitable range for the of the members of the Association. Trustees—Chas. J. James, Geo. Henry G. Shaw, John Comb, David Wilder, George Humphrey, Her Burns, E. H. Pardee, Sheldon J. Kellogg, Jr., Jacoby, and John B. Griswold. This corporation no capital stock.

REVENUE M. Co.—June 9th. Location: O county, Idaho. Trustees—A. K. P. Harrison, C. L. Tier, Robert Sherwood, George M. Pinney, and Holcombe. Capital, \$5,000,000.

ORIGINAL GENESSEE M. Co.—June 9th. Location county, Nevada. Trustees—Wm. M. Stewart, Morgan, Louis Aldrich, J. R. Hardenberg and

Mining Stocks.

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New incorporations.

The following companies have filed certificates of incorporation in the County Clerk's office at San Francisco:

EAST OPHIDS. M. Co.—June 7th. Location: Store county, Nevada. Trustee—Alphous Bull, (M. Peck). Charles J. Collins, J. F. Atwill, and H. R. West. Capital, \$100,000.

CALIFORNIA REEF ASSOCIATION.—June 7th. Object: To encourage reef practice, to promote a system of fishing and to regulate and direct fishing among the National Guard of the State, and to provide a suitable range for the use of the members of the Association. Trustees—D. V. C. Thompson, James Coey, Henry G. Shaw, John M. Cornb, David Wilder, George Humphrey, Henry Burns, E. M. Pardee, Sheldon J. Kellogg, Jr., Phil J. Jarry, and John B. Griswold. This corporation has each stock \$500.

REVENUE M. Co.—June 9th. Location: Owyhee county, Idaho. Trustees—A. K. P. Harmon, C. L. Wheeler, Robert Sherwood, George M. Pinney, and S. Holcombe. Capital, \$5,000,000.

ORIGINAL GENESSEE M. Co.—June 9th. Location: Lyon county, Nevada. Trustees—Wm. M. Stewart, James Morgan, Louis Aldrich, J. R. Hardenbergh and W. V.

ing very smoothly and satisfactorily. From 1,200 to 1,400 hends are at work, of whom about one-half are white men and one-half Chinamen.

At Wook.—The battery of the Woodside mine, Greenwood, started up last Tuesday, with flattering prospects for a prosperous season. We are assured by competent judges that the sulphurets from the Woodside mine are immensely rich.

MINING ENTERPRISE.—At the St. Louis—formerly known as the Menning—mine, heavy machinery for pumping and hoisting works is being delivered and put in place, with a view to a thorough testing and development of the mine. A splendidly timbered shaft with three compartments is down 90 feet, at which depth there is a large, well defined and widening ledge of fine milling ore, but the flow of water was too great for the small pump and light machinery formerly in use. This mine is principally owned by St. Louis capitalists of enterprise and abundant means. O. P. Johnson, late of Springfield, Missouri, is superintendent, and a brief acquaintance has been sufficient to convince us that he is the right man in the right place, one of those energetic, thorough going business men of whom our mining interests have stood much in need, a man of sound judgment, large information, much shrewdness, and with an unlimited supply of "sand in his craw." Under his management of the St. Louis mine we feel hopeful that our people will learn what they have long been anxious to know, what there is in the quartz of our section at the depths where the mines of other districts have yielded their best pay. We are in no degree fearful as to the ultimate result if Johnson holds his grip and is properly sustained by his company.

FRESNO.

SPECKERMANN QUARTZ MINE.—Fresno *Expositor*, June 2: We understand that Wm. Speckerman has bonded his quartz mine, near Crane valley, to a San Francisco company. The company are to work the mine at their own expense, and give Mr. Speckerman one-fourth of the proceeds. This mine is supposed to be quite valuable. It was discovered some four years ago, and Mr. Speckerman has worked it from time to time with varying success. The quartz is of a decomposed nature and shows considerable gold, but the gold, owing to the presence of some mineral, does not seem to have an affinity for quicksilver. It is generally supposed that with scientific working the ore will pay largely. The company propose to extract the ore by contract.

INYO.

LIDA VALLEY.—Coker. *Inyo Independent*, June 5: Lida is little spoken of, now a days. There never was much blowing about it, but now it seems that we are to take a place among the places more favorably known, as the Lida milling and mining property has been incorporated; capital stock \$3,000,000. Gold Mountain mines have also been incorporated for the same amount. Similar steps have been taken with the Montezuma mines. It is expected that active operations will be commenced by all those companies soon; should this be a reality, this summer may prove to be a lively one. However, those camps do not entirely depend upon those companies.

PANAMINT DISTRICT ITEMS.—Panamint *News*, June 1: In the Kennedy tunnel, in the Wyoming mine, a magnificent development has been made of very high grade ore, assaying from \$114 to \$1,100 per ton. This tunnel is run from the east side in the red mountain. This ledge is certainly wonderful, tracings and openings having been made upon it for a distance of nearly three miles, and there seems to be very little if any diminution either in the class of ore or width of vein. On the north side of Surprise canon we find that the workings in all the mines show a decided improvement in every respect. In the light of recent developments the croakers of Panamint have entirely subsided, and nothing now remains but to put into operation our mills, send out the bullion and prove to the world that the Panamint mines are capable of eclipsing the productions of any other mines on the coast, not excepting the "big bonanzas" of Nevada.

NEVADA.

NEW YORK HILL.—Grass Valley *Union*, June 6: Friday evening the new pump on the New York Hill mine was started up, and the "hand power" force were discharged. The new pump is an eight inch, which is large enough for all the water they expect to find. The specimens are still coming out thick and fast. We saw several fine specimens at the bank yesterday, all of which have been taken out within a day or two.

CINCINNATI HILL.—This well known mine, which has been worked as far back as 1854, but which has remained idle for some time, has begun to show life again. The machinery that used to be on the William Penn mine is now being erected on the shaft, which is 100 feet deep. Forty loads of rock, which it is estimated by experts will yield from \$50 to \$75 per load, have already been taken out, and there is plenty more in sight, which stimulates the owners with renewed confidence.

PITTSBURG MINE.—Splendid specimen rock is now being taken out of this mine. Last Thursday they struck quite a bonanza. The Pittsburg is quite a good piece of property.

OSCEOLA.—This enterprise has again started up and the owners are busily engaged in clearing at the old tunnel, and in repairing their shaft. Already they have taken out some good rock, which is very encouraging to them.

LARIMER'S MILL.—This old mill, which has

crushed out so many tons of rock, is now about to enlarge its capacity, in order to meet the increasing demand, for there are hundreds of tons of rock that now await crushing. The stamps have heretofore been run by water power, but the water seems to be getting scarce, and so to insure a constant operation, some steam machinery that used to be in Eu-reka South has been purchased, and will be used by this mill. The foundation has already been laid and the boilers set, and the rest is being placed in position as rapidly as possible. Ten more stamps will be added. When the water becomes short, the steam will furnish the motive power, and so the precious metal will flow in a ceaseless stream from its batteries.

OMAHA.—We were yesterday shown a specimen that was carelessly picked up from the dump of the Omaha, in which we saw a large amount of free gold and plenty of sulphurets. There are forty loads of rock at the Larimer mill now being put through the stamps, eighty more at the mine awaiting transportation, and before this is crushed they will have enough more ready to swell the number of loads to at least 125. The Omaha company have commenced to erect machinery on their works. They have purchased machinery formerly owned by the Enterprise gravel mining company, who used to operate at Buena Vista. The machinery will be running in about thirty days from date. The Omaha shaft is down 300 feet.

PLACER.

WILL IT PAY?—Placer *Herald*, June 5: This question has often been asked in reference to the enterprise now being prosecuted with so much vigor by the Auburn gravel mining and ditch company. From what we know of the country, and from what we have heard, we had believed it would prove a good investment. From what we have recently seen this belief has been very much strengthened. While on the ground a few days ago, we witnessed the washing of three pans of dirt, taken, as we saw, promiscuously from three places on Grizzly hill. Those three pans yielded, at the very lowest estimate, fifty colors, visible to the naked eye, from the size of a pin-head down. Sections of this hill, we heard an old miner say, would pay \$10 a day to the man with sluices. What, then, will be the result when worked by hydraulic? The company intend to begin washing on this hill, which, though comparatively shallow, is, so far as they know, supposed to be the richest. From this hill they are sanguine of getting out every dollar they have put into the enterprise, and it is but a garden patch compared with the broad field of deep gravel lying before them. These are the indications at present as to whether it will pay. They will, if all goes well, begin washing by the first of July next, and in a month or less from that time we will know more about it.

CHROME.—The work of extracting ore on the Chrome mine has been begun in earnest. It is, we understand, being raised as fast as two four-horse teams can haul it to the station, or at the rate of from eight to ten tons per day.

SONOMA.

LOCAL ITEMS.—Russian River *Flag*, June 3: The second furnace for the California borax company will be finished in about ten days.

The kiln of brick for the furnace of the Great Eastern (Guernville district) will be fired next week.

The Mt. Jackson continues to yield good ore and plenty of it, but the furnace fails to give satisfaction. It will probably soon be re-modeled.

M. S. Bush, superintendent of the Annie Belcher, informs us that that mine will resume work June 20th.

The Harriet, adjoining the Annie Belcher, owned by Jno. Goldthorpe and John Knight, has developed good metal. About 500 tons is now on the dump.

STANISLAUS.

ANOTHER MINING COMPANY FORMED.—Stanislaus *News*, June 4: There was a meeting of those who had subscribed to the formation of the Modesto mining company at this place last Saturday. The meeting was called to order by J. J. Scrivner; J. D. Spencer elected Chairman, and J. J. Scrivner Secretary. A majority of the members being present the company proceeded to perfect a temporary organization, which was done by the election of five directors, consisting of Judie Schell, A. Hawel, J. R. McDonald, Thomas Farrell and J. D. Spencer. On motion, J. W. Houson was elected Treasurer. There are fifty-four members of the company, and all have signed an agreement to pay assessments to the amount of \$100 each, to be used, if deemed necessary, in the location, prospecting and development of mines in this county.

TRINITY.

CINNABAR.—Trinity *Journal*, June 5: James Mullane was in town this week and informs us that everything in the Cinabar district is prospering. Lytle and Hawtack are retorting about 40 tanks of quicksilver per week, having already shipped over 200 tanks. They have been unable to procure tanks enough and are compelled to make troughs from logs, in which to put the quicksilver as it flows from the retorts. In the mine the ore is constantly improving. Mullane is packing out from 7 to 8 tons of concentrated ore per week. H. C. Wilt is working his claim, while Superintendent Dickinson has started a tunnel on the Bonanza mine on the east side of Crow creek.

RIVER MINING.—Seven companies of white men are preparing to work in Trinity river, just above Lewiston, this summer. Many other

places along the river will be worked this season, as the low stage of water is more favorable than ever before and there is little else to do anyway.

COPPER MINE.—Ten or twelve years ago a copper lode was discovered in Trinity Center district, about four miles from the Carr place, and on the opposite side of the river. Several shafts were sunk along the ledge to the depth of 30 or 40 ft, but could not be sunk deeper on account of water. From these shafts rich ore was taken and many large pieces of almost pure copper were found. The locators, finding it impossible to work the lode through shafts, started a tunnel with which they expected to tap the vein 200 ft below the surface, in running a distance of 250 ft. This tunnel was in very hard rock, so hard that not more than one foot a day could be made; expenses were so heavy the owners were compelled to abandon the project after the tunnel was in a distance of 140 ft. Since then nothing has been done at the mine. Recently John Martin, Armentrout, Trotter and others have relocated the lode and tunnel right, and intend to run the tunnel to the ledge. Provision, tools, powder, fuse, etc., have been sent to the mine, and operations will commence at once.

Nevada.

WASHOE DISTRICT.

CONS. VIRGINIA.—Gold Hill *News*, June 3: Daily yield, 600 tons of ore, keeping the mills all running up to their full working capacity. The ore breasts are looking well and yielding the usual amount of good ore. The joint east cross-cut on the 1400-ft level is steadily advancing, not yet having reached the east wall of the ore vein.

OPHIR.—Daily yield, 150 tons of ore. This ore is being mostly extracted from the 1465-ft level. At the depth of 47 ft, perpendicularly below the 1600 ft level, the winze being sunk has been connected with the southwest drift from the east shaft, affording a fine circulation of good air, and greatly aiding the development in that portion of the mine. The bottom of the winze and drift also were in fine ore when the connection was completed.

BULLION.—Cleaning out the old incline below the 800-ft level preparatory to sinking it on down to connect with the north drift on the 1700 ft level, for prospecting and air purposes, has been commenced, and is making favorable progress. The body of quartz developed on the 800-ft level still continues of a very encouraging character.

ORIGINAL GOLD HILL.—The ore body developed by the cross-cuts from the south drift opens out finely, and everything will soon be ready for ore extraction and milling.

CHOLLAR-POTOSI.—Daily yield of ore 65 tons, the assay value of which is \$28 per ton. Sinking the main incline is making fair progress.

BELOZER.—Daily yield of the mine, up to this morning, 500 tons of ore. The ore breasts throughout are looking well.

BALTIMORE AND AMERICAN FLAT.—The cross drifts on the 754-ft level have developed some fine bodies of quartz and low grade ore, but nothing that will yet pay for milling. The cross drifts on the 850 ft level have not yet developed any considerable body of quartz ore.

CALIFORNIA.—The completion of the air winze from the 1400 ft level to connect with the upraise from cross-cut No. 3, has greatly improved the air circulation in the south portion of the mine, adding speed and comfort to all the prospecting now being done in that section.

COSMOPOLITAN.—The Hope mill is kept steadily running at the rate of 25 tons per day on ore from the stopes above the tunnel level.

JUSTICE.—The cross-cuts from the main drift, at the 400-ft level, from the south mine, as well as the winzes below it, show a good amount of ore developed and indicate a large ore body.

BEST & BELOZER.—The Burleigh drills in the face of the main south drift on the 1700-ft level are advancing at the rate of about 15 ft per week, the rock in the face still being of a very tough, hard character.

CROWN POINT.—Daily yield, between 500 and 600 tons of ore. There is no change to report of either the appearance or yield of the ore breasts.

SENATOR.—Some very fine looking quartz has been met with in the drift this week, giving encouraging assays. The machinery is all right and operating finely.

JACOB LITTLE CONS.—The good ore developed by the main west drift, as well as by the cross drifts, is accumulating on the dump, ready for milling as soon as required.

ELY DISTRICT.

AMERICAN FLAG.—A letter of the 2d says: Ore in the third level still looks encouraging, but the ore body is lessening in size.

MEADOW VALLEY.—The weekly letter of June 1st says: The east drift, 1200-ft level, has been advanced 8 ft, making its total length 583 ft. The drift being run to the west, following the ore streak from the rise on the 1200-ft level, has been extended 10 ft; the ore seam has dwindled to one-half inch in width, but is very regular, giving reasons to hope that it will again make its appearance with greater width. The west rise, which is being carried up from the east drift, has attained a distance of 13 ft, the top showing very hard quartzite formation, with only a very small seam of ore to show the continuation of the fissure. Winze No. 2, which was being sunk from the east drift, when it reached a depth of 30 ft met such a heavy body of water that they were compelled to suspend

operations. The cross-cut being run south from the summit shaft, on the 1200-ft level, is again being advanced. On this dump there are 130 tons of ore, and about 6 tons are being daily extracted.

RAYMOND & ELY.—Bullion shipped June 9th, \$11,041. The weekly letter of the 31st says: The main shaft is down 50 ft below the 11th level. Water rushed in very rapidly after letting off a blast in the bottom of the shaft, on the 30th, but it was lowered at the date of writing 20 ft, leaving 5 ft to be drained. The 10th level drift has been advanced 23 ft, making its total length 1042 ft, and the face shows well in ore. The ninth level drift has been advanced 25 ft, making its total length 1349 ft; no pay ore in the face. Winze is down 49 ft, in bottom of which there is about one foot of fair ore. The 8th level has been advanced 5 ft, with no pay ore in the face; 35 to 40 tons of ore is being extracted daily.

ALPS.—The mine is daily improving and a large amount of bullion will be shipped this month.

Arizona.

SILVER BELT.—Arizona *Miner*, May 28: This company has about fifty tons of ore procured in sinking a shaft seventy feet on the ledge. This ore varies more in richness than in the character of the metal it carries. The ores, so far as can be judged without analysis, are sulphurets of silver in combination with galena and a trace of antimony. Yet there are seams all through the rock and little pockets filled with what appears to be chloride of lead, but upon collecting and washing it is found to contain considerable quantities of metallic silver. A small furnace with a fan blower, to be run by horsepower, is erected, and lined with a fire clay found in the mine and mixed with quartz tailings.

The Isabella lode belonging to the Big Bug company, near Prescott, is not a large lode or extraordinarily rich. It is well opened on the surface for nearly 100 feet in all, besides having a shaft down 25 feet in one place, at the bottom of which the vein is about three feet wide. A ditch has been brought on the lode and several tons of pay ore ground sliced out and piled up ready to be sent down on a tramway to the creek, where the battery from the Big Bug mill will be set up, and run by water from the ditch to crush it. In sluicing out the ore now on hand, they saved from \$12 to \$18 per day in free gold to the hand, which is sufficient evidence of the value of vein matter, aside from what may be in the rock itself. The Isabella runs parallel with the Eugenia, and dips into the mountain toward the other, is of the same character of ore, and as the Eugenia is a perpendicular ledge, it is believed that at a depth of several hundred feet, that they come together and form one ledge, or in other words, that the Eugenia is the ledge and the Isabella a spur. They have crushed some seven or eight thousand tons from the Eugenia, with good results, but it is quite inaccessible on account of its great elevation, and if it can be reached through the Isabella it would greatly facilitate its working and render it much more profitable.

Montana.

MEAGHER COUNTY MINES.—Helena *Independent*, May 27: The miners in Cave gulch are all busily engaged upon their mines, have plenty of water and are in fine spirits. No clean-ups of any consequence will be made until the 1st of July. The indications are that the mines will pay better this season than for the past four years.

In all the small gulches near Cave there is water, and the miners are taking out good pay.

Several companies are working in Oregon gulch and all are doing well.

The Drain company in Magpie are still at work prospecting their ground.

Two bed-rock flumes are being put down in Hell Gate canon, and we understand have struck some rich prospects.

Two companies are working on Avalanohé with good results.

The ditch being constructed by Marshall and Sutton is progressing favorably. The excavating has been completed, and the lumber for the flumes is now being sawed and hauled upon the ground. When completed it will put the waters of Trout creek upon Gruell's bar, which is said to be very rich.

Utah.

BOULDER SPRINGS DISTRICT.—Salt Lake *Tribune*, June 5: Boulder Springs is the name of a new mining district opened on the 28th of last month, in Cedar valley, three miles from Boulder Springs, Tooele county. The Ophir laws were adopted, with an amendment requiring \$25 work in 30 days, \$25 in six months, and \$50 in 12 months. M. L. Cont was elected recorder. Four locations have been made—the Rambling Boy, Mountain Chief, Juniper and Boulder Springs. The former has a shaft down 8 ft, showing a 5 ft vein of ore, assaying 65 per cent. lead and \$18 silver. The formation is quartzite and spar. Timber and water are plentiful throughout the district, and the country is easy of access. The Utah Western railway is surveyed through the district, and when completed, will make the facilities for the shipment of ore very complete.

A valuable discovery of silver bearing rock has been made within 10 miles of the city, in the past few days. Samples left at the *Tribune* office assay 84 ounces silver, 50 per cent. lead and \$5 in gold. The owners of this new location are H. Cushing, T. G. M. Smith and F. D. Clift.

The Mouth of the Mississippi.

Much attention is being turned at this time to the engineering works just undertaken under the direction of Captain J. L. Eads, for the improvement of the mouth of the Mississippi. The importance of such a work to the great valley of that river can hardly be overestimated.

The Difficulties to be Overcome.

The Delta of the Mississippi is formed of narrow strips of land, mostly low-lying banks, through which the river winds until it makes its exit to the Gulf by a number of narrow passages. In some of these channels previous attempts have been made to deepen by dredging, with but partial success, however, as a single flood has been known to carry down sufficient sediment to fill them to their original depth; and the current, besides, emptying into the open water at the mouth, speedily left at that point bars of blue clay, surmountable only by light draft ships. Captain Eads proposes an entirely different plan—that which is known as the jetty system—which has succeeded most admirably at the mouths of many European rivers. Captain E. will operate at the South pass, one of the three principal mouths. The bar at this mouth is covered with seven feet of water at its shallowest point, is about two and a half miles long, and increasing at the rate of about 100 feet a year. The channel is about 730 feet wide, and Captain E. proposes to gradually narrow it, working from both sides until the increased force of the current will scour out the channel instead of continuing its present deposit of mud.

How it is to be Done.

The work is to be done in the following manner: Willow twigs are to be bound into bundles, called in engineering parlance "fascines." These fascines, say eight or ten feet in length, and as many inches in diameter, are put together in the form of a raft, like timber logs, towed to the required spot, and loaded with stones until they sink. This process is repeated with successive rafts until a continuous foundation is laid the entire length of the proposed line of jetties. The first or foundation rafts will be from seventy-five to 200 feet in width, according to the depth of water where they are sunk, the deepest water requiring the widest rafts. As soon as the foundation is completed in this manner, another line of willow rafts is sunk on top of these already down, and so on until the surface of the water is reached, each line of rafts being narrower than the one below it, until the topmost line will not be more than ten feet across.

By this means a channel is created with sloping sides. The water gradually fills up the interstices between the twigs with sand and sediment and in the course of a few years the structure becomes as solid as a wall, being in fact a submarine levee. It will readily be seen that an almost incalculable quantity of willow twigs will be required to construct these two long lines of jetties the whole length of the South Pass, and the work of cutting and preparing them will furnish employment to a great many men.

Some piling will have to be done at the head of the pass in order to provide for the proper regulation of the volume of water in the new channel at various stages of the river.

Captain Eads regards the construction of the jetties in the South pass as more feasible and easy of accomplishment than the work would be in the Southwest pass, on account of the large amount of sand that is carried down in the former, and which will pack and solidify the jetties much quicker than the muddier deposit of the other; though the commercial advantage is in favor of the Southwest pass.

The work is to be done at the expense of the national government, at a total cost of \$5,500,000, when a permanent depth of thirty feet has been secured. Partial payments are to be made as the work progresses, as follows: \$500,000 when a depth of twenty feet is secured, and \$500,000 additional for every two feet until thirty feet depth of water has been secured.

The Ultimate Success

Of Captain Eads in the completion of the jetty is not now questioned by any save his enemies. The known energy and engineering skill of the man are sufficient to insure the success of any enterprise he undertakes, and he has not engaged in this project without first satisfying himself, beyond doubt, of the practicability of the plan upon which he will proceed to open the mouth of the Mississippi. Captain Eads has found an abundance of capital to aid him in the work until the first payment comes due from government. Capitalists seem to have no limited confidence in his judgment as an engineer. The work is one of national importance.

FAULTS OF CONSTRUCTION IN BATTERY CONTACT.—Emile Girouard points out that one great obstacle in the way of our obtaining cheap electricity lies in the defect of the contact. The rivets which connect the zinc to the carbon are often ill made, and after having been in use for some time, they are corroded all round, and the oxidation prevents the contact from being perfect. The current, consequently, is unable to pass, unless the tension is considerable enough to overcome the bad conductivity of the oxide. The author proposes to obviate these defects by having all connections, etc., made of platinum.

Free clay rubbed on the hands will remove the unpleasant odor of chloride of lime.

Toughened Glass.

One of the most interesting and important improvements in glass making reported for many years is that recently patented by Bastie of Paris, which consists of a "toughening" process, applied to ordinary glass, after it has already been placed in the desired shape. No change of shape can be made subsequent to the "toughening." The following report of some experiments with this glass recently made by Messrs. Abel Rey & Bros., of London, will be found very interesting:

The toughened glass is in no way distinguishable by the eye from common glass. Its transparency is in no way impaired by the toughening process, and colored glasses, whether opaque or transparent, retain without change their original appearance. Various specimens were shown to us both of transparent and colored glass, such as window glass, plate glass, watch glasses, lamp glasses, glass plates and dishes of various kinds, and a number of other objects. These were thrown about the room in the most reckless manner without fracture of any of them taking place, though many of them were thrown as high as the ceiling and allowed to fall upon the floor. This, however, did not appear to be an adequate test, and so we proceeded to test the glass with a hammer.

A piece of common window glass toughened was laid by a flat upon a bench with one corner overhanging about two inches, and this overhanging part was struck by us many times with a common carpenter's hammer without being cracked or broken, the hammer rebounding from the glass in much the same way as if it were a sheet of iron. Finally, by an energetic stroke, the glass was broken. But the fracture was not like that of common glass at all. The piece broken off was crumbled into crystalline fragments resembling crystalline white sugar of large grain, and these fragments were not splintered, but a box full of them could be stirred up by the hand without the skin being broken. The piece of glass remaining under the hand on the table was not starred or cracked in the usual manner, but a network of cracks was spread uniformly over its whole surface, giving it the appearance of lace, and on being handled this portion also disintegrated itself into crystalline fragments all of about the same size.

The texture of the glass is completely altered by the toughening process. A diamond will no longer cut it. But the glass may be ground down like common glass on the wheel, and even when half the thickness is thus removed, the diamond will fail as before to make any impression in separating it, showing that the change in the glass has gone to the center. And not only can the glass withstand mechanical violence, but it is no longer liable to be cracked by alternations of heat and cold. Toughened lamp glasses will last forever, and saucepans, tea kettles, and other articles of a similar kind used in domestic economy may now be made of glass without much risk of injury. Cups and saucers, plates and dishes, jugs and basins, and other articles heretofore made of china or earthenware may now be made of glass, either transparent or opaque as may be desired, or partly one and partly the other, and if the glass is toughened the articles will be little liable to fracture. In every department of the art the new material will find important applications, and taken altogether the invention is probably the most valuable that the present generation has witnessed.

The Process of Toughening.

But what is the process, it will be asked, by which this great improvement has been wrought? Its simplicity is marvellous. It consists in heating the glass up to near the softening point, and then plunging it in a bath of oil or grease. There is nothing in the process, therefore, which will materially enhance the cost of the manufacture, but glass will now be used for numerous purposes for which it has heretofore been inadmissible. Gas and water pipes may now be formed of glass, as well as sulphuric acid chambers, cisterns, and stills, imitation marble chimney pieces, and numerous other objects. No material is more elegant than glass. The objection to it heretofore has been its brittleness, and this objection has now been done away.

The following extract is copied from the inventor's patent paper: "As the fragility of glass results from the weakness of the cohesion of its molecules, it may be expected that by forcing the molecules closer together, and rendering the mass more compact, the strength and solidity of the material should be increased. I have found that this can be effected by compression even when applied to the material in a fluid or soft condition. I have therefore applied to glass a system of tempering such as is usually applied to steel, and I will now describe the process and apparatus for this purpose.

"Fused glass dropped into water becomes greatly contracted, but, being shapeless, only objects of curiosity can be produced in this way. The sudden cooling in the water puts the glass into a state of unstable equilibrium in its constitution, so that the least shock causes it to break up, as in the case of Prince Rupert's drops. My object is to invert this result, to diminish or even to remove the extreme fragility of glass by tempering it by immersion in a liquid. In attaining this object two essential conditions have to be determined: First, the point at which glass can be tempered without

being put out of shape. I have found this to be when it is just at the heat where softness or malleability begins, the molecules being then capable of closing suddenly together, condensing the material when it is plunged in a liquid, at a considerably lower temperature. Also glass, when it is thin, may be tempered at red heat even before becoming soft; secondly, the liquid to be employed for the immersion of the glass, being such as can be heated much higher than water without boiling. For this purpose I find oils and grease, wax, resin, and tar or pitch suitable. Having settled these conditions, I have devised the process or practical method of operating, and suitable furnaces and apparatus, which will hereafter be described.

"In carrying out the process it is necessary that the glass to be tempered should be raised to a very high temperature; the hotter it is the less is the risk of breaking the glass, and the greater is the shrinkage or condensation. Hence the advantage and often the necessity of heating the glass to the point of softening, which is attended by the difficulties that glass in the soft condition gets readily out of shape, so that it must be plunged almost without touching it, and that in plunging the hot glass into a heated combustible liquid the latter is apt to take fire, and cannot easily be extinguished, so that time and material are lost. These difficulties are overcome by placing the tempering bath in immediate communication with the heating oven, and covering it so as to prevent access of air. The oven being charged with the articles to be tempered, these are pushed or caused to slide into the adjoining bath without handling them, and the liquid of the bath having no supply of external air is not liable to inflame."

Color in Decoration.

Decoration is the art of adorning the objects we use, and the houses we occupy. To accomplish this successfully, the art should ever be accompanied by its handmaidens—knowledge and taste. In the study of any art it is necessary to understand thoroughly the rudiments of the first principles of the art, and to teach these is one of the great objects of technical education. To decorate an object appropriately, it is necessary to consider the material of which it is made. From the beginning we must work on certain principles. Let the construction be evident, and if carving or inlaid ornament be introduced, let it form a feature with the construction, and not overlay or disguise it.

A proper disposition of well proportioned forms is the first consideration. With respect to color decoration as applied to the adornment of dwellings, it should be the ambition of every man to have his home clean, comfortable and tasteful; and a knowledge of the rudiments of the science—for it is a science—must be useful to every man. Color gives life to form; its variations, properly harmonized, delight the eye, and have a powerful influence on the mind when treated with the skill which a careful and well trained study of the art enable us to exercise.

To study properly the subject of color, we must begin with the consideration of light. When the rays of white light are intercepted or dispersed, color is produced. Familiar to all is the glorious rainbow, which, as Thomson has told us is

Born of the shower, and colored by the sun.

The rays of light emitted through a prism give out a series of brilliant colors known as the solar spectrum; and the relations of the colors thus produced form the rudimentary principles which regulate the science of color. With regard to harmony, how to bring together various colors in such proportions as to produce an agreeable effect, bright red and bright green, bright blue and bright orange, could not be used together in masses without much modification. To combine various modulations of color so that they may mingle together and form an harmonious whole, demands careful study, practice, and taste. We cannot too strongly urge upon those who seek to improve themselves in decorative art, to study carefully natural flowers and foliage, both for gracefulness of form and for harmony and richness of color. In decoration, it might be laid down as a principle that one color should dominate. In the majority of cases the most perfect and beautiful harmony is produced by employing neutralized hues of color of the larger masses, and then giving freshness, cheerfulness and beauty to the whole by the introduction, in small masses, of the primary or secondary colors that might form the proper equivalents to the prevailing color. It should always be remembered that the eye is never satisfied with any arrangement of color unless all the primaries are present in some shape or other. In carrying out decoration, it will be found that all colors have two kinds of harmony—that of analogy, or sympathy, and that of contrast. In churches, large halls, or public buildings of importance, it is necessary to consider very carefully the peculiar circumstances of each of them before designing the decoration or arranging the colors. Architects should be made to indicate the use of color in a building on which they have bestowed much careful study and labor. Judicious and well-designed arrangements of color should add to the architectural effect. By the use of the principal constructive features of a building should be emphasized or clearly expressed; and the whole, avoiding confusion, should present a combination of symmetry of form and harmony of color.—Ez.

Extensive Mining and Ditch Enterprise.

The *Piscer Herald* says: We have often had occasion to refer to the enterprise now being vigorously carried on by the Auburn gravel mining and ditch company, but never at sufficient length to give the reader a clear idea of the full extent of the work. The company is composed of men who, after satisfying themselves by extensive prospecting of the rich character of some extensive gravel deposits, a few miles northeast of Auburn, filed articles of incorporation, and at once began the work of bringing water in, a work on which they are now engaged, and a work which will lead to the development of these deposits and contribute liberally to increase the gold yield of the county and country for years to come. The enterprise is certainly a giant one. Many have been well aware of the rich character of these deposits, but when they come to consider the immense amount of labor and capital necessary to bring water in for successfully working them, the charms of the rich pan prospect faded by comparison, and they turned away in despair. To overcome the obstacles that presented themselves, was left for the capital and iron determination of this company, composed of only six or eight stirring men, and it is but fair to wish them the brightest returns, that present flattering invitations give reason to expect.

Bear river ditch runs at present, as it were, at the very foot of the hills which this company propose to wash down. Before any washing could be done, therefore, it became necessary first to secure a sufficient amount of water from Bear river ditch, and second, to bring that water in on a plane high enough to afford pressure for hydraulicking. The first difficulty was overcome by satisfactory arrangements between them and the owner of the ditch, to the effect that on and after the first of July next they are to take 500 inches of water. In order to obtain the desired raise, it was necessary to take the water out of Bear river ditch, about five miles above the claims. On this work they are now mostly engaged. The water is to be run the first three and one-fourth miles in an open ditch, exclusive of one stretch of flume of 1,100 feet. This ditch is five feet wide on top, three feet on the bottom, and two and one-half feet deep, cut in the solid ground. Seventy-five men are now engaged on it, who have 680 rods completed, and will have the entire job finished by the middle of June. From the end of the ditch the water is to be conducted through canons and over hills for about two miles in heavy iron pipe, twenty-two inches in diameter. This pipe is to be buried beneath the ground, the ditch two and one-half feet wide and three feet deep, for the reception of which, is now completed.

The contract for furnishing the pipe was let to Currier, of the San Francisco boiler works. Already 8,000 feet of the pipe is on the ground, 1,800 feet riveted together and covered up, and the whole job is being driven to completion as fast as two teams can haul the pipes out and distribute it along the line, and twenty-two boiler makers and twenty laborers can put it down, rivet it together and tar the joints. On the line of this pipe there are two depressions through which the pipe forms inverted siphons, the deepest of which is some 220 feet. The water, as conducted from the terminus of the ditch through this pipe, will be delivered at the claims under a pressure of 238 feet, exclusive of seventy feet allowed for friction. The company will begin washing on what is known as Grizzly hill, a small mound of comparatively shallow gravel. They are now running a tunnel six feet wide and seven feet high, to the center of this hill, at which point they will commence piping, running the dirt through the tunnel in a ground sluice, which latter will be in all some 1,500 feet long, constructed with all the modern improvements for saving gold. A number of teams are now engaged hauling lumber for the flume and sluices, work on which will be begun by a drove of carpenters this next week. The company is determined to commence washing by the first of July, and though there is yet much work to be done, at the way they are rushing things there is no doubt but all will be ready. As anon as they get started at Grizzly hill, they will put their force at work in laying a branch pipe to Tunnel hill, about 1,500 feet southeast of the former, which contains not less than eighty acres of very deep gravel. Besides this the company owns Westchester hill, about one-half mile west of Grizzly hill, which embraces about 160 acres of gravel known to be at least 150 feet deep, and Pine hill and Summit hill, which latter will be after consideration. This company owns in all about 500 acres of mining ground, in one body, enough to keep them mining for at least twenty years. This ground they purchased of J. B. Hobson, last winter, mention of which was made at the time. All their works are under the superintendence of Mr. Hobson, who is an interested party, and who orifies things ahead with an energy and skill becoming the magnitude of the work he is engaged in.

SOLNER FOR BRAZING STEEL.—The following solder will braise steel, and may be found very useful in case of a valve, stem or other light portion breaking when it is important that the engine should continue work for some time longer: Silver, 19 parts; copper, 1 part; brass, 2 parts. If practicable, charcoal dust should be strewn over the melted metal of the crucible.

USEFUL INFORMATION.

Filing Saws.

The grand secret of putting any saw in the best possible cutting order, consists in filing the teeth at a given angle to cut rapidly and of a uniform length, so that the points will all touch a straight edged rule, without showing a variation of a hundredth part of an inch. Besides this, there should be just enough set in the teeth to cut a kerf as narrow as it can be made, and at the same time allow the blade to work freely without pinching. On the contrary, the kerf must not be so wide as to permit the blade to rattle when in motion. The very points of the teeth do the cutting. If one tooth is a twentieth of an inch longer than two or three on each side of it, the long tooth will be required to do so much more cutting than it should, that the sawing cannot be done well. Hence the saw goes jumping along, working hard and cutting slowly. If one tooth is longer than those on either side of it, the short ones do not cut, although the points may be sharp. When putting a cross-cut saw in order, it will pay well to dress the points with an old file, and afterwards sharpen them with a fine whetstone. Much mechanical skill is requisite to put a saw in prime order. One careless thrust with a file will shorten the point of a tooth so much that it will be utterly useless, so far as cutting is concerned. The teeth should be set with much care, and the filing should be done with great accuracy. If the teeth are uneven at the points, a large flat file should be secured to a block of wood in such a manner that the very points only may be jointed, so that the cutting edge of the same may be in a complete line or circle. Every tooth should cut a little as the saw is worked. The teeth of a handsaw for all sorts of work, should be filed fleaming, or at an angle on the front edge, while the back edges may be filed fleaming or square across the blade.—*Ex.*

THE STRENGTH OF WOOD AND THE EFFICIENCY OF THE AXE.—In a recent volume of the annals of the Forest Academy, at Mariabrunn, near Vienna, Prof. W. F. Exner gives a novel and highly instructive analysis of the elasticity and strength of wood, its resistance to splitting, and the use of the wedge, the axe, etc. The importance of these matters he shows to be very great, because great industries depend upon the applicability of certain kinds of wood. Having deduced a few simple formulae to express the strength of woods and the power of the wedge, he develops a formula for the force with which an axe is handled, and shows what curve should be given to the face or cheek of the axe, in order to secure, under certain conditions, the least waste of power. By these formulae he is able to demonstrate that the splitting efficiency of the best axes made in Vienna, Prague and America, are to each other as 13.3 and 9.2, and 4.9, respectively; and applying his formulae to the elaborate experiments of Nordliugen, he is able to deduce the absolute ease with which various woods can be split.

TO PREVENT SPLITTING OF HANDLES.—All carpenters know how soon the butt end of chisels split, when daily exposed to the blow of a mallet or hammer, and we are indebted to one of our subscribers, Mr. W. Esmark, a stair builder, in Brooklyn, N. Y., for a remedy to prevent this, which he kindly requested us to publish. It consists simply in sawing or cutting off the round end of the handle, so as to make it flat and to attach by a few small nails on the top of it, two round disks of sole leather, so that the end becomes similar to the heel of a boot. The two thicknesses of leather will prevent all further splitting, and if in the course of time they expand and overlap the wood of the handle, they are simply trimmed off all around.

TEMPERING STEEL.—In hardening and tempering steel, a clean charcoal, anthracite, or coked bituminous coal fire is required; such as is fit for taking a welding heat on iron is entirely unfit for hardening purposes. The sulphur contained in the coal combines with the steel to form sulphuret of iron, and ruins its texture.

In hardening and tempering cast steel, the following is the golden rule:

"Hammer to a polish,
Harden at a blood red,
Temper to a straw color."

TO WORK HARD STEEL.—If steel is rather hard under the hammer when heated to the proper cherry-red, it may be covered with salt and hammered to about the shape desired. More softness can then be obtained, if required to give a further finish to the shape, by sprinkling it with a mixture of salt, blue vitriol, sal ammoniac, saltpeter and alum, made cherry-red again, and sprinkled with this mixture and hammered into shape. This process may be repeated until entirely finished. When ready the steel is hardened in a solution of the same mixture. This method is recommended by Mr. W. R. Lake.

TO OIL A BELT.—The best mode of oiling a belt is to take it from the pulleys and immerse it in a warm solution of tallow and oil; after allowing it to remain a few minutes the belt should be immersed in water heated to 100° F., and instantly removed. This will drive the oil and tallow all in, and at the same time properly temper the leather.

Hair Springs.

Perhaps the most provoking incident that occurs to the practical watchmaker in a watch repair shop, is the "putting in" of a new hair spring. If he attempts to take the wire from a spool, he has no test by which he can equivoque the weight of the balance rim.

Whether the repairer coils the wire or buys the untempered spring, the result is the same. We have touched upon this subject as, in our duty as journalists we are bound to furnish all the information that may fall within our ken. Recently there has been imported an article that will make the watch repairer glad. We refer to the graduated springs of Emanuel's, who is gaining a considerable trade from the fact of his manufacturing a reliable hair spring that watchmakers can depend upon being of excellent service—tempered and assorted from numbers 2 to 20, both in size and tension; consequently, in selecting a spring from any one of these papers, the workman has not the great disadvantage against him, that he must at the close of a series of experiments throw out the results of his labor and substitute another spring. The whole trade should be thankful that such a good article as a first class tempered hair spring has been introduced, for their own comfort and profit must be greatly enhanced.—*The Watchmaker.*

TO PRESERVE POSTS.—The *American Chemist* says that a Western farmer discovered many years ago that wood could be made to last longer than iron in the ground. Time and weather, he says, seems to have no effect on it. The posts can be prepared for less than two cents apiece. This is the recipe: Take boiled linseed oil and stir into it pulverized charcoal to the consistency of putty. Put a coat of this over the timber, and, he adds, there is not a man who will live to see it rot.

CASE HARDENING SMALL IRON WORK.—A simple method of case hardening small cast iron work is to make a mixture of equal parts of pulverized prussiate of potash, saltpeter and sal ammoniac. The articles must be heated to a dull red, then rolled in this powder, and afterward plunged in a bath of four ounces of sal ammoniac and two ounces of prussiate of potash dissolved in a gallon of water.

GOOD HEALTH.

Contaminated Drinking Water and Typhoid Fever.

Dr. Haegler of Basle, gives the details of an outbreak of typhoid fever in the village of Lausen, near Basle, where the ordinary conditions that have been said to govern the disease, such as the character of the subsoil and subsoil water, were extremely unfavorable for the development of the disease, and where, in fact, for a long time there had been no typhoid. In August fifty-seven cases occurred within a space of nine days, and in all the houses of the village except six, while these six drew their water supply from a source entirely different from the others. On investigation it was learned that two months previously there had been cases of typhoid in a farm house not far from the village, and that the dejections of the patients had been thrown into a little stream running through the yard, or into a ditch communicating with it; this stream joined the larger one that supplied the village. Other excrementitious matter had also been thrown upon dung heaps, from which a drain led to the same stream. Dr. Haegler concluded from these facts:

1. That the epidemic of typhoid fever in this instance was the result of drinking water contaminated with the dejections of typhoid patients.

2. He believes that typhoid fever depends upon a specific poison obtained from typhoid patients. Other putrid matter and decomposing organic substances, and at any rate, the filth of privies and dung heaps with which the typhoid dejections may be mingled, cannot produce the disease, since this instance shows that the drinking water of the town had been fouled by these substances for years without producing any bad result.

3. The ordinary situation of contaminated water by its passage through the ground, will not disinfest the water or furnish any protection against the action of the typhoid poison.—*Jour. of Applied Chemistry.*

TO PREVENT COUGHING.—The best method of easing a cough is to resist it with all the force of will possible, until the accumulation of phlegm is greater, then there is something to cough against, and it comes up very much easier and with half the coughing. A great deal of hacking and heaving and coughing in invalids is purely nervous, or the result of mere habit, as is shown by the frequency with which it occurs while the patient is thinking about it, and its comparative rarity when he is so much engaged that there is no time to think, or when the attention is impelled in another direction.

WHEN TO TAKE A WARM BATH.—A warm bath should be taken at night just before retiring, and if the system is weak the bed and sleeping room should be warm to prevent taking cold. Very few persons can take a warm bath in the daytime and go out into the air and attend to ordinary business without much peril.

Acidity.

Acidity of stomach always arises from that organ not being able to digest, to work up the food eaten, to extract the nutriment which it contains, hence two results: First, the food decays, that is, rots, becomes sour and generates a sour gas, which is belched up, causing a burning or raw sensation, located apparently at the little hollow at the bottom of the neck, or in that vicinity. Sometimes an acid fluid is generated and is belched up, and is so very sour occasionally as to take the skin off some parts of the throat, mouth or lips. Second, the food not being properly worked up, does not give out its nourishment, the system is not fed, and consequently becomes weak, the circulation becomes feeble, the feet grow habitually cold; the person is easily chilled, and dreads going out of doors; is happiest when hugging the fire, and takes cold so easily that the expression is frequently used, "the least thing in the world gives me a cold." When such a condition is reached these colds are so frequently repeated that before one is cured another comes, and there is a perpetual cough which the most unintelligent know is the certain harbinger, the forerunner of consumption of the lungs.

When persons are troubled with indigestion, and one of its effects, acidity, the advice given in nearly all cases is to take something to correct the acidity, such as cream of tartar, soda, saleratus, the ley of wood ashes, and other alkalies. These things correct the acidity, but the stomach gets no power of a better digestion, the effects as far as sensation is concerned are removed, but the system continues to be improperly nourished; the man grows thinner and weaker; and with wasting of flesh and strength, there is diminished power of circulation; the person becomes chilly, colds are taken from slight causes and at diminishing intervals, and before he knows it he has an annoying, hacking cough, which too often ends in a wasting, fatal disease.

When acidity follows eating, it is because there has been an error in the quantity or quality of the food eaten; the stomach could not manage it, could not perform the work imposed upon it. The true remedy is to eat less and less at each meal, until no acidity is perceptible, or to change the quality of the food; and in a short time the stomach, not being overtasked, gets time to rest, to recuperate, to get strong; then it digests more food and digests it better, with the inevitable result of a more vigorous constitution, more power of endurance, more strength of body and greater elasticity of mind, more happiness and a spirit and energy to grapple with life's duties, which makes existence a pleasure.—*Hall's Journal of Health.*

LIME WATER FOR BURNS.—A correspondent writes that the readiest and most useful remedy for scalds and burns is an embrocation of lime water and linseed oil. These simple agents combined form a thick, cream-like substance, which effectually excludes the air from the injured parts; and allays the inflammation almost instantly. He mentions a case where a child fell backward into a bath tub of boiling water, and was nearly flayed from her neck to below her hips. Her agonies were indescribable; but her clothing being gently removed, and the lime and oil preparation thickly spread over the injured surface, she was sound asleep in five minutes. Subsequently the parts were carefully washed with warm milk and water three times a day, the oil dressing renewed, and the little patient rapidly recovered. Though all the scalded skin came off, she did not have a scar. This remedy leaves no hard coat to dry on the sores, but softens the parts, and aids nature to repair the injury in the readiest and most expeditious manner. This remedy may be procured in the drug stores; but if not there accessible take a lump of quicklime in water, and, as soon as the water is clear, mix it with the oil and shake it well. If the case is urgent, use boiling water over the lime, and it will become clear in five minutes.

ONIONS FOR SLEEPLESSNESS.—I now venture to suggest a new but simple remedy for want of sleep. Opiates in any form, even the *Liquor opii sedat* and chlorodyne will leave traces of their influence the next morning. I therefore prescribe for myself, and have frequently done so for others—onions, simply common onions raw, but Spanish onions stewed will do. Everybody knows the taste of onions; this is due to a peculiar essential oil contained in this most valuable and healthy root. This oil has, I am sure, soporific powers. In my own case they never fail. If I am pressed with work, and feel that I shall not sleep, I eat two or three small onions, and the effect is magical. Onions are also excellent things to eat when exposed to intense cold. Mr. Paraby, Trontdale Fishery, Keswick, informs me that when collecting salmon and trout eggs in the winter, he finds that common raw onions enable him and his men to bear the ice and cold of the semi-frozen water much better than beer, etc. The Arctic expedition, just now about to start, should therefore take a good stock of onions. Finally, if a person cannot sleep, it is because the blood is in the brain and not in the stomach; the remedy, therefore, is obvious; call the blood down from the brain to the stomach. This is to be done by eating a biscuit, a hard-boiled egg, a bit of bread and cheese, or something. Follow this up with a glass of wine or milk, or even water, and you will fall asleep, and will, we trust, bless the name of Frank Buckland.—*Land and Water.*

DOMESTIC ECONOMY.

Dinner.

Dinner, both in the nature and quantity of its components, must be regulated by the constitution and judgment of individuals, who, however, bearing in mind a constant and consistent discrimination with respect to aliments, should be careful to study the peculiarities of their constitution and digestive powers, and to adapt their diet to them. We may, however, very well add, that those who are chiefly employed in mental occupation, and not exposed to much bodily labor, require less animal food than such as are in the continual exercise of corporeal strength, and should consequently avoid excess in that particular; with this exception, that an hysterical or hypochondriac tendency seems to require animal food, which, however, should be freely joined with the vegetable. We may here also properly remark that no error is in this country more common or more dangerous than the neglect of bread. This valuable edible is the safest and most nutritious of vegetable aliments, and the best corrector of animal food. By its plentiful use alone, the bad consequences of an excess of the latter may be obviated. The tables of the French are supplied as freely with animal food as those of the English, yet that people, by a greater use of bread and dried acid fruits, prevent the ill effects of a heavier diet, and preserve a cheerful buoyancy of spirits, to which the generality of the phlegmatic islanders are strangers. The English, therefore, who are so much devoted to animal food, should particularly moderate its effects by a liberal use of bread and other vegetable matter, since vegetable food is necessary to secure, not only health, but long life. In infancy and youth we should be confined mostly to it. In manhood and the decline of life we should more freely use animal nourishment; and in old age, we should return to the vegetable. Vegetables and milk, indeed, are strong antidotes to soury, and putrid and inflammatory fevers; nay, in the former disease, milk alone will frequently do more good than any other remedy.—*Ex.*

MINCED VEAL WITH POACHED EGGS.—Take some remnants of roast or boiled veal, trim off all brown parts, and mince very finely. Fry a chopped shallot in plenty of butter; when it is a light straw color, add a large pinch of flour and a little stock; then the minced meat with chopped parsley, pepper, salt and nutmeg, to taste; mix well; add more stock, if necessary, and let the mince gradually get hot by the side of the fire. When quite hot stir into it off the fire the yolk of an egg and the juice of a lemon to be strained and beaten up together. Serve with pipets of bread fried in butter, round it, and three or four poached eggs on top.

NUN'S PIE.—Soak one pound of salt codfish in cold water for two hours; put it on the fire to boil, adding a small red pepper and the skin of an orange. Boil eight good sized potatoes, and, when ready to mash, pick up the codfish, squeeze over it the juice of one orange, and mesh all together; add a large lump of butter, put the mixture in a bake-tin, and cover with bread crumbs; scatter a few small lumps of butter over it, and cover the whole with milk. Bake one hour. If well made, it will be as light as a meringue pie, and, altogether, enjoyable.

APPLE PUFFS.—Mix a quarter of a pound of butter with a quart of sifted flour, two eggs and a spoonful of salt; half teaspoonful soda, dissolved in a little cold water; moisten it with cold water so that you can just roll it out easily; roll as thin as possible; cut into cakes; put three of them together, sprinkle flour between each one; lay on the top thin slices tart apples; sprinkle sugar and a little nutmeg over them; press the edges well together, fry in sufficient hot lard to cover them. When of a light brown take up carefully.

DELMONICO PUDDING.—One quart of milk; three even tablespoonfuls of corn starch, dissolved in cold milk; the yolks of five eggs; six tablespoonfuls of sugar. Boil three or four minutes; pour in a pudding dish and bake half an hour, or perhaps less time will do if the oven is hot. Beat the whites of the eggs with six tablespoonfuls of sugar; put it over the top and return the pudding to the oven till it is a nice light brown. No sauce. Nice for Sundays, as it can be made the day before.

TO FRY CHICKEN.—The best fried chickens are thus prepared: The chickens are killed, scalded, picked and washed out cleanly in water, then quartered and thrown into boiling lard. In a few minutes they are done brown, and are then removed and served up hot and dry, not put into grease again. In this way the fowl "is tender as chicken," and is a great delicacy. If you don't believe it, try it, and if you do believe it, try it.

ARCTOA LINIMENT.—Add to one pint of sweet oil two tablespoonfuls of tincture of arnica; good for wounds, stiff joints, rheumatism and all injuries.

VINEGAR WHISKY.—Take of milk one pint, vinegar half an ounce; boil for a few minutes, and separate the curd. Excellent for the sick.



W. B. EWER,..... SENIOR EDITOR.

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our prospectus and terms of subscription.

San Francisco:
Saturday Morning, June 12, 1875.

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Salvador Mines.

Mr. John F. Flint, U. S. Consul at Salvador,
Central America, arrived in this city this week
on the *Colima*. While here he intends calling
the attention of mining men to the mining in-
terests of that section of country, which are as
yet entirely undeveloped. The ore in the mines
there is mainly silver, containing some gold,
and averages from \$40 per ton up into the
thousands. Encouragement is given to fore-
igners to work the mines, and labor is cheap,
miners being hired at fifty cents per day, the
common rate of labor being thirty cents. Sev-
eral of the mines are now being worked, one
by a French company on a good scale. This
company shipped through the custom house to
Swansea last year ore valued at \$150,000.
There are no reduction works in the country,
arrastras only being used. One of the mines
—Loma Larga—is worked down to 130 feet,
and operations have been suspended for want
of capital. This mine has yielded over \$500,
000. It belongs to General Gonzales, Presi-
dent of the State of San Salvador. He has in-
vested some \$100,000 in the mine, including
purchase money and money expended in pur-
chasing engine and pump and clearing the mine
of water. He now wants other parties to help
procure the necessary machinery to work the
mine. The large amount of money yielded by
the mine was taken out with little outlay from
comparatively shallow workings. Mr. Flint
promises to give us some further items with
relation to the mining interests of Salvador. He
thinks there is a good field there for men pos-
sessing the requisite experience and capital.

The new combination shaft, on the Com-
stock, described in another column has been
commenced. This shaft will have four com-
partments, three of which will be five by six
feet in size, and will be used for hoisting. The
other will be six by seven feet in size and will
be used for the pump shaft.

The usual amount of prospecting is being
vigorously carried forward in the old upper
levels of the Sierra Nevada mine, without yet
developing any paying or valuable ore bodies.

Selling Mines.

How many meritorious and valuable mines
sitting idle in California and Nevada to-day
for want of capital to work them? The question
is as difficult to answer, no doubt, as the ques-
tion, "How shall these mines be made profitable
without capital?" The most difficult thing in
most cases is to get capitalists to make the first
move toward even examining the mine, or
sending their experts to it. Many of our readers
will remember very vividly the weeks and
months they have spent in San Francisco try-
ing to get the attention of capitalists. They
will recollect how very difficult it was even to
get these people to examine the rock or map,
or even listen to them at all. In despair of
doing so, most miners are compelled to defer
to some hangers-on of California street who
may be fortunate enough to have the ear of a
rich mining man. This person will keep the
owner of the mine dancing attendance on him
for several weeks to impress him with his im-
portance. Then perhaps he will drop the mat-
ter, or else offer hundreds where thousands
were asked. Sick and tired of capitalists and
capital, the disgusted owner, thinking perhaps
that he wants neither at his mine after his ex-
perience, either sells for what he can get or re-
turns home a sadder and wiser man.

This is not the experience of one alone but
of many, and these circumstances have created
in our midst a class of men whose sole oc-
cupation is "placering mines"—either organizing
companies or selling to capitalists. These men
are more accessible than capitalists until they
finally become capitalists themselves. Their
business is to find out the location of a mine in
which some work has been done, and then in-
corporate a company and put the stock in the
market, or if the mine is really a good one it is
sold to the heavy mining men who "incorpo-
rate" it themselves. They expect, of course,
to make a good thing out of both buyer and
seller, and with a man of experience and good
connection, the business is a profitable one.

It will of course be seen that this class of
men, even without the slightest mining or
metallurgical knowledge, exercise a powerful
influence on our mining interests. Their
knowledge of the ins and outs of mining as
carried on at California street; their acquaint-
ance with the men who advance money on
mining property; the skill they display in get-
ting mines cheap and selling them high; and
the fact that it is difficult to negotiate mines
without their assistance, all combine to make
their influence felt. To the hard-working, in-
dependent miners nothing is more disagreeable
than hanging about asking favors of men
richer than they, so they turn their property
over to these men to do what they can with it.

While these people are, under present sys-
tem, useful to both miner and capitalist, it is
unfortunate that they cannot be done away
with and the seller and buyer brought together
without the intervention of a middleman, who
invests no labor and no money. "Mining
Bureaus" are not successful and probably
never will be, for it is almost impossible to
keep their managers incorruptible. There is
so much chance for "jobs" in a business of
this kind that few people have confidence in
the promises of corporations or individuals
who make a business of this sort of thing. If
it were possible to bring miners and capitalists
together, many good mines now lying idle
would be worked with profit to owners and
miners. Until, however, some better system
than that in vogue is adopted, it is probable
that many of these mines will continue in their
present semi-abandoned position for want of
the requisite capital to put them in working
order.

Notes at the Foundries.

At the machine shop of Hawkins & Cantell
they are building some new style percussion
rock drills after a pattern invented by L. W. Coe,
of this city. It is called the California drill.
The working parts are few and the valve and
rotary motion are very simple and novel. One
of these drills has been at work in the Consol-
idated Virginia mine since February, and has
operated so well that a number are now being
made for the same mine. Three of them are
to be tried at the New Almaden quicksilver
mine next week. The drills are made in two
sizes, 3½ inch diameter and 5-foot stroke, and
2½ inch by 3½ stroke. We shall shortly give
a detailed description of this new drill.

At the Etna Iron Works (Pendegast &
Smith) they are making quartz mill machinery
for a 20-stamp mill to go to Idaho. The mill
is a dry crusher. A new style roasting furnace
is also being made to go with the mill.

They are also building water jackets for
smelting furnaces at the Kohler Reduction
Works, and castings for same. The retort
pots, fronts, etc., for John Reynolds' new
chemical works, on the San Bruno road, are
also being made at these iron works. The
proprietors of these works are under con-
tract to furnish acid for the new bullion refin-
ing works at the mint.

They are also building several house fronts,
one for Belden block, another for the new
extension of the Humboldt Savings Bank, and
another for a large building to be erected in
Santa Barbara. A good deal of jobbing is also
being done at this foundry.

Commencement Day in Berkeley.

The Commencement exercises of the Univer-
sity of California were held yesterday at the
Assembly room of the University, at Berkeley.
The room was elegantly decorated for the oc-
casion and was crowded with a very select au-
dience from this city and elsewhere. The ex-
ercises, under the direction of President Le
Conte, passed off very pleasantly to all, and
creditably to the young gentlemen graduates.

The salutatory was pronounced in Latin by
Alexander D. D'Ancona, of San Francisco, and
the valedictory by Dwight B. Huntley, of
Oakland. There were three orations. A philo-
sophical oration (Lord Bacon), by Isaac T.
Hinton, of San Francisco; an English oration
(Arotic Explorations), by Frank B. Sutton, of
San Francisco, and a classical oration (A Pas-
sage in Sophocles), by Josiah Royce, of Oak-
land.

The degree of Bachelor of Arts was conferred
upon the following candidates: Charles F.
Boardman, Chesley K. Bonestell, Joseph G.
Brown, Alexander D. D'Ancona, Frank Deering,
Arthur F. Low, Josiah Royce and W.
Turkington. Bachelor of Philosophy—John F.
Alexander, Leonidas S. Burchard, H. J. W.
Dam, John O. Wyatt, Frederick V. Hollman,
H. O. Lang, F. S. Sutton, John W. Rice, W.
P. Gummer, Isaac T. Hinton, Dwight B.
Huntley, George W. Pierce, R. H. Robertson,
H. H. Webb, W. R. Windsor.

The degree of Master of Arts was conferred
upon John L. Beard, of the class of '68, and
George W. Reed and John M. Whitworth, of
the class of '73.

The literary exercises were concluded by a
very appropriate and thoughtful address by
President Le Conte.

We understand that ninety-three applications
had been made for admission to the new class up
to Monday last. This number of applications
at so early a day betokens the entry of a very
large class for the present year.

Academy of Sciences.

A regular semi-monthly meeting of the Cali-
fornia Academy of Sciences was held on Mon-
day evening last. Frank Soule, Jr., Professor
of Astronomy and Civil Engineering, and S.
B. Christie, Assistant in College of Chemistry,
University of California, were elected resident
members.

The following donations to the museum were
received and described by the Curator: Specimens
of volcanic formation from Colima, donated
by J. Roedel chestnut or ash-wood found
imbedded in quartz rock, 230 feet below the
surface, at Palisade station, on the Central
Pacific railroad, Elko county, Nevada, and do-
nated by A. J. Dennison.

The Swiss Consul presented a handsome
broeze medallion of Agassiz, the naturalist,
made in Neuchatel, Switzerland, the native
place of him whom the design commemorates,
by F. Laundry. On the face of the medallion
is a well executed bust of Agassiz, on the reverse
an olive leaf, within which is read *Homo In-
genio Laboris, Scientia Praestantissimo*.

Mr. Amos Bowman briefly described a stone
pestle and mortar which he presented, and es-
timated that he would give a more detailed descrip-
tion shortly. The specimens are important in
a geological point of view.

The Secretary read a paper by Henry Ed-
wards, on *Vanessa Californica*, being No. 13 of
a series on Pacific Coast Lepidoptera, written
by Mr. Edwards.

Dr. Gibbons, Sr., entertained the Academy
with a very instructive and extemporaneous ad-
dress on Cloud Foundations and their Climatic
Influences.

Dr. Winslow mentioned that in 1853 he pur-
chased a particle of fossil he saw in a barber
shop window, on Kearney street, near Pacific.
The barber explained that he had procured the
bone from a well then being dug in that neigh-
borhood. Subsequently the doctor sent the
bone to Leipzig, and received word that it was
the bone of a mammoth sloth. The rest of the
skeleton is still in that place, corner of Pacific
and Kearny streets, and he thought something
might be done to secure it intact, since the
street there is being excavated.

HON. THOMAS H. SELBY, ex-Mayor of San
Francisco, died in this city on the 9th inst. Mr.
Selby has been identified with the business in-
terests of this city for many years. He has
held many responsible official positions during
his residence in California, all of which he has
filled with credit. Mr. Selby was a large metal
importer and proprietor of the shot tower and
extensive smelting works in this city, being
interested also in various other industrial en-
terprises. He was the first President of the
Industrial School Association, and also of the
Merchants' Exchange. He was President of the
Board of Trustees of Calvary church, and held
a similar position in the Board of Trustees of
the City College. He was also a life Director
of the Mercantile Library Association and an
old pioneer of this State, having arrived here
in August, 1849. Mr. Selby was so well known
among us that it is hardly necessary to speak
of his business relations. He died leaving a good
record behind him, as well as a large fortune,
figuring up among the millions.

Notices of Recent Patents.

Among the patents recently obtained through
Dewey & Co.'s American and Foreign Patent
Agency, the following are worthy of mention:

IMPROVEMENT IN CARRIAGES.—Francis Scherb
and Frank F. Doland, Sacramento, Cal. This
improvement in the construction of carriages,
consists mainly in a novel combination of two
forms of spring, and also in the means by
which the wagon bed is mounted on these
springs, so as to obtain steadiness and ease of
motion. The head block and rear axle are
united by reaches, and cross-bars are secured
to the reaches a short distance from the
head block and axle bed respectively, to
support the ends of the springs or pecks,
and also to allow the front wheels to be
cramped short in turning without touching the
springs. This part of the carriage is con-
structed after a patent issued to Francis Scherb,
September 28th, 1869. To the head of the
springs are united side springs which may be
made continuous or in two parts. A shaft or
bar extends across beneath the middle of the
wagon bed, and when the spring is made con-
tinuous the ends of this bar will pass beneath
the center of the spring. A rubber or other
elastic plate is secured between the spring and
bar to prevent wear. If the spring is jointed,
it may have its meeting ends bent around the
end of the bar like a hinge. Two other bars
cross beneath the wagon bed near each end, and
the ends of these bars are flattened so as to form
the upper leaf of the side spring and bolted or
clipped to the top of the springs at a point
midway between the shaft and heads. These
shafts pass through elastic cushions, which are
secured in boxes beneath the wagon bed, and as
the ends of the shafts are firmly bolted to the
springs, it will be manifest that any depres-
sion or change of angle in the springs will
cause the shafts to rotate slightly within the
cushions and thus relieve the strain. These
cushions also by their elasticity assist in re-
lieving the jolt and strain of any end motion,
caused by the roughness of the road. Adjust-
ing screws press against the moveable plates and
boxes, and thus serve to regulate the tension of
the cushions and take up any loss from the
deadening of the cushions, the device thus
forming an easy and comfortable carriage.

GRAIN SEPARATOR.—Elijah Knapp, San Fran-
cisco, Cal. This invention relates to improve-
ments in apparatus for separating wheat from
barley and the small grains with which it is
usually mixed. In carrying out the improve-
ment the inventor employs a hopper for the
reception of the grain and a screw or plain
roller in the bottom of the hopper for feeding
the grain upon the screen surfaces. The grain
falls upon a compound screen which is sus-
pended in an inclined position by its four cor-
ners, from the main frame. This screen is
provided with three or more sifting surfaces,
one above another, and in its construction and
application is not materially different from the
screens ordinarily used in separators. Below
this screen is mounted a sifter or screen at an
opposite inclination, and to this screen is im-
parted an up and down motion or jar. The
compound screen consists of three plates
placed one above another. The two upper
plates are perforated at the upper end, leaving
a plain plate section at the lower ends. The
lower screen plate has its lower edge also per-
forated. The grain will fall from the hopper
upon the upper end of the upper screen plate,
and as the entire screen is given a shaking
motion the wheat and smaller seed will pass
through the holes and fall upon the second
screen plate, leaving the barley and larger grains
to pass down over the apron of the lower screen
plate. The grain and small seeds which pass
through the perforations will pass down
through the two upper plates successively and
fall on the oppositely inclined screen below.
This oppositely inclined screen is made of wire
cloth in which the meshes are small enough to
prevent the wheat from passing through, while
the meshes are large enough to let small seeds
and dirt pass through. This screen is stretched
upon a frame which has an inclined bottom be-
low the screen. The frame is mounted on
springs both at its upper and lower ends so
that it is supported on them. A screen passes
loosely through a hole in the end timbre of
the frame at each corner of the screen frame
and is sorwed into the bottom. A rod extends
upward from the middle of each side of the
screen frame, passes through a staple in the
frame, and in the upper end of this rod a roller
is secured. The driver shaft extends across
the frame just above the upper ends of these
rods, and secured to the driver shaft above
each of the rollers is a four-armed cam. As the
shaft is rotated the arms of the cam strike the
roller on the upper end of the rod successively
and depress it, thus forcing the screen frame
downwards by compressing the springs upon
which it is supported. After the arms pass the
roller the springs will force the screen frame
upwards until the heads of the screws strike
the under side of the end timbers of the frame.
This gives the screen a peculiar motion which
will throw the grain upon it upward and thus
keep the meshes clear, while it favors the pas-
sage of the small seeds through the screen so
that they will fall upon the bottom. When the
compression of the supporting springs is re-
leased they will suddenly strike the timbers,
thus producing an upward throw and jar which
is very effective in separating the grain.

Short Lectures on Patents.
No. 8.—By JNO. L. BOONE, of Dewey & Co's MINING AND SCIENTIFIC PRESS Patent Agency.

Design Patents.
Inventions are divided into two classes. First, those that possess utility, and secondly, those which only relate to the ornamental without reference to utility. Where the invention possesses utility, in however small a degree, a mechanical patent is issued to cover it, but when it relates only to shape, form, configuration, or design; when it is intended to represent something which is pleasing to the eye, something beautiful, it is then characterized as a design, and a design patent is issued to cover it.

If an inventor applies a new shape to a stove, and that shape involves utility, it is the subject of a mechanical patent. But if the shape is only applied to the stove for ornament, without possessing utility, it is a subject for a design patent. The line of distinction between a mechanical patent and a design patent is sufficiently marked to prevent any one from mistaking the one for the other. The only question to be settled is, does this invention possess utility outside of the peculiar design or shape which it possesses? If it does not, then it is a design.

Frequently an invention comprises both a mechanical patent and a design patent. For instance, if a person invents a new and useful device, or machine, and he finds that although he can embody his invention in a dozen different forms, there is one particular form or shape that is ornamental and pleasing to the sight, he can have a mechanical patent on his improvement and a design patent on the design. But the design patent must be applied for and obtained previous to the mechanical patent, for if he first obtains his mechanical patent and represents the design in it, he thereby estops himself from taking out the design patent, unless he states in his mechanical patent that he intends to patent the design. This is to prevent the inventor from defrauding purchasers, for if he takes out a mechanical patent covering his invention, he might sell the right to manufacture, or an interest in his patent to another, and then by taking out a design patent covering the form or shape, prevent the purchaser from having any benefit from the right he has purchased. But if he first secures a patent on the design, it will not debar him from subsequently obtaining a mechanical patent.

So great is the mania of the present age for change and novelty, that designs, like fashions, no matter how popular they are when they are first introduced to the public, usually become stale in a short time and are replaced by others. Owing to this fact, the patent law provides for the granting of design patents for shorter periods than for mechanical patents. These terms are three and a half, seven and fourteen years, and the inventor may elect which term he chooses for his patent. The fees are granted in the same ratio. The inventor is thus made the only judge as to the probable permanency of his design.

Probably some of the most valuable patents issued by the United States Patent Office cover designs for carpets, cloths, stoves and burial caskets. These are articles which require ornamentation in order to suit the public taste, and when an inventor happens to secure a design that becomes fashionable in any of these articles his fortune is generally made.

When a person manufactures a machine, or article in a particular shape, or with a fixed design upon it, which could be patented, no other person has a right to apply that design upon a similar machine or article, and the design becomes a trade mark by which the machine or article is recognized in the market. The general or peculiar shape of the exterior of a package, or machine, fixes itself more firmly in the minds of most people, than any mark or brand which it has upon it, and frequently the design is the only mark or feature that the purchaser goes by in making his purchases. Most manufacturers know the value of securing an independent original design for their articles, and as the cost of design patents is not great, they can easily afford to protect themselves from imitations.

If an inventor applies for and obtains a design patent for three and a half years,—the shortest term—he cannot have it extended at the end of that time, neither can he have a seven years' patent extended. His judgment must be exercised in making his first application as to the length of time for which he desires the patent to be issued, and when the patent expires it cannot be revived or extended.

A single design patent cannot be obtained for two articles which are not ordinarily used together, nor where their relative positions are liable to be varied when used together, but each design must be applied for and secured by a separate patent.

The same rules of law that apply to mechanical patents with regard to infringements, are employed and recognized in design patents. It is an infringement if another party uses a design which is sufficiently similar to that patented to deceive or mislead the public. The general effect of the design is always taken into consideration in determining the question of infringement.

Tea.
Preparation for Market and Varieties Sold.
In our last issue we gave a partial description of the methods of cultivation of tea in Japan, concluding with some remarks on the way the leaves were dried. We now continue our description with illustrations showing a tea plantation under the shadow of the sacred mountain, Fusi-Yama, and young girls picking and sorting the leaves. After drying the next process consists in sifting and sorting the leaves, and this is done in another house where young girls are seated around flat tables with piles of tea in front of them. Before sorting the tea, it is well shaken in sieves of various sizes, to rid it of all dust and flake particles; then it is heaped upon the table; each girl

54,133,599 pounds. San Francisco imports of China and Japan for the past fifteen years, according to the San Francisco Journal of Commerce, have amounted to 79,487,522 pounds, worth \$29,735,417.

Seven-eighths of the teas sold in this market are Japanese, and these are daily coming into favor in the East.

Green Teas
Imported in San Francisco are divided into the following varieties: Moyune, Fy Chow, Teen Kai, Pingsney, Young Hyson, Twankay, Gunpowder, Imperial and Hyson. They come chiefly from the northern tea districts of China bordering on the great river Yang Tse Kiang. These teas are classed as divided into different varieties as: Gunpowder and Imperial of first, second and third class, and Hyson Skin and Twankays; fine young Hyson, first, second and third. The Moyune district is recognized as producing teas the most superior in flavor.

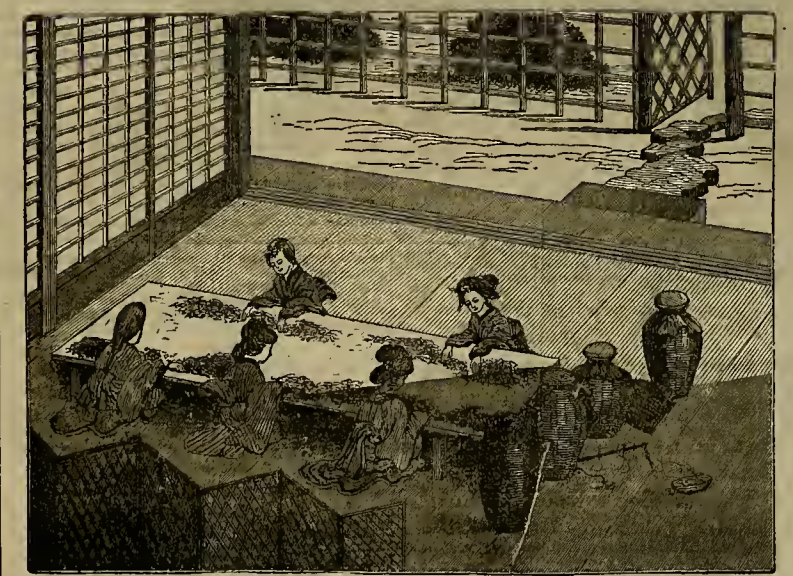


TEA PLANTATION—FUSI-YAMA IN THE BACKGROUND.

takes her left hand full of leaves and throws them before her on the tables, while with her right hand she picks out any stray stick, straw, or imperfect leaf, and sweeps the rest into a basket. This is done with great rapidity, and their fingers move in the same way as a hen uses her beak when pecking corn. The tea is sometimes still further sorted, when they wish to separate the fine, small leaves from the larger ones; the former always constitute the best quality of tea, while the latter forms the chief bulk of that which is exported to foreign countries. Of course the best tea remains at home, and the poorest goes abroad; but as we usually spoil its real flavor, with our milk and

Next comes Fy Chow and Teen Kai, which are rated as about equal in value. Pingsneys, although the best in appearance, are the poorest in flavor. All these teas are manufactured in Canton, but of low and medium grades.

Black Teas
Are produced in largest quantities in the districts of Oo Nsm and Hnh Pah. Here are produced Congous and Sou Chongs for the English market. In the neighborhood of Foo Chow is the principal producing district of Oolong, which are favorites in the United States. They are teas that run from 20 cents to \$1.50 per pound. The island of Formosa



SIFTING AND SORTING TEA LEAVES.

sugar fixings, perhaps it does not make much difference after all.

All that which is exported has to be "refined" again in Yokohama, or some other port. Here they do the thing on an immense scale in large stone houses, where hundreds of men and women are employed in heating and rolling the leaves again, and putting the "finishing touch" on the whole process; this is absolutely essential to preserve the tea and render it fit for transportation. In the firing ten per cent. in weight is lost. The fresh tea odors which greet you as you pass the open windows of these tea-firing establishments, are such as would make our lady friends smack their lips with delight. Such is the process of preparing tea for the market in Japan.

The consumption of tea has increased at a marvelous rate both in Europe and America during the past fifty years. The American Exchange and Review states that in 1711 it was only 141,995 pounds. In 1874 it was 137,442,264 pounds. In the United States the consumption in 1791 was 985,997 pounds and in 1874 it was

and the neighborhood of Amoy have, within the last five years, produced a large quantity of very superior Oolong, as also has Japan, and this last circumstance has urged the choice growers to extra exertions to improve the quality of their own. Specimens of all kinds of teas have been brought from time to time to this market, more as curiosities than anything else, among which we may mention the celebrated Mandarin tea and the Brick tea, which is sold at from 90 to 95 cents per pound. Frequently it is said teas have sold for less in the market than what they have cost to produce in Japan.

One great feature of the trade in this city has been the system of auction sales, which are held monthly, and sometimes oftener, and at which from 3,000 to 5,000 packages at a time are usually disposed of. There are in this city not less than twenty-five firms who import more or less, and most of whom also act as jobbers; and who have not less than a million and a half dollars invested in the business. This does not include those who are jobbers only, or who are retailers.

Hints on the Washoe Process.
(Continued from last week.)

The Results Obtained in Settlers, Agglalors, and Concentrators.
On drawing the charge, the greater part of the quicksilver runs quickly into the bowl or reservoir of quicksilver in the bottom of the settler, whence it flows out, free from sand, through a siphon, into a kettle outside. It is preferable to fill the settler, when the charge is drawn, with water falling as a rain, and, when the settler is full, to let nothing run out, but turn off the water and run the stirring-arm in the charge for an hour. This collects the floured quicksilver somewhat, and settles it. Then turn on plenty of water, and let the settler discharge through the top plug-hole as long as possible. The operation should be so timed as to reach the bottom hole of each individual settler only just in time to receive the next charge. The settler will never choke with heavy sand if the pan has ground well and the driving-belt is in good shape. In the settler accumulate some coarse sand, some un-reduced sulphurets, amalgam, quicksilver, and iron from the pans; and once a week the settler should be cleaned out, and the concentration reworked in the pans.

A good supply of water should be kept constantly running in the agitators. Here there will be found some coarse sand containing a little quicksilver, amalgam, sulphurets, and considerable iron; but the saving is very small. The floors throughout the mill should be kept clean, and the whole mill as neat and free from dirt as possible; no loose quicksilver should be found in the floors, on the table, or anywhere; all drains should lead into the agitators; and the quicksilver floor, unless the weather be too cold, should be washed with a hose every day.

Except on ores containing a large proportion of heavy sulphurets, or containing much slime that coats quicksilver, I have found but little benefit in concentrators applied to tailings from the pans. In ordinary cases, they collect little except iron from the pans and coarse sand. The pans grind so fine that the precious metal left in the tailings is very difficult to concentrate after leaving the agitators—provided the ore has been well worked. It is necessary to have a regular supply to the concentrator; and this may be effected with siphons of one and one-half inch and two inch pipe. I have found Hufferford's concentrators very good for slimes and slimy ores, since the shaking collects the floured and slime-coated quicksilver very well.

After leaving the concentrators, the tailings were run, in the Owyhee mill, over a double set of blanket sluices, 250 feet long; but it was found that on the ores then worked, the saving did not pay for the labor employed in frequent washing; and at last the blankets were worked only about once a week.

The Straining of Quicksilver, Cleaning of Amalgam and Retorting.
The quicksilver collected in kettles outside the settler is strained through canvas escks, the amalgam collected is cleaned from small mechanical impurities in a cleaning pan, then re-strained and retorted in an iron retort, beneath which fire is kept up for eight to twelve hours. The distilled quicksilver is condensed by a sleeve around the esock pipe, filled with water. After cooling, the retort is opened and the bullion is taken out and delivered to the assayer.

The retort is a source of considerable expense in milling. My experience leads me to prefer a cylindrical retort of cast iron, weighing about 1,200 pounds and fourteen inches by forty-eight inches inside dimensions. This style has various external shapes, doors, etc. The main trouble in retorting is this: with a long continued bright fiery red heat at the last, almost but not quite all of the quicksilver can be volatilized. The sublimation of the last one or one and a half per cent. cannot be effected without heating the retort till part of the hullion is melted, which requires a white heat. At this temperature the iron loses its tenacity, becomes spongy and rotten, and easily changes its shape. In a short time, under this treatment the retort becomes distorted, even if turned around frequently, and after a time it bursts, frequently volatilizing up the chimney 200 pounds of quicksilver. Three or four such experiences a year are rather expensive. I have made many experiments, such as retorting in vacuum, firing twenty-four hours at a moderate heat, etc., but finally concluded to braze the retort as well as possible, never heat it above cherry red, and submit to the loss of one per cent. of quicksilver for the present. In one's own assay office I think it can satisfactorily be assayed during melting, by a condensing chamber in the stack or chimney.

(To be Continued.)

The main north drift on the 1700-ft level of the Gould & Curry mine will have about 40 ft yet to run to connect with the south drift from the Best & Belcher. As soon as this connection is completed, and the necessary ventilation of the level obtained, cross-cuts will be started to out and prospect the ore vein at several different points, and some lively developments may be looked for.

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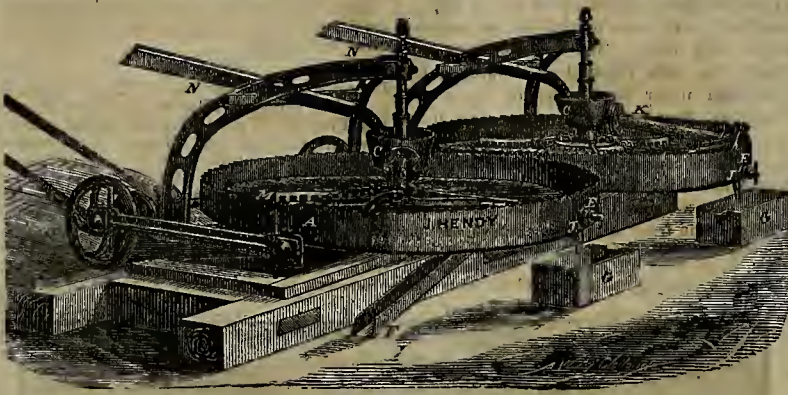
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I have been familiar with the workings of your Concentrators for four years past; have run them myself in
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you this testimonial. For further information you are at liberty to refer to,
Yours respectfully,
JAS. H. OROSSMAN, M. E.

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SAN FRANCISCO, April 27, 1872.

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As further evidence of their worth, I now order TWELVE more of your Machines for our new Mill, now in
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It renders water soft, and imparts a delightful sense of
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drops in every pot of water used in watering.PRICE.—Per Pint Bottle, 25 cents; per quart Quart Bot-
tle, 40 cents; per Half Gallon, 75 cents.
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thin hair thickens; and faded or gray hair resumes their
original color. Its operation is sure and harmless. It
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business in buying and selling mining properties, city
real estate, and agricultural and other lands, in the
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mined to do only a strictly legitimate business, the
Directors rejected the old method in vogue by mining
companies generally, and adopted a new one which
secures to all parties who become shareholders, equal
advantages in the business transacted. By the provi-
sions of the by-laws,

A Sinking Fund

Is to be made of one-half the proceeds of the total cap-
ital stock, which shall be sold on the joint account of
the original co-owners. The stock will be classified as
follows: Sinking Fund, mining property, city real
estate and agricultural lands. Before any stock is
issued in any class, the property will be appraised by
the owners, and the stated value entered upon the
books of the Company. Shares for not more than fifty
per cent. of the valuation will be issued in any of the
classes, and the amount of shares offered for sale in
any one class, exclusive of the sales of stock in the
Sinking Fund, will not be allowed to exceed 50,000,
if sold at less than the par value of a dollar per share.

Guarantees of Safety.

In regard to the Sinking Fund, which will constitute
fifty per cent. of the par value of the stock, all moneys
received as the proceeds of sales of stock on account of
the fund will be deposited with some solvent banking
institution, which pays interest on deposits invested
in interest bearing stocks, bonds and other securities,
which can be realized on at thirty days, and in no case
will it be lawful for the directors or trustees to invest
any moneys of the Sinking Fund in the purchase of
stocks, bonds or other securities of any incorporation
whatever, which shall have failed to pay interest or
dividends for a period of six months preceding any
proposed investment pertaining to the Sinking Fund of
the Company.

Payment of Interest.

The by-laws further make positive provision for the
payment of interest monthly on all stock issued in
each class at the rate of twelve per cent. per annum,
payable on the 5th day of each month. Another im-
portant concession is that any shareholder has the
option to take stock in payment for interest at par
value in any class that may be preferred. No assen-
ment will be levied until the total stock of the Sinking
Fund shall have been sold and paid out as provided by
the by-laws. Indeed, so secure is the plan of the Com-
pany that in case the whole capital stock of the Company
should be sold immediately and the Sinking Fund in-
vested as provided, the proceeds would be sufficient to
pay the interest for eight years and a half on the total
capital stock. Perhaps no other company in the world
has ever been able to present so brilliant a certainty.

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Stockholders will not only be sure of their twelve
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profits. The dividends will be paid from the profits
and sales of property, and only on shares of consols
that have been issued for property valued and entered
on the books of the Company. As there can be very
little question that the transactions of the Company
will be very extensive, and that the profits will rapidly
reach something handsome, the dividend prospect
should serve as a strong inducement to stock pur-
chasers, for perhaps in no other direction can they be
positive of receiving one per cent. a month for money
invested, and almost a certainty of large yearly di-
vidends is addition.A further provision can be made at any time by the
Company by setting aside the percentage agreed upon
of the sales of the properties of the Company. The
main object of the directors is to incorporate a more
legitimate and assured method of transacting business
in mining and property than has hitherto obtained on
this coast. They are therefore resolved to touch nothing
but bona fide investments, and to make it a rule to
have nothing to do with speculative values. Every
possible care will be taken to protect the interests of
shareholders; and in order that they may be constantly
posted in the transactions of the Company, a monthly
statement of affairs will be prepared by the officers,
and the books will be at all times open for inspection.
Shares for the first series issued for mining property
in Washoe, Storey and Lyon counties, and on the Coun-
ty side in Nevada, and for account of Sinking Fund,
will be ready for delivery to subscribers and purchas-
ers to-morrow, at Greenbaum & Co's, 308 Montgomery
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For description see MINING AND SCIENTIFIC PRESS, March 6, 1875.

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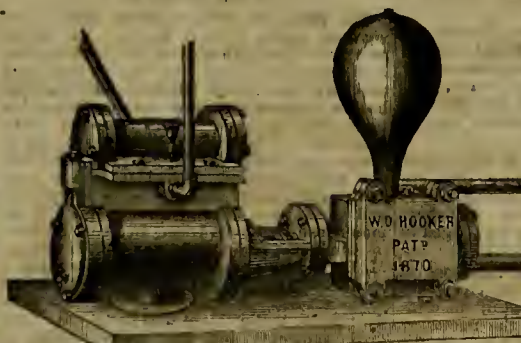
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From 3 to 75-horse power. Shafting, Pulleys, Hoist Gears, Quartz Mill, Water Turbine, Spanish Arrastras, Pumps and Pipes, Washburn and Bidon Pans, and all kinds of Machinery for sale at lowest prices by

THOS. P. H. WHITELAW,
256 Brannan street, S. F.
Highest cash prices paid for all kinds of Machinery.

DIAMOND CATARRH REMEDY.



DR. EVORY'S
CELEBRATED
DIAMOND
REMEDIES.

DIAMOND NERVE PILLS.

CATARRH AND COLDS—Dr. Evory's Diamond Catarrh Remedy never fails; perfect cure; try it; fifty cents per bottle. Depot, 608 Market street, San Francisco, Cal., opposite Palace Hotel. Sold by all druggists.

BLACK DIAMOND FILE WORKS.



G. & H. BARNETT,
Manufacturers of Files of every Description
Nos. 39, 41 and 43 Richmond street,
Philadelphia, Pa.

Sold by all the principal hardware stores on the Pacific Coast. 18v25.1y

Brittan, Holbrook & Co., Importers of Stoves and Metals, Tinners' Goods, Tools and Machines 111 and 113 California St., 17 and 19 Davis St., San Francisco, and 173 J St., Sacramento. mr.-1y

Metallurgy and Ores.

JOHN TAYLOR & CO.,

IMPORTERS OF AND DEALERS IN

ASSAYERS' MATERIALS

Chemical Apparatus and Chemicals,
Druggists Glassware and Sundries,
PHOTOGRAPHIC GOODS, ETC..

512 and 514 Washington street, SAN FRANCISCO

We would call the special attention of Assayers, Chemists, Mining Companies, Milling Companies, Prospectors, etc., to our large and well adapted stock

ASSAYERS' MATERIALS

—AND—
Chemical Apparatus,

Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grains Grammes, will be sent free upon application.

7v25-1f **JOHN TAYLOR & CO.**

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidity pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merit. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pan being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces.—Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco.

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.
Ores sampled.
Assaying in all its branches.
Analysis of Ores, Minerals, Waters, etc.
Plans furnished for the most suitable process for working Ores.
Special attention paid to the Mining and Metallurgy of Quicksilver.

E. HUNN,
C. A. LUCKHARDT,
Mining Engineers and Metallurgists.

RODGERS, MEYER & CO.,

COMMISSION MERCHANTS.

ADVANCES MADE

On all kinds of Ores, and particular attention PAID TO

CONSIGNMENTS OF GOODS.

4v16-3m

Instructions in Assaying,

Chemical Analysis, Determination of Minerals, and use of the Blow-pipe.

HENRY G. HANKS

Will receive a few pupils at his new laboratory, 617 Montgomery street, up-stairs. TERMS MODERATE

LEOPOLD KUH,
(Formerly of the U. S. Branch Mint, S. F.)
Assayer and Metallurgical CHEMIST,
611 Commercial Street.
Opposite the U. S. Branch Mint
SAN FRANCISCO CAL. 7v21-3v0

NEW ALMADEN QUICKSILVER.

TRADE A MARK.

The well known full weight and superior quality of the Quicksilver produced at the New Almaden Mines, having induced certain unscrupulous persons to offer their inferior productions in blasks having our "Trade Mark A," notice is given to consumers and shippers that Quicksilver A brand, guaranteed weight, can be purchased only from THOMAS BELL, or his duly appointed sub-agents.

J. B. RANDOL, Manager,
New Almaden, April 6th, 1875.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., June 8th, 1875.

FOR WEEK ENDING MAY 25TH, 1875.

MACHINE FOR SAVING QUICKSILVER.—John W. Varney, Virginia City, Nev.

SPRING TRAOE CARRIAGE AND BACK LOOP.—Wm. Davis, Petaluma, Cal.

SHOE FOR WAGON BRAKES.—John Grimste, Milton, Cal.

PRINTERS' GALLEY.—Henry H. McWilliams, Sacramento, Cal.

TRACTION ENGINE.—William H. Miltiken, Sacramento, Cal.

RE-ISSUE.

HYDRAULIC ELEVATOR.—Timothy Stebins, San Francisco, Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. Note.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect security and in the shortest possible time.

General News Items.

BEFORE her examination by the physicians which resulted in declaring her insane, Mrs. Lincoln carried \$57,000 in securities in her pocket. She also spent large sums of money, bought \$600 worth of lace curtains; three watches costing \$450; \$700 worth of jewelry; \$200 worth of Lubio's soaps and perfumery; and a whole piece of silk.

THE Sioux chiefs have returned from their visit to Washington, dissatisfied with their treatment by the authorities, and it is feared they will take revenge for supposed grievances by attacking the Black Hills pioneers.

Mrs. M. L. SANBORN is a candidate for Superintendent of Schools, in San Diego county, and as her qualifications are undisputed, and she is supported by papers of both parties, it is probable she will be chosen without opposition.

INDIOTMENTS have been found against several citizens of New York for complicity in the Tweed frauds, and the prosecution of all suits against members of the ring are being pushed vigorously.

AFFAIRS in the Pennsylvania coal regions are still in an unsettled state, and a collision between strikers and miners now at work, may occur at any time.

THE Atlantic cotton mills in Lawrence, Mass., employing 1,200 operatives, will shut down on account of the dull market, on July 10th, and remain closed till September 1st.

MISS MARY TELFAIR, who died in Savannah last week, bequeathed the greater portion of her estate, valued at \$1,000,000, to religious and charitable objects.

THEY have a zinc spring near Quicooy, Pinamas county, and already wonderful cures are reported from those who have quaffed its waters.

THE suspicion, for want of support, of the weekly journal, *Common Sense*, speaks well for the good sense of San Francisco people.

THE meeting of the National Photographic Society which was to have been held in this city next month has been postponed to 1877.

A FINE new barn belonging to Michael Rogers was burned in Sucoo, Alameda county, last Monday. Loss, \$15,000; partially insured.

W. H. TALCOTT, buyer for H. B. Claflin & Co., has been arrested on a charge of buying \$400,000 worth of smuggled laces.

A GERMAN named Gotthold Behrens suicided by inhaling charcoal fumes in this city, on Sunday last.

REPORTS from the Fiji Islands state that 50,000 of the natives have lately died of the measles.

REV. A. B. FISK, the new pastor of Howard St. Presbyterian church, preached his initiatory sermon last Sunday.

THE P. M. S. S. Co.'s new steamship *City of New York*, was launched at Chester last Saturday.

THE Aroy wine cellar Visalia was destroyed by fire last Wednesday. Loss \$4,000. Incendiarism.

THE International Typographical Convention has been in session in Boston this week.

THE German corvette, *Arcona*, lies at anchor within the portals of the Golden Gate.

GOONS intended for exhibition at the Centennial can be imported duty free.

COINAGE of twenty cent pieces has been commenced at the S. F. mint.

HUENEME now has telegraphic communication with the outside world.

THE American rifle team sailed from New York on Saturday last.

A NEW time table on the S. P. R. R. went into effect this week.

MODESTO thermometers marked 105° in the shade last Saturday.

THE small-pox is raging in New York city.

Industrial Items.

THE Lincoln fire clay has been used in the rolling mills at San Francisco, and found equal to the best Eastern quality. Two car loads of the clay have been used at Selby's works, San Francisco, and found satisfactory, and practical tests have been made in the potteries also at Oakland.

THE Butte Record says: It is announced that H. Hale & Son, of Petersburg, Ill., are willing to bring their woollen mills to California and take one-third the capital stock. Let them come to Chico, and they will not be obliged to repeat the offer.

IN Los Angeles the Board of Directors of the East Los Angeles and San Pedro street railroad have directed the president of the company to proceed at once to order the necessary material to build five miles of road, on the prismoidal plan, from the southern limits of the city to East Los Angeles.

LATE advices from San Fernando tunnel say that five hundred men are at work in the cut. The south end is 150 feet deep, and on the north end the work is on the approaches. Considerable trouble had been experienced from a cave of soapy sand.

MA. A. L. SRINSON, proprietor of the Pioneer hosiery manufactory at Jefferson, Oregon, has commenced operations, the carding and spinning rooms being under the charge of Mr. James Barnes, a gentleman lately from a large factory in the East.

COLLECTED returns made to the Bureau of Statistics show that 18,106 emigrants, of whom 9,049 were males, and 8,157 females, arrived at the port of New York during May, 1875.

A NEW planing mill is being erected by the Central Pacific railroad company near the ship yard. Its dimensions are 200x60 feet, and two stories in height.

A JOINT stock company has been formed in Guerneville to manufacture chairs, with a working capital of \$4,000.

FROM 1,200 to 1,400 men are now at work on the El Dorado ditch, about half of whom are Chinamen.

THE wharf at Santa Monica has reached 1,300 feet from the starting point.

Nature's Great Specific.

The Extraordinary Virtues of Bethesda Mineral Spring Water.

In this age of ceaseless activity and general excitement, there are so many influences at work to engender disease and enfeeble health that few persons possess sufficient physical stamina to enable them to dispense altogether with corrective and restorative agencies. Of course, under the circumstances, there are numerous specifics offered as efficacious in the several departments of disease. Experience, however, has proved that most of them are worse than useless, inasmuch as they either further impair the vital powers or aggravate suffering. Medical science, on the other hand, while it reaches the diagnosis of disease and is able to prescribe certain remedies to check for a time the progress of decay, does not, in the great majority of instances, restore the human system to its natural vigor and eradicate the seeds of disease which render health impossible while they remain.

A Wonderful Discovery.

Nature, however, has been more friendly to the human family than medical science *per se*, and the most malignant diseases have been brought under control by her agency. The cures, for example, effected by the use of Bethesda Mineral Spring Water have been of so remarkable a character as not only to attract universal attention, but to cause the utmost surprise in the scientific world. This discovery may truthfully be pronounced one of the most important that has ever been made in connection with disease, and as the reputation of the water is now established beyond all cavil, and its achievements as a specific conclusively demonstrated, nothing but the bare facts need be stated, for the tests have been so thorough and the results so satisfactory that nothing can really prejudice the case.

Triumph over Deadly Diseases.

There is no known remedial agent that can cure certain diseases as effectually as Bethesda Water. It is specified in all cases of diabetes, inflammation of the kidneys, inflammation of the neck of the bladder and urethra, inflammation of the bladder, dropsy, gouty swellings, stoppages of urine, albuminuria, rosy or cloudy urine, brick dust deposits; thick, morbid, bilious and dark appearing urine, with bone dust deposits; burning catarrhs with sharp stings and burning urine; hemorrhages of the kidneys; pain in the kidneys and loins, torpid liver, indigestion, calculus, and female weakness.

Almost as soon as the water was discovered its great virtues were established in the most positive manner. One followed upon cure, marvels succeeded wonders, the most agonizing form of disease succumbed to this potent and all powerful remedy, the hopelessly lost regained their strength, the doomed were restored to health, shriveled, shrunken, helpless beings were brought back to life, men anured to long suffering and bitter anguish revealed in the relief of restored powers, while here and there and everywhere the magic of Bethesda, the certainty of its cure, and the marvel of its work was heralded as doing the work of miracles. Its discoverer was beginning to be appreciated; the taint, the jest and the sneer fell as before some superior power, and where ridicule had been instituted admiration took its place; while encouragement to the man, praise, laudation and favor occupied all places and claimed every attention.

What is Claimed.

The water has restored thousands from the brink of the grave; given health and strength to those deemed beyond the reach of all medical science, and turned the path of affliction to one of happiness in the blessings contained within its virtues. It cures the deadly Bright's disease of the kidneys, the disease which restores the urinary organs to strength and power; is a certain specific in dyspepsia; and unfailing antidote to a diseased and poisoned system from any and all causes; a sure agent in all cases of debility, nervous prostration or loss of power; acts with nerving certainty in giving new life to a languid and overtaxed system—in a word it is a natural restorer of health and has performed the most wonderful and miraculous cures of any known specific on the globe.

The agents everywhere have numerous testimonials in proof of the wonderful cures effected, and the sales of the water are greatly on the increase in every State of the Union. The general agents in this city are Dunbar, Handry & Lavery, at 107 Stockton street.—*Evening Post.*

"KNOW THYSELF."

The great educator, profound thinker, and vigorous writer, Herbert Spencer, has wisely said: "As vigorous health and its accompanying high spirits are larger elements of happiness than any other things whatever, the teaching how to maintain them is a teaching that yields to no other whatever." This is sound sentiment, and one great want of the present age is the popularization of Physiological, Hygienic and Medical science. No subject is more practical,—none comes nearer home to every man and woman than this. "The People's Common Sense Medical Adviser, in Plain English, or Medicine Simplified," by R. V. Pierce, M. D., is a book well calculated to supply a manifest want, and will prove eminently useful to the masses. It contains about nine hundred pages, is illustrated with about two hundred wood-cuts and fine colored plates, is printed upon good paper, and well bound. It is a complete compendium of anatomical, physiological, hygienic and medical science, and embodies the latest discoveries and improvements in each department. It has been the author's aim to make the work instructive to the masses, and hence the use of technical terms has been, as far as possible, avoided, and every subject brought within the easy comprehension of all. An elevated moral tone pervades the entire book. While it freely discusses, in a scientific manner, the origin, reproduction and development of man, it does not cater to depraved tastes, perverted passions or idle curiosity, but treats to a chaste and thorough manner, all those delicate physiological subjects, a proper knowledge of which acquaints us with the means for preserving health, and furnishes incentives to a higher and nobler life. The author, who is also the publisher of his work, anticipating a very large sale for it, has issued twenty thousand copies for the first edition, and is thus enabled to offer it (post-paid) at one dollar and fifty cents per copy,—a price less than the actual cost of so large a book, if published in only ordinary-sized editions. The large number of subscribers received for it in advance of its publication, has very nearly exhausted the first edition almost as soon as out, and those desiring a copy of it will do well to address the author, at Buffalo, N. Y., without delay.—*Com.*

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

J. L. THAYER—San Francisco.
B. W. CROWELL—California.
O. CHAMPION—Tulare, Fresno and Inyo Counties.
JOHN ROBERTS—California.
A. C. KNOX—California.
G. W. MCOREW—Santa Clara county.
OSAS, T. BELL—California, Oregon and W. T.
D. J. JAMES—Australian Colonies.

METALS.

[WHOLESALE.]

WEDNESDAY M., June 9, 1875.

American Pig Iron, 3 ton	—	@	46 00
Scotch Pig Iron, 3 ton	46	00	00
White Pig, 3 ton	—	@	46 00
Oregon Pig, 3 ton	—	@	46 00
Refrain Bar, best assortment, 3 ton	—	@	46 00
Boiler, No. 1 to 4	—	@	46 00
Plate, No. 5 to 9	—	@	46 00
Sheet, No. 10 to 14	—	@	46 00
Sheet, No. 15 to 24	—	@	46 00
Sheet, No. 25 to 34	—	@	46 00
Sheet, No. 35 to 44	—	@	46 00
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Sheet, No. 55 to 64	—	@	46 00
Sheet, No. 65 to 74	—	@	46 00
Sheet, No. 75 to 84	—	@	46 00
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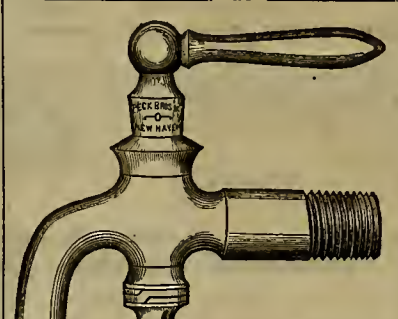
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Gobblers, 30 to 40 40 to 60 pounds
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16 to 20 turity.
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Mining and Other Companies.

California Consolidated Mill and Mining
Company. Location of principal place of business,
San Francisco, Cal.

Notice.—There are delinquent upon the following
described stock, on account of assessment levied on
the 1st day of April, 1875, the several amounts set
opposite the names of the respective shareholders, as
follows:

Names.	No. Certificate.	No. Shares.	Amount.
Burke, T.	33	100	\$ 50 00
Burke, T.	34	50	25 00
Burke, T.	35	50	25 00
Hendy, Joshua, Trustee.	84	70	35 00
Hendy, Joshua, Trustee.	73	24,550	12,275 00
Hendy, Joshua, Trustee.	73	2,118	1,059 00
Heardon, John.	80	50	25 00

And in accordance with law, and an order of the
Board of Directors, made on the 1st day of April, 1875,
so many shares of each parcel of said stock as may
be necessary, will be sold at public auction, at the office
of the company, 408 California street, room 16, on the
18th day of May, 1875, at the hour of 1 o'clock P. M.,
of said day, to pay said delinquent assessment thereon,
together with costs of advertising and expenses of sale.

J. W. TRIPP, Secretary.
Office, Room 16, No. 408 California street, San Fran-
cisco, Cal.

POSTPONEMENT.—The above sale is postponed
until Tuesday, the 15th day of June, 1875, at 2 o'clock
P. M. By order of the Board of Directors.
J. W. TRIPP, Secretary.

Carbon Coal Company.—Location of Prin-
cipal place of business, San Francisco, Cal.

Notice.—There are delinquent upon the following
described stock, on account of assessment levied on the
first day of May, 1875, the several amounts set opposite
the names of the respective shareholders as follows:

Names.	No. Certificate.	No. Shares.	Amount.
J. W. Harker.	Unissued	100	\$125 00
A. P. Bryerton, Jr.	Unissued	100	125 00
J. Martenstein & Co.	Unissued	100	125 00
L. A. Booth.	Unissued	100	125 00

And in accordance with law, and an order of the
Board of Directors, made on the first day of May, 1875,
so many shares of each parcel of said stock as may
be necessary, will be sold at public auction, at the office
of the Secretary, No. 220 Clay street, San Fran-
cisco, on the fourteenth day of June, 1875, at the hour
of one o'clock P. M., of said day, to pay said delinquent
assessment thereon, together with costs of advertising
and expenses of sale.

N. O. FASSETT, Secretary.
Office—No. 220 Clay street, San Francisco, California.

Cordillera Gold and Silver Mining Com-
pany. Location of principal place of business, San
Francisco, Cal. Location of works, Morelos Mining
District, State of Oahuahu, Mexico.

Notice is hereby given, that at a meeting of the Board of
Directors, held on the 8th instant, an assessment of Ten
cents per share was levied upon the capital stock of the
company, payable immediately, in United States gold
coin, to the Secretary, at the office of the company, No.
321 Washington street, San Francisco, Cal.

Any stock upon which this assessment shall remain un-
paid on the 18th day of June, 1875, will be delinquent,
and advertised for sale at public auction, and unless payment
is made before, will be sold on Saturday, the 3d day of
July, 1875, to pay the delinquent assessment, together with
costs of advertising and expenses of sale. By order of the
Board of Directors.

HENRY R. REED, Secretary.
Office, No. 321 Washington street, San Francisco, Cal.

Geneva Consolidated Silver Mining Com-
pany.—Principal place of business, City and County of
San Francisco, State of California. Location of works,
Cherry Creek Mining District, White Pine County, State
of Nevada.

Notice is hereby given, that at a meeting of the Board of
Directors, held on the 13th day of May, 1875, an assess-
ment of twenty-five cents per share was levied upon the
capital stock of the corporation, payable immediately, in
United States gold coin, to the Secretary, at the office
of the company, Room 14, 302 Montgomery street, San
Francisco.

Any stock upon which this assessment shall remain un-
paid on the 14th day of June, 1875, will be delinquent,
and advertised for sale at public auction, and unless payment
is made before, will be sold on Wednesday, the 30th day of
June, 1875, to pay the delinquent assessment, together with
costs of advertising and expenses of sale.

I. T. MILLIKEN, Secretary.
Office, Room 14, 302 Montgomery street, San Francisco
Cal.

Martin & Walling Mill and Mining Com-
pany. Location of principal place of business, San
Francisco, California.

Notice.—There are delinquent upon the following
described stock, on account of assessment levied on the
24th day of April, 1875, the several amounts set
opposite the names of the respective shareholders as
follows:

Names.	No. Certificate.	No. Shares.	Amount.
Bishop, Edgar.	52	100	50 00
Cox, A. P.	42	50	25 00
Cooper, Mrs Mary E.	10	50	25 00
Flannigan, Martin.	110	75	37 50
Flannigan, Martin.	111	100	50 00
Flannigan, Martin.	112	100	50 00
Gibbons, O. P.	107	100	50 00
Hudgin, John D.	11	50	25 00
Hudgin, John D.	12	100	50 00
Hudgin, John D.	13	100	50 00
Hudgin, John D.	14	100	50 00
Hudgin, John D.	15	100	50 00
Hudgin, John D.	16	100	50 00
Hudgin, John D.	17	100	50 00
Hudgin, John D.	18	100	50 00
Hudgin, John D.	19	100	50 00
Hudgin, John D.	20	100	50 00
Hudgin, John D.	21	100	50 00
Hudgin, John D.	22	25	12 50
Hudgin, John D.	23	25	12 50
Hudgin, John D.	24	25	12 50
Hudgin, John D.	25	25	12 50
Hudgin, John D.	26	25	12 50
Hudgin, John D.	27	50	25 00
Hudgin, John D.	28	50	25 00
Hudgin, John D.	29	50	25 00
Hudgin, John D.	30	50	25 00
Hudgin, John D.	31	50	25 00
Hudgin, John D.	32	100	50 00
Hudgin, John D.	33	100	50 00
Hudgin, John D.	34	100	50 00
Hudgin, John D.	35	50	25 00
Hudgin, John D.	36	50	25 00
Hudgin, John D.	37	2000	1000 00
Hudgin, John D.	38	125	62 50
Hudgin, John D.	39	100	50 00
Hudgin, John D.	40	100	50 00
Hudgin, John D.	41	100	50 00
Hudgin, John D.	42	100	50 00
Hudgin, John D.	43	100	50 00
Hudgin, John D.	44	100	50 00
Hudgin, John D.	45	100	50 00
Hudgin, John D.	46	100	50 00
Hudgin, John D.	47	100	50 00
Hudgin, John D.	48	100	50 00
Hudgin, John D.	49	100	50 00
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Hudgin, John D.	51	100	50 00
Hudgin, John D.	52	100	50 00
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Hudgin, John D.	65	100	50 00
Hudgin, John D.	66	100	50 00
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Hudgin, John D.	96	100	50 00
Hudgin, John D.	97	100	50 00
Hudgin, John D.	98	100	50 00
Hudgin, John D.	99	100	50 00
Hudgin, John D.	100	1000	500 00
Hudgin, John D.	101	2000	1000 00
Hudgin, John D.	102	2000	1000 00
Hudgin, John D.	103	2000	1000 00
Hudgin, John D.	104	2000	1000 00
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Hudgin, John D.	164	2000	1000 00
Hudgin, John D.	165	2000	1000 00
Hudgin, John D.	166	2000	1000 00
Hudgin, John D.	167	2000	1000 00
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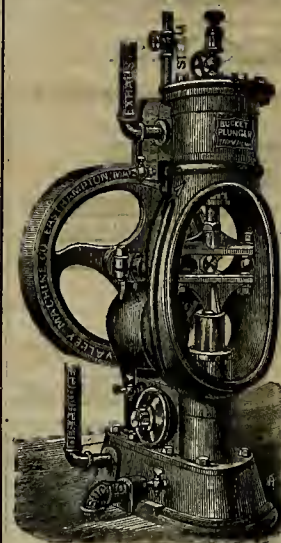
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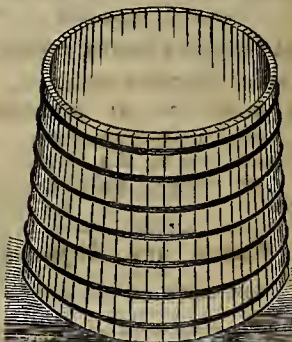
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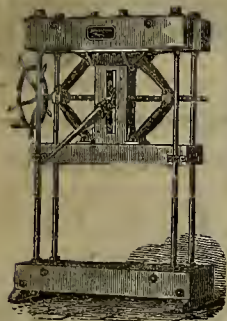
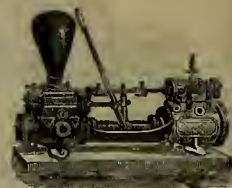
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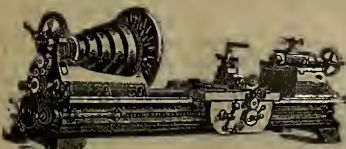
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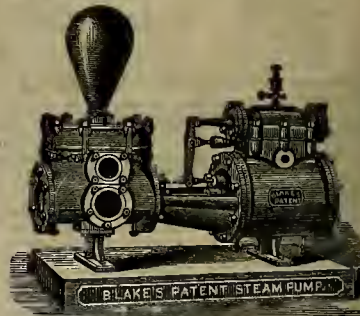
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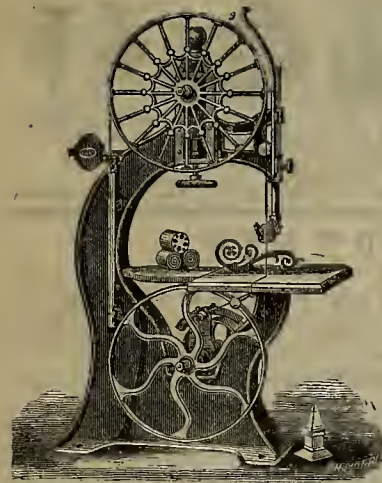
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

BY DEWEY & CO.,
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SAN FRANCISCO, SATURDAY, JUNE 19, 1875.

VOLUME XXX
Number 25.

An Improved Window Sash.

The accompanying illustration is an improved arrangement, recently patented through the agency connected with this office by John J. Price, of this city, for raising, lowering and locking the upper sashes of windows, and also to provide a lock or fastener for the lower sashes. The first arrangement consists in so arranging one of the weights which assists in balancing the upper sash that it will operate as a slide inside of the window casing, and then applying the force to raise and lower the weight instead of applying it to the sash. As the weights exactly balance the sash when hanging freely in the casing, the lifting or lowering of the slide weight will raise or lower the sash. The second improvement consists in the employment of a snap catch on the bottom rail of the lower sash, which will automatically lock into the sill of the window frame when the sash is drawn down against the sill.

The upper sash is balanced by two weights, one on each side of the casing. One of these weights, *d*, is arranged to slide up and down in ways in the lower part of the casing. The cord which connects the sash with this weight passes over a pulley in the top of the casing in the usual way, and is then carried down under the pulley in the sliding weight, *d*, and thence is carried up inside of the casing to the top of the window frame, where it is fastened at *c*. The weight pulley, *d*, will then travel in the height of the cord, and will only have to raise and lower a little over one-half the distance in order to raise and lower the sash that it would if the end of the cord were attached directly to the weight, *d*. The weight in the opposite side of the casing is suspended in the ordinary way.

In the facing of the casing directly in front of the sliding weight, *d*, is made a vertical slot, *b*, which is as long as the weight, *d*, will have to travel in order to raise and lower the sash. A metal plate, which is slotted to correspond with the slot in the casing, is sunk into the outside of the casing, so as to be flush with its outside face, and one edge of the slot on this plate is provided with teeth, *e*, as shown.

The shank of an ornamental button, *a*, passes through the slot and is fastened to the sliding weight, *d*, inside of the casing, while the button, *a*, remains on the outside. The shank is so constructed that by turning it to one position it will move up and down freely in the slot, but by giving it a half or quarter turn in either direction it will lock into the teeth, *e*, and fasten the weight firmly in place. Now, as the sash is balanced by the two weights, very little power is required to raise and lower it, and this power is applied to the sliding weight, *d*, through the button, *a*, and its shank.

By turning the knob or button, its shank is released from the teeth, when a slight upward or downward pressure applied to the button will raise or lower the weight and upper sash to any desired point, where it can be again locked by turning the button so that it cannot be opened further until the weight is released; and as the weight travels in this height of the cord, a short movement of the button up or down will completely raise or lower the sash, thus bringing it within the reach and power of the merest child to raise and lower the upper sash. This arrangement also avoids the trouble of having to raise the lower sash in order to reach outside and grasp the lower rail of the upper sash to raise or lower it.

The lower sash is provided with a snap catch, *f*, which automatically hooks into a recess in the sill of the window casing, or in the strip which is secured upon the sill. This catch is unlatched by lifting upward upon a projecting lever handle, which is so connected with the hook, *f*, that by lifting upward on the lever handle or finger catch, the hook is forced backward, and released from its catch. The lower face of this hook is inclined so that when the sash is closed down it will be forced backward and automatically fastened.

By this means Mr. Price provides a greatly improved arrangement for operating and locking window sashes. Where three or more sashes are placed in one window opening, the

upper sashes can all be balanced and operated by sliding weights as described for the upper sash, and in this case the sliding weights which operate the different sashes can be placed on opposite sides of the window. The slot, *b*, can be made on the inside face of the casing if preferred, and the locking shank inserted through it, and fastened in the weight as above described, but this can be arranged according to convenience. It is not absolutely necessary that the lifting weight should slide in ways, but it is much preferable to so construct it. Those desiring further information

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

MOUNTING HEADER REELS.—Frederick Wyman, San Buenaventura, Cal. This invention consists in so mounting header reels that the belt which drives the reel will preserve a uniform tension when the reel is raised and lowered. In the ordinary construction of

along each portion of the hinged front, so that a pen or pencil can lie in this groove and a single elastic strap about the middle of the holder will press the pencil against the hinged front so as to keep it closed without the necessity of an additional strap. It also consists in the use of a temporary memorandum plate or tablet upon the inside of the hinged leaf.

IMPROVEMENT IN WATCHES.—John Gordon, San Francisco, California. This improvement relates to that class of watches in which a permanent winding device is secured to the winding post so as to be contained and operated in a recess or well in the inner case of the watch. This improvement consists in attaching the winding lever bar or disk to the winding post of the watch in such a manner that any attempt to wind the post in the wrong direction will release the lever bar or disk from the post without turning it, thus preventing the watch from being strained or injured. Upon the winding post the lever, bar or disk is secured so as to lie in the well or recess and so that it can be turned towards the watch by inserting the fingers into the recess. Heretofore the bar, lever or disk has been either permanently secured to the winding post or the square post has entered a square socket in the bar or lever, so that the post cannot be turned in either direction. Instead of attaching the lever, bar or disk permanently to the post, Mr. Gordon forms the upper end of the post into a screw. The lever or bar has a hole through it which is tapped with screw threads to fit the screw or upper end of the post. The bar or disk is then screwed down upon the post, and will serve as a lever to wind the watch so long as it is turned in one direction, but when it is turned in the other direction it will unscrew from the post without turning it, thus greatly improving the winding device and preventing frequent injury by an accidental turn of the post in the wrong direction.

FEED AND REVERSE MOTION FOR SAWMILL CARRIAGES.—Frank M. Covell, Los Gatos, Santa Clara county, California. This is an improvement in that class of forward and reverse feed mechanisms for sawmill carriages, which operate by means of friction devices, and it consists in the use of a small pulley so mounted upon a shaft that it stands between the outer face of a small pulley mounted upon one shaft, and by moving the small pulley a short distance in either direction it can be brought in contact with either of these faces, thus giving motion in either direction to the shaft of the double pulley. The invention also comprises a novel method of mounting the movable pulley shaft and a lever by which it is thrown into one pulley face or the other. The whole device greatly simplifies the feed and reverse motion of the carriage.

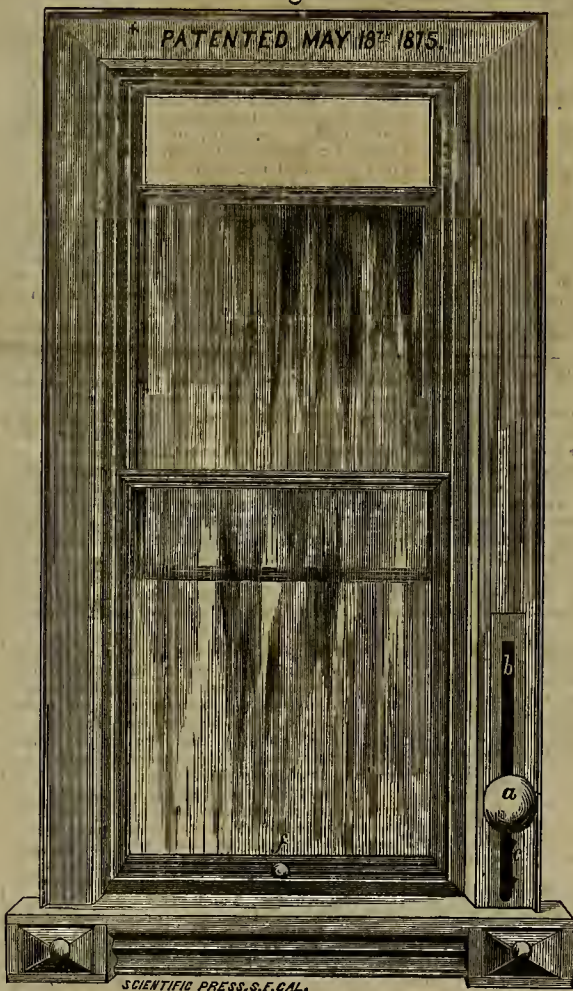
PHOTOGRAPHIC PLATE HOLDER.—Isaiah W. Taher and Thos. H. Boyd, San Francisco. This improvement in plate holders consists in a novel arrangement by which the inventors are able to employ only two pieces inside of the plate holder frame instead of the large number of pieces usually employed, in order to accommodate the different sizes of plate and adjust them to the center of the plate holder frame. The holder is so arranged that they can accommodate the various sizes of plates by adjusting the tray and covers to or from each other, according to the size of the plates. It provides an exceedingly simple and cheap arrangement for holding the negative plate and receiving the drippings of silver, while the pieces can be readily adjusted to the various sizes of plates.

The matter of supplying the town of Fulton with water from Mark West creek is now under discussion. The fall from Rector's mill to the town, two miles, is 83 feet.

The new hoisting machinery of the Niagara mine, on the Comstock, has arrived and is being put in working position.

Some fifteen acres of porcelain clay have been discovered near San Fernando. Also, a rich vein of zinc ore not far from Los Angeles.

Fig. 1.



IMPROVED WINDOW SASH.

Fig. 2.



on this subject can address the inventor, John J. Price, 521 Brannan street, San Francisco.

ABANDONED MINES.—The Calaveras *Citizen*, in speaking of West Point district, states that abandoned mines are relocated nearly every day. Strangers are flocking in from all directions to secure an interest in old "worked-out" mines which were to be had one year ago for one dollar per dozen. Competent miners can find employment.

The Europa mine machinery for the new hoisting works is now on the ground, the foundations ready, and grading for the building about completed. As soon as the requisite timbers can be procured, the machinery will be placed in position, and will be running in the course of a couple of weeks.

The Crown Point mine, on the Comstock, hoisted nearly 17,000 tons of ore last month.

headers, the lever arm which supports the header reel at each end, and by which it is raised and lowered, is pivoted to upright standards at each end of the header frame, and this pivot serves as a center about which the reel moves when it is raised and lowered, while the pulley which drives the reel belt is below and at the rear of the pivot so that when the reel is raised and lowered the belt is alternately slackened and tightened. Various devices have been devised for remedying this difficulty, some of which have been successful but clumsy and liable to get out of order. By the arrangement patented, this inventor preserves the tension of the belt at whatever point of the reel the belt is moved to.

BILL FILE HOLDER.—F. B. Alderson, San Jose, Cal. This invention relates to certain improvements in temporary bill holders such as are employed to carry bills, letters, or other papers for present reference, and it consists in the formation of a groove or slot extending

CORRESPONDENCE.

Nevada County Mines.

[From our own Correspondent.]

EDITORS PRESS:—Leaving French Corral and taking the up grade along "the ridge," a moderate day's ride takes us through the old-time towns of Birchville, Cherokee, Bloomfield, North Columbia, North San Juan, and Relief Hill. The mere mention of these to an old California miner awakens in his mind a vivid remembrance of early days, when "Gold—money hunted, sweat and blood for gold," and he recalls the time when there was rushing in hot haste to and fro all over these wooded hills, and the mountains trembled and the trees waved their branches, as the deep and rock-walled canyons gave echo to the giant blast. As these thoughts crowd his mind, he smilingly muses on the old canvas hose and primitive nozzles that then were the pride of the more fortunate miners. All these camps or towns lay claim to being located in the great "channel" or gold-bearing gravel belt that traverses this part of California. While there is somewhat of mining going on in most all these places yet a cry is heard like unto that that was uttered with imploring zeal by the rich man in hell: "Give us water—more water!" But here the analogy ends, as we learn from sacred history that the unfortunate rich man wanted only *one drop* of water to cool his parched tongue, or lave his burning brow, while these burghs want *floods* of water sufficient to tear out the bowels of the hills and bring about that state of affairs that begets the fevered brain—a great mining excitement.

At North San Juan—

The prettiest and perhaps largest town on this range—the surrounding country bears evidence that there are those among the population who have quit the precarious occupation of the hunt for gold, and turned their attention to the plow and pruning hook. The broad undulating fields of grain, whose verdure paints the sloping hillside, with the thrifty growling vines, and blooming orchards that dot the landscape as we view it from some lofty eminence—together with the quiet little village cozily nestled down in the forest—all these give to the scene such a pleasant charm as to make the bolder wish that his home was on the mountains.

Relief Hill,

Formerly a lively camp, had been until quite recently almost entirely abandoned. Now, however, they have got in a better supply of water and there seems to be a new life infused into all the population and there is a real buzz of business perceptible. Old claims are being reopened, and every prospect seems encouraging.

Your correspondent will not soon forget his first visit to Moore's Flat. At six o'clock in the afternoon he left Relief Hill, six miles distant from Moore's Flat, and after an hour's ride over a rough road with innumerable by roads to mislead him—found himself apparently no nearer Moore's Flat than when he set out on his journey. He stood where three roads diverged, in the deep solitude of a gloomy forest, and darkness drew on apace. There was no sign of human habitation. Hundreds of feet above him, on the topmost bough of a gigantic pine, sat a night bird that had apparently just shaken off his drowsiness, and was watching with eager eye the play of the fast fading sunbeam on the snow topped peak beyond. He cast his eyes to the northward, and as the last glimmering ray reflected from them, raised himself to his full height, flapped his wings in triumph, and blinked his great eyes with perceptible satisfaction—and while the vesper bells throughout the world were bidding sons of toil to cease their labors and turn their thoughts to heaven, he—bird of darkness—l—took forth his *matin lay*, and the woods and the hills were full of doleful echoes. Alone, and in a strange forest, the denseness of which added tenfold to the darkness of the night—your correspondent felt that "though churchyards gape and yawn and ghosts sit on the tombs, he'd choose to ramble 'mong the graves where dead men slept than keep society with the forest ghouls at night time." Shutting his eyes to the fluttering shadows, and trusting to the agency of his horse to take the right road, a horseman swift darted through the trees, across the pebbly brook, then up the hillside, through the manzanita brake, then down! down! Moore's Flat, and nine o'clock has struck.

When morning dawns Moore's Flat presents on a business air now a days, for this winter just past, they have not been snow-bound, which is an escape worthy of remark, and very unusual at Moore's Flat. They have a stage running regularly, and the result is that they have kept in constant communication with the outside world for 365 consecutive days.

Messrs. Marks & Co. have a

Large Water Ditch

Running by Moore's Flat, and from this source the mines thereabout get their water supply. There are some good mines here, but there is

no mining being done except in the Chinese and Illinois mines. At the blue bank they are running a tunnel for an outlet. The Esigs mine, which has formerly been worked quite extensively, is now lying idle.

Mr. Henry McNulty (who, I must here remark, is a 49er), tendered his service as companion and guide to me, and gave me much insight into the working and controlling of the water ditches, the disbursement of the water, etc. He has charge of the ditch that supplies the mines, and it is worth one's time to take a tramp along the flume in company with him. He has resorted to various ingenious devices for his own convenience in controlling the gates opening into the different flumes. At two points where the gates in the main ditch are high upon the hill, and difficult of access, he has what he calls "a system of telegraphy," whereby he can open and close the slips; at will, and yet be hundreds of yards away. This gentleman is also proprietor of a slaughtering and butcher establishment, and he has the most complete arrangement for the prosecution of this business that we have ever seen. As a general thing, a slaughter house is rendered conspicuous by the stench that pervades the surrounding atmosphere, and is the last place that we would think of visiting, for we are unfortunately rather epicurean in our tastes and the more ignorant we are of the internal workings of such an establishment, the more we relish the viands set before us. But we are glad to testify that Mr. McNulty's shops are an exception to the rule, for we failed to observe anything in the entire manipulation of the various meats, that would be offensive to the most fastidious. He has, in every department of this business, mechanical appliances of his own conception and construction that reduce the manual labor at least a third, and what is more worthy of notice, there is perfect ventilation throughout, and everything looks as bright and neat as the show cases in a milliner's shop.

All these towns up the "ridge" have enjoyed more prosperous seasons than now, and Moore's Flat, with the rest, can mourn over departed glory, yet its populace are by no means unhappy. L.

Mining Industry.

(Written for the PRESS by J. E. OLATON, M. E.)

The Stone Age.

Before man learned to mine and work the metals, he had to depend upon the use of implements made of stone, wood, bone, and horn for weapons of defence and offence against the wild beasts of the forest, and neighboring hostile tribes. For long ages the early races of man knew nothing of metals. Stone hatchets, stone knives, and articles of bone and horn are found in abundance in the old drift deposits of Europe and America, but no traces of any metallic implements in the early haunts of primeval man.

The Age of Bronze.

The first step in the advancement of the human race was made when native copper, (and perhaps silver) was discovered, and came into use for weapons and domestic purposes. The tribes that first used copper were able to overpower their neighbors on account of the superiority of their class of arms for destruction, and it is fair to presume that the localities from which the copper was derived were guarded with jealous care to prevent their neighbors from supplying themselves with like material.

In process of time it was discovered that other metallic substances would combine with copper, forming various alloys that gave the metal much greater hardness and durability.

The Aztecs and Peruvians carried the manufacture of bronze to great perfection; their chisels and other implements for cutting stone are unsurpassed in hardness and durability by any metals or alloys of the present day.

The art of making copper tools and giving them hardness equal to the finest steel was known to them, but it has been lost in the destruction of those nations by the so-called Christian Spaniards.

The civilization of the Montezomas and Incas was confined within the limits of the supply of copper and bronze. There was not enough of these metals obtained to allow their universal use by the masses, hence they remained in comparative ignorance and poverty.

The mechanical arts so far as they could be developed by this limited supply were confined to a class, and they as usual in such cases were under the control of the priest and rulers of their respective countries.

The Age of Iron.

The nations of the Eastern continents had made much greater advances in the discovery and uses of other metals than those of the Western. The art of reducing iron from its ores and working it into all kinds of shapes and forms for use, gave a much wider field for the development of the mechanical arts among the masses. Its great abundance and universal distribution, and the ease with which it could be wrought into useful forms, gave an impulse to mechanical industries and manufactures which had been unknown to man before iron began to supplant copper, bronze, and brass implements. By a careful study of the early civilization of different races, in all parts of the world, we discover that such civilization was always limited by the supply of useful metals and their knowledge of working them into useful forms.

Where the supply was small, and the knowledge of their uses and manufacture confined to a few persons, the advancement of the races was slow, and in fact confined within very narrow limits. Their condition was due, firstly, to the limited supply of the crude material; secondly, to their ignorance of the best modes of producing the metals in useful forms; and thirdly, their poverty in the possession and use of metals, made one portion of them an easy prey to their more fortunate and powerful neighbors. Thus through the dim past we can trace the influence of the mining and working of metals upon the growth of civilization.

Those nations, and races of men who have learned to mine and work useful metals, have become powerful, have subdued their less fortunate neighbors, have collected the wealth of surrounding tribes, and made them tributary to their growth and power. The miners and metal workers in time became masters of the world, and in the higher sense they are masters of the world to-day. In brief, a careful reading of the history of civilization will show that those nations that learned to mine and work metals, became civilized, wealthy and powerful, while those races that never established mining industries and the manufacture of metallic articles have always been savages, and are savages to day. The conclusion therefore is inevitable, that mining, as an industry, is the oldest known to our race, and that it has been, as it is now, the foundation of the whole structure of civilization, the chief element of progress and the basis upon which all other industries rest.

I have thus briefly traced out the influence of mining industry upon the civilization and advancement of those races that learned to mine and work copper and its useful alloys, and the more universally distributed and still more valuable metal—iron. I now proceed to consider the uses and influences of the precious metals,

Gold and Silver.

Upon the continued advancement of the human race up to the present time.

Gold and silver were, no doubt, both of them known to the ancient races long before the manufacture of iron was discovered, but they possessed but very little importance on account of their limited supply, their softness rendering them unfit for weapons, or tools and instruments for mechanical purposes; and hence they were used mainly for ornamental purposes, thus becoming vehicles of trade and exchange between different tribes for articles of use and necessity. This naturally led to the adoption of these metals as the representatives of value among all nations and tribes of men, and they became the universally recognized standard of values and the medium of exchange in all commercial transactions.

During the age of despotic governments, when the national power was centered in a king or an irresponsible party, the precious metals as accumulated were, by command, deposited in the national treasury, thereby enabling the ruling sovereign to wield an enormous power over his subjects and use the means at his disposal according to his whim or fancy, alike for the purposes of conquest, the construction of fortified cities, works of national utility, or the erection of temples and palaces. While the building of temples and palaces may have been acts of folly on the part of the rulers, and the people may have been oppressed and impoverished by the burdens thus laid upon them, yet, nevertheless, benefits were derived which were of lasting importance.

These benefits were the growth of general intelligence, the development and extension of mechanical arts, the establishment of manufacturing industries and the encouragement of agriculture to keep up the necessary supplies of food for maintaining the great armies of miners, quarrymen, stone cutters, artisans and mechanics of every description.

Without the use of precious metals as a representative of value, there could be no great concentration of power over large populations or widely extended territories; but with large accumulations of gold and silver, extensive establishments for the manufacture of iron in all its various branches and divers uses could be maintained, and the highest order of skill developed, by the constant and long continued employment of the best mechanics of the day. Thus great cities were built up around these manufacturing centers, composed in the first place of artisans and their families, and afterwards by accessions from all classes engaged in commercial and manufacturing enterprises, and in time these cities became the centers of wealth, intelligence and political power.

Mining industry furnishes the material for all classes of tools and implements by which other industries are made possible; it is the basis of mechanical arts, and has given man the power to subdue and control all things in nature that are necessary for his physical, intellectual and moral well being.

The above outline of the origin of mining industry, and its influence upon the growth of civilization, the establishment of agriculture, manufactures and commerce, will show beyond reasonable doubt that the arts of mining and working the metals are the oldest known to the human race, and are the basis upon which all other branches of human industry rest. Mining industry is, therefore, the bed-rock or granite foundation upon which our present civilization is reared in all its grandeur and beauty. Agriculture, manufacture, commerce and the fine arts could not be developed until mining and working the metals was first estab-

lished, so as to put tools and implements into the hands of every man, woman and child, with which they could cut, hew and dig their way up to the place of civilized life. We often hear financial and commercial men ask the question why mining can't be made

A Legitimate Branch of Business.

A reliable industry, like manufacturing and commercial pursuits. The above historical review of its origin, progress and all pervading influence upon the civilization of the present age, is the best answer that I am able to give to such questions. When capitalists bring to the bosom of mining the same amount of skill and care that is bestowed upon manufacturing and commercial pursuits, we will hear fewer complaints about the uncertainties of mining as a legitimate branch of human industry. So much for the defense of mining as a business. I have now

A Few Questions

For the consideration of bankers, manufacturers, capitalists and commercial men, in relation to the risks and uncertainties connected with their several branches of business, to-wit: The capitalist invests his money in building up cities, that are in perpetual danger of being destroyed by fire, flood or earthquake. He builds great ships that are in perpetual danger of going to the bottom of the ocean. He invests in railroads and canals that may never pay a dividend. He invests in the bonds of governments that are in perpetual danger of being revolutionized, or swept out of existence. He establishes manufactories that may be destroyed by fire, by competition, or by a change in tariffs. He establishes banks that may at any time be overwhelmed by financial changes and political revolutions. He may finally engage in agriculture as the

Safe and Sure Thing

To bring certain returns for his investment, but here, too, he is met by risks over which he has no control. Untimely frosts, unusual floods, a season of drouth, or perhaps an over supply for the market, a flight of locusts, or the destructive march of an army of grasshoppers, or men may make of his farm a desert waste. Where, then, can you invest your money without encountering risks over which you have no control? Echo answers "where?"

The truth is that every branch of human industry must encounter risks beyond the control of human power, or the grasp of the intellect to foresee. It therefore is but a question of minimum risks and maximum returns for the capital, skill and labor that is to be invested in any and all branches of human industry. Can those who speak sneeringly of mining industry truthfully point out greater risks for it than for other great branches of productive labor? I think not. I refer now to mining for the precious metals, and I ask a careful and honest consideration of the risks, as compared with every other branch of human industry.

Mining Risks.

The first and greatest risk is in the search for and exploitation and development of the mining property to be operated upon. This risk may be small or great, in proportion to the intelligence and skill of the person engaged in the selection of the mines. When a suitable mining property is found, and the explorations intelligently made, we still have the second risk to encounter. The mine may pinch out or become poor at some depth below the surface; all mines are liable to this risk, and knowing this we must guard against extravagant expenditures, or any expenditures that are not warranted by the indication of values in sight. We must cautiously feel our way to the deep and use our best judgment in driving ahead or ceasing to expend money when the facts and values exposed will not warrant it. After a mine has been proved in this way, there are but few risks that are not under the control of careful and skilled management. Your product of the precious metals never rots, it is not affected by tariffs or revolutions, it is not depreciated to any considerable extent by competition, nor is it in danger of over production. Your produce is everywhere welcome in the world's markets; every dollar in gold or silver won from the earth is a dollar added to the world's wealth. The miner is, therefore, a creator of wealth. His industry is the only one that actually produces money. The hardy miners of the Republic have actually produced or won from our desert wastes and rocky barren mountains over \$1,500,000,000 within the last twenty-six years. And this is the money with which your banks, ships, railroads, telegraphs, publishing houses and manufacturing industries are established. How, then, can you presume to question the legitimacy, permanency and utility of mining industry, when it must be evident to every student of history and political economy that mining industry is the mother of all other great systems of labor, and the source to which they must all come, for the life force (money) that moves the world along the grand highway of civilization and human progress.

REPORTER STARKS.—It was reported in town last evening that a rich body of ore had been struck in the Pride of the Mountain mine yesterday. We hope that the report will be confirmed, and that the predictions of Professor Stewart as to the future of the mine will be more than realized. As yet the mine is being worked on the surface only, and when depth is attained on the vein it will undoubtedly prove to be one of the most valuable in this part of the State.—Silver State.

SCIENTIFIC PROGRESS.

On Some Recent Operations in Magnetism.

The nature and mode of action of the magnetic force is a question which at present largely engages the attention of physicists.

When a bar is magnetized with a current in one direction, then with a weaker current in the opposite direction, there is an superposition (according to M. Jamin) of two contrary magnetisms, the one deep, the other superficial; and it is the difference that we then observe. He has cited several facts in support of this view of magnetic action. If a closed steel tube, with a steel bar inside, be magnetized with currents of growing intensity, the first and weaker currents do not magnetize the bar; but with a certain force the bar is magnetized, and increasingly, with the force. If the bar be previously magnetized with a direct current, then put in the tube, and the latter magnetized with inverse currents of increasing intensity, the bar retains its (direct) magnetism while the latter currents are weak, but gradually loses it and acquires inverse magnetism, as these increase.

But there is still better evidence. "M. Jamin procured some very homogeneous bars of steel. After magnetizing one of these he put it in dilute sulphuric acid, and examined its condition every half hour. In dissolving the metal, the acid evidently dissolved also the magnetism. If the magnetism were equally distributed throughout the mass, the proportion of its quantity to the thickness should have been constant; but it was not so. It diminished oven to zero. (This method could be used in reference to the first experiment noted above). Again, M. Jamin took a number of bars of different thicknesses, arranged in series, and magnetized them all with currents of increasing strength. So long as the currents were weak, they gave all the bars the same magnetism, because the magnetized layers penetrated in each to a depth less than its total thickness. But with a certain strength of current the thinnest of the bars was saturated; its thickness was then equal to the depth of the layers. With a stronger current the second bar was saturated, and so on; showing that the depth of the layers reached successively the entire thickness of the bars; and that, therefore, it increases with the intensity of the current. It was found, however, that when the thickness of all the bars exceeded a certain limit, all took an equal amount of magnetism, showing that the magnetic layers themselves are limited to this thickness, which they can never exceed.

The limit is very different in different steels; it is very great in those which are soft or annealed; and diminishes with tempering, and as the proportion of the carbonate increases. Some only took a sort of magnetic "varnish" on the surface, which it was impossible to increase in thickness with any intensity of current. But if the depth of the magnetism diminishes when the magnetic conductivity decreases, the intensity of the magnetism goes on increasing.

This remarkable property of magnetism, of concentrating at the surface of very coercive steels, led M. Faye to suggest that perhaps it might be possible to make magnets of thin layers of magnetized steel alternating with thin layers of copper, which would possess an energy and constancy unattainable in continuous masses. And we may note in this connection, that M. Camacho has lately presented to the academy a new form of electro-magnet, giving strong dynamical effects with weak currents, and in which each core is formed of a series of concentric tubes, with insulated copper wire passing round them successively, beginning with the outermost tube of one arm, and terminating with that of the other.

Another question with which M. Jamin has recently been occupied, is the effect produced by application of armatures to perfect magnets. When an armature is applied to one pole, say the north, of a magnet, it does not in any way affect the south portion, that has no armature. If we now apply an armature to the south pole, it can be easily shown that the armature takes the magnetism which the steel loses, but this new distribution is in no way modified if we either detach or attach the armature of the north end. The two halves of the magnet are quite independent with regard to their armatures. Again, it is only a redistribution of magnetism that occurs when an armature is applied; the previous quantity is neither increased nor diminished. It seems from experiments as if the armature gained more than the magnet loses, but the cause of this is the different magnetic conductivity of the steel magnet and of the iron proof-concent with which the strength of the magnet is estimated. The author's investigations lead him to the result, that in combining a number of magnetized bars, the total force obtained will increase with the extent of the armatures. The larger this extent the greater is the number of bars required before the (higher) limit of force is reached.—*Iron.*

THE FLOOR OF THE MISSISSIPPI VALLEY.—The boring of an artesian well at St. Louis showed the Potomac sandstone to be four thousand feet below the head of the Mississippi river; and as this rock carries a fossil *trilobite*, that level at one time must have been the floor of an ocean.

SEA WAVES.—Dr. Scoresby's observations on the height of waves in the North Atlantic Ocean, records twenty-four, thirty and forty-three feet—the latter the highest. The mean of his records was eighteen feet. The highest waves in the Bay of Biscay, as recorded by French observers, is thirty-six feet. Capt. Wilkes records thirty-two feet in the Pacific, and Sir John Ross thirty-two in the South Atlantic. The highest waves observed in N. W. gales off Cape of Good Hope are forty feet; off Cape Horn, thirty-two feet; in the Mediterranean, fourteen feet ten inches; and in the German Ocean, thirteen and one-half feet. In the British waters the waves are found to average only eight or nine feet.

The velocity of ocean storm waves, as observed by Dr. Scoresby in the North Atlantic, was thirty-two miles per hour. Capt. Wilkes records twenty-six and one-half miles in the Pacific. It is claimed that storm waves have been known to traverse at the rate of sixty miles an hour (doubtful authority).

Dr. Scoresby estimated the distance from crest to crest of Atlantic storm waves at 600 feet. From the above the reader may ponder on what small dimensions the most terrific waves are constructed.

CURIOSITIES OF EBULLITION.—Dr. T. L. Phipson, in the *Chemical News*, says that water, strongly acidified with hydrochloric acid, and containing a small quantity of benzole, was found to enter into violent ebullition every sixty seconds; after while the boiling ceased completely, and then recommenced suddenly every thirty seconds for some time. The flask still being kept over the spirit lamp, the periods between quiescence and violent ebullition dropped to twenty, ten, and finally to eight seconds, at which interval the phenomenon continued for some considerable time. The temperature of the vapor in the flask was 214° F., in the liquid 218°, during the whole time of the experiment. When methyl alcohol was added to the above mixture of water, hydrochloric acid and benzole, and the flask placed over a spirit lamp, no ebullition at all occurred for a very long space of time, and then it took place very suddenly and continued.

BURNING IRON.—A Berlin experimenter has demonstrated the combustibility of iron peculiarly. He takes a straight bar magnet of some power, and sprinkles iron filings on one of its poles. These filings arrange themselves in accordance with the lines of magnetic force; and however closely they may appear to be placed, of course no two of the metallic filaments are parallel, and consequently a certain amount of air is enclosed as in a metallic sponge. The flame of any ordinary spirit lamp or gas burner readily ignites the finely divided iron, and it continues to burn brilliantly for some time, the combustion being, apparently, as natural and easy as that of any ordinary substance. If the experimenter with this operation stands on a slight elevation and waves the magnet to and fro while burning, a magnificent rein of fire is said to be produced.

COLORATION OF METALS.—A French correspondent says that if objects in metal are plunged in a bath composed of a solution of 42.5 grammes of acetate of lead in 225 of water, and heated to 88 or 93 deg. Cent., the sulphate of lead is precipitated in flocculent black particles, and colors the metal with a tint of which the density depends on the amount of the precipitate. Care is required, however, in heating the metal regularly, to obtain uniformity in tint. Iron treated in this way assumes the appearance of blued steel; zinc, on the contrary, becomes brown. Sulphuric acid, used in the same proportion as the acetate of lead, will color gun-metal a splendid red, which is very permanent. Imitations of marble are obtained by covering brass heated to 160 deg. Cent. with a solution of lead thickened with gum tragacanth, and afterwards submitted to the acetate of lead bath above mentioned.

THE SUN'S RAYS IN WATER.—A curious experiment has recently been made to ascertain how far the sun can penetrate the water. The research was conducted upon the lake of Geneva, whose waters are among the clearest of the Swiss lakes, and the results have recently been communicated to the Society of Natural Sciences in the canton of Vaud, by M. Forel. He found that the chemical action of the sun's rays was felt in the summer time at the depth of between forty and fifty metres. We are not aware of the nature of the sensitive compound employed in these experiments, but hope shortly to learn more of the details.—*Photographic News.*

Five thousand feet beneath the grand prairies of Illinois is found the Silurian limestone, in which lie imbedded vast families of crustaceans that once sported in the waters of an ocean. Then the edict was promulgated that the ocean should be filled up, and that the face of the land thus formed should blossom with the rose and violet, that the growing grain should wave over the grave of this once active animal life, supporting a dense population of human beings; and it was done. But who shall estimate the cycles that intervene between that epoch and the present?

THE "MISSING LINKS."—Mr. Darwin has in press a description of a few of the "missing links" between animal and vegetable life, in a monograph on carnivorous plants.

MECHANICAL PROGRESS.

Steel Boilers in England.

In his address on taking the chair as President of the British Iron and Steel Institute, Mr. William Menelans, said to be 'perhaps the most practical iron worker in the world,' spoke as follows of English experience with steel boilers. His remarks have a peculiar interest in this country in view of the recent discussion of the Master Mechanics' Association on this subject:

Mr. Sharp, of Bolton, was one of the first to produce excellent boiler and ship plates of steel, and to make boilers of steel plates. Mr. Sharp tells me that they have made between nine and ten thousand tons of steel plates at Bolton, three fourths of which have been used in the construction of boilers. He says that steel plates, with a tensile strength of from thirty to thirty-four tons, are easily and safely worked by experienced men. They have had steel boilers at work for nine years, and they have given perfect satisfaction, and the repairs are light as compared with those of iron boilers.

Mr. Adamson, whose talents as a mechanical engineer are well-known, informs me that in his steam engines, when the choice of materials is left with him, all the principal parts are made of Bessemer steel, and that the results have been most satisfactory. Mr. Adamson states that he has used various kinds of steel in boiler work, but since the introduction of Bessemer steel plates he has used no other; of this material he has made between six and seven hundred boilers, mostly for high pressures. He is now making a number of steel shell and fire-box boilers, of seven feet diameter, to work to eighty pounds and one hundred pounds pressure to the square inch.

He describes his method of working steel plates as follows: "A piece is cut off every plate and tested before the plates are accepted; the edges of the plates, when used for boilers, are all planed, the rivet holes are drilled through both plates together, after the plates are bent and in place; in every case double or chain riveting is adopted." He goes on to say: "In the application of steel plates for fire-boxes, I have experienced the most satisfactory results; there is no blistering, and the plates show great endurance. When boilers have been allowed to run short of water, the plates have bulged or collapsed, but they never fractured." In this respect, he thinks that steel plates are superior to any iron ever made. Mr. Adamson, like Mr. Sharpe, advocates the use of steel of comparatively low tensile strength, from thirty to thirty-two tons per square inch. Steel of thirty-eight to forty tons to the inch was found quite unsuitable for boiler work; it was found wanting in ductility, and the use of such a material was quickly abandoned.

A great deal has been said and written about the want of uniformity in Bessemer steel, but what could be more satisfactory than Mr. Adamson's experience on this head? Messrs. Galloway, of Manchester, who have a large experience in boiler making, and who are noted for the excellence of their work, inform me that when they commenced using Bessemer steel plates, about 1861, the results were not satisfactory, the plates being too hard; but that of late they have used steel plates extensively, and that the conclusion they have come to is, that when the annealing is carefully performed the plates are perfectly trustworthy; in fact, in the testing of boilers they now find quite as little trouble with steel plates as with iron ones, if not less. They state further that careful annealing has a most beneficial effect; and they refer to some experiments made for the Manchester Boiler Insurance Company by Mr. Kirkaldy on the strength of riveted joints, which conclusively proved that even in the case of wrought iron plates which are punched it is advisable to anneal them.

Rapid Corrosion of Iron on Railway Bridges and Depots.

It has frequently been noticed that iron used in railway bridges, which is exposed to the smoke, steam and heated gases escaping from the passing locomotives, shows a greater tendency to corrode than iron in situations not so exposed. In some cases the iron beams and rods on the upper part of the bridge have been found to be rusted to such a depth that the safety of the bridge is endangered. It is therefore important to learn the causes of this rapid corrosion, in order to know what steps must be taken to prevent it.

A few weeks ago some pieces of iron rust, taken from a bridge on the Pennsylvania railroad, were sent to the laboratory of the Stevens Institute, for a qualitative chemical examination, to learn whether such examination would reveal any of the causes of the rusting. The result of the analysis showed that rapid oxidation was undoubtedly caused by the presence of carbonic, sulphuric and sulphurous acid, which are sufficient to promote rapid corrosion whenever present in the smallest appreciable quantities. The sources from which these substances are derived is evidently the escaping gases of the locomotive, which contain carbonic acid, and it there is sulphur in the coal, sulphurous and sulphuric acids. The same difficulty is met with in connection with

railroading in England, as will be observed from the following paragraph, which we clip from the *Industrial Monthly*:

"There would appear to be some danger in the use of cast iron as a roofing material for railway stations. The Vice-President of the Manchester Literary and Philosophical Society exhibited at the last meeting some portion of the cast iron roof from the Salford station of the Lancashire and Yorkshire railway, which having been put up for a period of four years, was so much corroded and damaged that it had to be taken down. He attributed the effects to sulphuric acid and soot, arising from the combustion of the coals used in the locomotives passing under it, aided by the action of steam and vibration. He referred to a paper by himself, communicated to the society, on the effects of old coal-pit water on cast iron, where similar results had been produced by sulphuric acid, carbonaceous matter and water; also to a case alluded to by one of the most distinguished members of the society, the late Dr. W. Henry, of the rotting of cast iron by the escape of steam from the junction of a pipe imbedded in charcoal. Of course, the rate of decomposition much depended on the quality of the iron, but as that metal was now so much employed in building and mining operations, he considered it desirable to bring before the public every instance that came to his knowledge where it had been damaged or decomposed."

Adhesion of Glue.

Mr. Bevan, experimentalizing on the adhesion of glue, fastened together two cylinders of dry ash wood, one-fifth of an inch in diameter and about eight inches long. After they had been glued together twenty-four hours they required a force of 1,260 pounds to separate them; and as the area of the circular ends of the cylinders was 1.76 inch, it follows that a force of 715 pounds would be required to separate one square inch. It is proper to observe that the glue used in this experiment was newly made, and the season very dry; for, in some former experiments on this substance, made in the winter season and upon some glue which had been frequently heated, with occasional additions of glue and water, he obtained a result of 350 to 500 pounds to the square inch. The present experiment was, however, conducted upon a large scale, and with care in the direction of the resultant force; so that it might be as nearly as practicable in a line passing at right angles through the center of the surfaces in contact. The pressure was gradually applied, and was sustained two or three minutes before the separation took place. Upon examining the separated surfaces, the glue appeared very thin, and did not entirely cover the wood, so that the actual adhesion of the glue must be something greater than 715 to the square inch. Upon comparing with this the natural cohesive force, latterly, of wood of the same kind, Mr. Bevan found it to be only 562 pounds; consequently, if two pieces of this wood were well glued together, the wood would have yielded in its substance before the glue. From the subsequent experiments made on solid glue the cohesive force was found to be 4000 pounds per square inch, from which it may be inferred that the application of this substance as a cement is unsceptible of improvement.

COMPRESSION IN CASTING.—Col. Uchatius, director of the Arsenal at Vienna, whose name is coupled with a peculiarly fine and tenacious steel made in Sweden, has lately given the results of an exhaustive series of experiments on compressing bronze when in a state of fusion, and otherwise treating so that it acquired many of the properties of steel. With an alloy of 90 per cent. of copper and 10 per cent. of tin, and a pressure of eighty tons, a very hard, tenacious metal was produced, but one with little more elasticity than ordinary bronze. On cold rolling this bronze cast, under pressure, into an ingot, its power of resistance, its elasticity and hardness were increased. After repeated experiments it was found that an alloy of 92 per cent. of copper and 8 per cent. of tin was the best and most economical. In casting the bronze to produce a homogeneous mass, after repeated and varied trials a double mould with a solid forged copper core 0.05 metre in diameter was decided to be the best. The bronze produced in this manner is declared to have all the hardness, homogeneity, and power of resistance of steel tubes. Its wearing qualities are as great, and the cost of bronze guns made in this way is much less than steel if the value of the old metal is taken into account.

QUERY.—A correspondent of the *Scientific American* propounds the following query: The pressure gage and the safety valve on my boiler do not agree. The steam blows off freely with the weight at eighty pounds on the lever, while the gage shows but sixty. The valve is thirteen-sixteenths of an inch in diameter. I have examined the gage and find nothing wrong. How can I calculate the proper weight for the valve? That journal answers as follows: When you have no steam in the boiler, secure the valve stem to the lever, and attach a spring balance to the lever just over the center of the valve stem. Then raise the lever slightly, so as to get the valve clear of the seat, and note the reading of the spring balance. Then divide this reading by the area of the valve in square inches (0.5184 in your case), and the quotient will be the pressure in pounds per square inch at which the valve opens. The attention of all who wish to test their safety valves is invited to this extremely simple and accurate method.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

California.

AMADOR.

MINING.—Amador Ledger, June 12: Our quartz mines are generally looking well, and the ores taken from the various developed mines keep up the usual yield per ton. The mills now being run by water find many advantages resulting from the latter power over steam; more rock can be crushed in a given time by reason of the steadiness of the propelling force and uniformity of motion. All the mills now using steam within reach of the Amador canal are making preparations to run by water.

VOLUNTEER MINE.—The mill now being erected on this mine is progressing rapidly, and in a very short time will be ready for crushing. The mill will have 10 stamps propelled by water. The ore from the mine presents a very flattering appearance.

GOVER MINE.—This mine presents a very fine appearance, indeed. Mr. Reichling and Mr. Berryman say, in regard to their examination of the Gover, "We find a large and well defined quartz ledge, with sufficient ore in sight to supply a 20-stamp mill for many years," again they say, "The rock appears to be of fair quality and contains an unusual quantity of sulphurets, which we are satisfied are good." Mr. Horn says, "He was greatly surprised to find the mine looking so well," and suggests a larger mill, as also an air shaft; with the latter he says there would be no difficulty in taking out 100 tons of ore per day.

There is a strong probability that the Amador canal company will convey water across Amador creek and supply motive power to the Gover and other mills in the vicinity. Mr. Tregloan, the superintendent of the Gover, has worked faithfully and intelligently in developing the mine, and under his management it is fast becoming valuable property. With a larger mill and steady crushing power, the mine would soon become very productive property. We are glad to chronicle the flattering prospects of the Gover.

CALAVERAS.

GOOD CLEAN-UP.—Calaveras Chronicle, June 12: One of the best paying gravel claims in the middle or southern counties is the Tunnel Ridge hydraulic, owned by J. F. Veith, Esq., of this place. The claim is a very extensive one, and it is worked on a large scale. A recent clean-up, after a "run" of fifteen days, yielded \$3,000, and more than the usual quantity of top dirt was washed. The claim is good for an average yield of \$200 for every day water is run. It will better any of the hydraulics in the State, except a few of the most prominent ones in the northern counties, to make a better showing.

WEST POINT DISTRICT.—A "worked out" mine has been relocated by Mr. Woodworth, and is now being reopened. Its location is south of the Josephine. Josephine is turning out 10 tons of ore per 24 hours. The bottom of the shaft shows better ore than ever, yielding very valuable specimens. The "Matrimonial" has been relocated. The Enterprise company are beginning a new working shaft on the main south chimney of the Mina Rica mine. This chimney was worked many years ago to the depth of 175 ft, with handsome profits, in spite of reckless management. The present company intend to erect here their principal hoisting works and sink the shaft to the depth of 500 ft as fast as muscle can accomplish it. The Fields tunnel is turning out very fine ore. The Haskins mine, near Skull flat, yields fine ore which is nearly pure sulphurets. Champion ore rich as usual.

COLUSA.

THE RICHEST YET.—Colusa Sun: A vein of cinnabar about 2 ft thick has been struck in the Rathlum mine, which is perhaps the richest ever found in this State. It is very soft, is pure vermilion, and is about 80 per cent. mercury, the balance sulphur. There is no rock or hard substance in it.

INYO.

PANAMINT ITEMS.—Panamint News, June 8: The southern portion of our district, although first discovered, excited less attention than the Surprise or Narchoe canons, although Happy valley and the canons south are better watered and have more timber than the first mentioned localities. During the past two months Happy valley and the canons lying south have attracted considerable attention by recent discoveries made by experienced prospectors, the most prominent of which are the Pennsylvania, Stonewall Jackson, General Lee, Young America and others, beside the well known Happy Valley and Juno claims. The Pennsylvania, about half a mile south of the Juno, is a gold and silver bearing ledge of high grade, assaying from \$18 to \$20 in gold and from \$30 to \$150 in silver, with small quantities of lead, showing considerable free gold to the naked eye. This ledge consists of three parallel veins about 100 ft apart, with a width of not less than 3 ft, and widening to 5 or 6 ft. But little is done as yet on this claim. The ledge shows more than 400 ft on the surface, and two extensions have been taken up. The same parties have discovered the Stonewall Jackson. This is a carbonate bearing ledge of great strength, showing at no point less than 10 ft, and increasing to a width of 25 and 30 ft. This ledge lies at the

head of Happy valley, running southerly from the foot of Sentinel peak across the valley, continuing in nearly a straight line over the next ridge and across Indian valley, showing over 7,000 ft on the surface. The ore assays from \$18 to \$68 in silver, and is improving as the work progresses. The General Lee is a ledge of the same characteristics as the Stonewall Jackson, apparently a part of the same, and running together at the northern and southern extremities, with a hill between them. At the junction of the two ledges it attains a width of 35 or 40 ft. A heavy body of timber to the south and east, easy of access, with a sufficient quantity of water, combine to make this claim very valuable. To the southward lies the Young America and other claims, showing more of the character of the Surprise canon ledges, all of which are bound to make Happy valley an active and busy camp at no distant period.

FRESNO.

QUICKSILVER MINING.—Fresno Expositor, June 16: From Deo Melcolm, of Panoche, we learn that the Little Panoche mining company is now extracting some very fine ore from the mine, and the work of developing it is going steadily ahead. The Fresno mine, near Mexico, is also developing well. A considerable force of men is engaged at the mine. The New Idria company are working a full force of men, and are turning out an abundance of the silvery liquid. The Cerro Benito mine is looking much better than formerly. A tunnel has been run from the flat into the mountain, a distance of about 1,500 ft, and a fine vein of ore has been struck, giving great encouragement to the owners of the mine. Two new locations have been recorded by John W. C. Maxwell, superintendent of the New Idria mine. They are both situated near the New Idria mines. The prospects are now favorable for a busy mining season in that region, and if the new mines only turn out as well as is now anticipated, the region of country in and around Panoche will be thickly populated and prosperous.

KERN.

HAVILAH MINES.—Southern Californian, June 10: Mr. Jacoby arrived from Kernville on Monday. He gives the most encouraging statement of the mines of the county. The Summer mine, he is led to believe, will yet be able to run a thousand stamps. The owners have a patent for nearly two miles of mineral on the surface with a depth beyond imagination. Since the change of ownership of the mines at Havilah there is strong prospect of great improvement in that section. One good mine would be worth more than all the county seats they could ever hope for. The county seat will not make a town of any place. Too much importance has been attached to it. With good mines, or a large and prosperous agricultural country about it, the town must grow into a city. Without either all would be a failure.

LAKE.

COAL LOCATION.—Santa Rosa Democrat, June 12: On Soda creek, six miles from Grunoe, in Lake county, several localities have been made for coal by different parties. The best prospect so far is on the location of T. H. Hames and James Brown. The last named parties are following down upon a stratum, which at the depth of 40 ft has widened to nearly 10 inches. The quality of the coal is very superior, and there seems scarcely a doubt but that a good coal mine will be developed on this claim. Mr. James Brown formerly lived in Anala township, in this county, and his many friends here will be glad to see him make his "pile" on coal.

NEVADA.

KENTUCKY MINE.—Foothill Tidings, June 12: The contractors are making very good progress in sinking the main shaft of this mine, the ground being quite favorable. The ledge in the bottom of the shaft is somewhat split up but the quartz looks well, the black rock or cab is cutting out and the walls are now taking their regular dip—showing that they are getting down to where the country rock is more settled. No water is met with in sinking. As an indication and to show what practical miners think of Kentucky as an investment, we will mention that a few days since one of the foremen in the Idaho, a most thorough miner and a man of superior judgment, went through the mine and examined it carefully, and so pleased was he, comparing the present aspect of affairs with those of the Idaho at the same depth, that he immediately purchased stock at several times the price at which it was sold a few months since. It is this class of men, men who saw Idaho go up from \$2.50 to \$25 and then to \$250 and since to \$1000 a share, and who know just how that mine came near discouraging its owners before they got down to its permanent and paying levels, that are gradually picking up this stock.

HOWARD HILL MINE.—Grass Valley Union, June 16: In visiting the mine, after examining the upper levels we found ourselves at the 300-ft level. The shaft is 100 ft deeper than this but has not been pumped out as yet. A six-inch pump is in it now, so that when it is thought expedient, it can soon be made dry. The east drift on this level is the only part of the mine that is now being worked, and 6 men are here employed working eight hour shifts. This drift is in 460 ft, which carries it into the Cambridge ground. In the face of this drift the ledge is at least 6 ft thick and as fine a one as we ever set eye on. Plenty of beautiful sulphurets and considerable free gold is visible. The ledge in this drift clear from the shaft has been so large that but little of the foot or hanging walls have had to be removed, hence there is but little dead work. From this

drift alone the dump has been filled, and it has now become a question where to store the rock until the mill commences. The west drift at this level is in 380 ft, and has a good ledge in its face. Stopes enough are now opened to keep the mill running a year with the rock now in sight. The most of the water encountered comes from the Cambridge works, for a large stream constantly flows from it. After a close examination of the ledge in the drifts and stopes, we came to the surface and went through the mill. Fifteen stopes are still in place from the old mill, but the rest of the works have been removed and will be replaced by the very latest improvements. The machinery is being overhauled and fixed up, so that when it is at work a saving of at least two cords of wood per day will be effected. Electro-copper plates and Eureka rubbers will be introduced, and the mill will start in July. It will crush between 35 and 40 tons of rock a day, and the rock will average at the very least \$20 per ton. This average will no doubt fall far below the real yield, but to be safe we say \$20. This can be mined and milled for \$6 per ton, which leaves \$14 a ton clear gain.

PLACER.

MINING ITEMS.—Placer Argus, June 12: The St. Patrick mine is looking up under the efficient management of J. A. Townsend. The 212, 312, 360 and 440-ft levels are showing good milling ore. The clean-up of the St. Patrick mill, on the 3rd inst., proved very satisfactory. Two gold bars, weighing 502 ounces, were shipped to San Francisco, one-half of which was the yield from 64 tons of rock taken from the 440-ft level. It is the intention of the company to shortly put in new machinery for hoisting, the present proving inadequate for the present work.

The Good Friday mining company are drifting and running west at a depth of 120 ft. The rock improves as the work progresses.

The Eclipse mill and mining company have leased their mill to C. A. Cooper, who will continue to run it on custom rock.

The St. Lawrence mill and mining company started up their mill on Monday. They have 100 tons of rock on hand that promise to pay well. They are stoping on the 150 and 175-ft levels. The ledges are from 15 inches to 4 ft in thickness. Isaac Thomas is the superintendent of the mine.

The Kirkland mill and mining company, located near Ophir, on the road between Ophir and Newcastle, is owned by an English company. This is a new company, the ground having been recently surveyed and patent applied for. A mill will be erected at once.

The business prospects of the Green mine are flattering. Everything is looking well. The company intend to put in a new pump to connect with the old one now in use, so that they can sink deeper. The rock of this mine improves as they go down.

The Hobson gravel mining company are pushing their work with considerable energy. They have now about 30 men at work in laying pipe, about 90 Chinamen at work digging ditch, and 6 teams hauling timber and pipe.

The Placer Herald says that most of the mines are still running at Dutch Flat and Gold Run, and those places are livelier than they have been for years. Money there is said to be plenty.

PLUMAS.

GREENVILLE ITEMS.—Cor. Plumas National, June 12: Mining interests are looking up. The Indian Valley mine shipped \$3,000 last week for twenty days' run of sixteen stamps. The Wolf Creek mine, under the new management, is doing finely, and promises to be one of the best paying mines in this section. The Green Mountain is said to be sustaining its former reputation of one of the best on this side of the ridge. The Union mine is running twelve stamps with prospects improving every day. The Baker ledge has its full complement of men and a good body of rock in sight. Harry Gregg is taking some of the richest rock from the Grass ledge that has ever come out of it. Tanner has recently sold his interest in the Corvales ledge to his partner Wiles, for \$2,000.

SANTA BARBARA.

OUR QUICKSILVER MINES.—Santa Barbara Press, June 5: We take pleasure in saying that the cinnabar mines, in this county, are soon to be represented in the market with the first ore smelted in their furnaces. On Monday next, June 7, the first furnace will be fired in the Los Prietos mines, and in a few days the value of these mines will be tested in a practical manner. The company have reason to feel some degree of satisfaction with the work done on these mines. There is no distrust of their richness and value as the ore is accumulated for the fiery trial. Everything about the outlay has been on a broad scale, and the determination to develop the immense resources of these mines to the fullest extent has never flagged for a moment.

SAN BENITO.

CINNABAR AND COAL.—San Benito Enterprise, June 12: It is not generally known that in the last few months the most flattering prospects for extensive cinnabar and coal have been discovered and partially developed, in the district of country between Slack's canon and the head of Cholame valley, lying about 80 miles southwest of Hollister. Some 30 or 40 quicksilver localities have been made, on some of which considerable work has already been done with the most satisfactory results. One mine has 100 tons of first class ore on its dumps. A short distance east of the cinnabar range very prom-

ising coal croppings have been found. The geological formation of the country thereabouts, and other indications known to experienced coal miners, leave no doubt of the existence of large deposits of this mineral in that locality—in fact, the croppings prove to be the genuine article.

STANISLAUS.

QUICKSILVER.—Stanislaus News, June 10: The prospects in the Orestimba quicksilver claim, back of Grayson, in the Coast range of this county, are opening up splendidly. A large body of cinnabar has been struck that readily smelts from 10 to 20 per cent. of pure quicksilver. The ledge is large, well defined, and easily worked. Several other claims have also been located on the same range that promise well.

SOLANO.

QUICKSILVER STRIKE.—Vallejo Independent, June 12: A rich strike of black ore was made on Thursday last in the Loop quicksilver mine on D. N. Hastings' ranch, Benicia. The ledge was uncovered for a space of 15 by 20 ft, and every part is sparkling with the metal. Parties well posted pronounce it the richest of anything yet discovered. A tunnel being run is now in 120 ft; which in 50 ft more will strike the chimney 150 ft below the surface.

TUOLUMNE.

BIG OAK FLAT MINES.—Union Democrat, June 12: The Longfellow quartz claim, formerly known as the Butler claim, at Big Oak Flat, we learn is yielding some very rich rock, some of it more suitable for the mortar than crushing in a mill. Also the mine owned by C. Mormon gives out good rock and is undoubtedly a rich claim. A little capital over among the mines in that vicinity will stand more than a fair chance of securing a profit.

The Nonpareil mine at Deer flat has been successfully opened, the tunnel which was being driven the past three years has drained the mine and connections have been made with all the levels. The ore taken out is of a rich grade. While waiting for machinery the mine is not being worked, over 8,000 tons being already out for milling. Machinery for the mill is now on the way from Oakland, which the superintendent, Mr. Du Pratt thinks, can get in place in the next two or three weeks.

THE CONFIDENCE MINE.—Tuolumne Independent, June 12: Is now working 12 men on the 500 ft level, running north and south. In the south drift they have a white rock with not much in it. In the north drift the walls are from 6 to 10 ft apart, filled with vein matter, 10 to 15 inches of which is very good, showing free gold. They expect the vein to fill in, as usual, as they advance, when it will undoubtedly prove a fine chute. It is contemplated to sink, and a Burleigh drill has been ordered for the purpose.

THE GRIZZLY MINE.—They are down 60 ft, and have struck a new chute in the northern part of the mine, where the vein is about 3 ft in width. It looks splendid and shows free gold plentifully. This is a new chute, never before worked. The chances are favorable for a good mine.

SPRING GULCH MINE.—The vein is looking well in the shaft, 250 ft from the surface, they have struck the vein 6 ft wide on the foot wall, showing free gold, and the prospects are splendid.

Nevada.

WASHOE DISTRICT.

CROWN POINT.—Gold Hill News, June 10: Daily yield, 550 tons, from the old ore producing levels of the mine. The stopes and breasts hold out finely, with plenty of ore in sight for some time to come. Nearly 17,000 tons were extracted last month. Nothing doing at the 1600-ft level. At the 1700 the drift seat for the ledge is being pushed forward steadily; the operations at this level are calculated to also test the merits of the level above. The main incline is being sunk deeper, and is now 40 ft below the 1700-ft level.

LADY BRAYAN.—To-morrow sinking the main ledge will be resumed, the drainage tank at the 350-ft level being completed. This will catch up all flowage of water at and above that point, and prevent its interfering with the sinking of the shaft. It is an evidently wise idea to sink this shaft deeper, as the bottom of it is nearly quite touching the east wall of the vein, and owing to the great width and easterly dip of the vein it will probably pass through 300 ft of it before reaching the west wall.

CONS. VIRGINIA.—Daily yield, 600 tons of ore, from the regular ore producing sections. The stopes and breasts continue looking and yielding splendidly as usual. The connections made between the 1400-ft level and the level below, and between the winze from cross-cut No. 3 at the same level, and the up-rise from cross-cut No. 3 of the California 1500-ft level, mentioned in our last report, operate to immense advantage in giving air circulation and cooling off the hot depths of both mines.

CHOLLAR-POTOSI.—Daily yield 80 tons, assaying about \$32 per ton on the average. The old ore sections are holding out pretty well as yet, and the bullion yield for May footed up nearly \$32,000.

OSPHR.—Daily yield of ore 150 tons, principally from the stopes and breasts of the 1465-ft level, which continue to hold out well and promise much. The connection between the winze sunk below the 1000-ft level and the southwest drift from the east shaft, mentioned in our last week's report, proves of vast benefit in the ventilation and development of the mine. The winze is now being continued down to the 1700-ft level for a similar purpose, following the dip of the vein.

BELOHER.—The repairs to the machinery being completed, the works and everything in and about the mine is running as before, giving the regular yield of 500 tons ore. The ore producing sections are holding out finely, with plenty of good pay ore in sight to last for a long time to come. The mills being well supplied with accumulation of ore during the temporary suspension of work in the mine, run steadily along, and are kept doing so. The main incline is now sunk to the depth of 25 ft below the 1600-ft station, with the bottom in dry, hard rock.

GOULD & CONRAT.—The north drift of the 1700-ft level progresses slowly to its connection with the Best & Belcher south drift, owing to the very hard rock and almost unendurable heat. The south drift from the double winze at the same level, is also slowly progressing under the same disadvantages, but as soon as connection is made with the Best & Belcher, first-rate ventilation will be secured and mining operations very much facilitated.

CALEDONIA.—The new shaft is down a little over 200 ft, and good progress being made, considering the amount of water met with. The drain tunnel, to intersect this shaft 120 ft from the surface, will be completed shortly. Most of the new and powerful machinery for this shaft has arrived on the ground, and the mason work of the foundations is under good headway.

CALIFORNIA.—Cross-cut No. 6, on the 1500 ft level, 100 ft south of the Ophir line, is being driven ahead for the ore vein at a lively rate. It is running in hard porphyry, which blasts well, allowing of very good progress.

HALK & NORCROSS.—The daily ore yield of this mine is limited to but a few tons at present. Active prospecting for new deposits is going ahead, with good promise of success.

BEST & BELOHER.—The main north drift of the 1700-ft level is being advanced at a very good rate, considering the difficulties of the situation, and the tough, hard nature of the rock.

SIERRA NEVADA.—Sinking the shaft goes right straight along as usual, and the prospecting operations in the old upper workings of the mine are pushed ahead energetically without, however, any very good developments in the way of new or paying ore bodies.

COSMOPOLITAN.—Mine is looking splendidly, with plenty of good pay ore in sight, but owing to increase of bad air in the stopes, ore extraction from them is temporarily suspended until the proper air drift connections can be made.

SILVER HILL.—Prospecting operations at the second and third levels going ahead vigorously.

UTAH.—The powerful new hoisting works are being hastened to completion as fast as plenty of men and means will allow. The machinery is among the best on the Comstock, and will be ready to start up in the course of a week or ten days.

JUSTICE.—The face of the north drift at the 800-ft level shows improvement, the vein matter being of a more favorable and promising character.

SECREGATED GOLD HILL.—Cross cutting at the 400-ft level has developed a fine body of \$30 to \$40 ore, and a drift is being pushed east for the well known east ore body or red ledge.

BULLION.—The main south drift from the 1700-ft level of the Imperial is steadily advancing along the west wall of the ore vein, and the cross-cut east from it is still in ore. The quartz body developed at the 800-ft level continues looking finely, and promises to lead to a good ore deposit.

GLOBE CONS.—The material in the face of the main west drift at the 240-ft level is getting somewhat softer, and large seams of quartz gravel are being passed through.

WOODVILLE CONS.—New shaft 368 ft deep today. It has passed vertically through 32 ft of milling ore, and, according to present indications, the west wall is not far off.

BALTIMORE AND AMERICAN FLAT.—Very promising bodies of low grade ore continue to be met with in cross-cutting at the 750-ft level.

JACOB LITTLE CONS.—During the past week the ore developed by the west drift and cross-cuts has shown considerable improvement, and the dump shows an accumulation of it which will pay well under the stamps.

MEXICAN.—The bottom of the winze, below the 1465-ft level, continues in low grade ore, the assays of which run higher than those of last week. The prospects are very encouraging.

ORIGINAL GOLD HILL.—Opening out the ore body in the south drift, and extending the north drift farther north is about the situation in this mine.

SACRAMENTO DISTRICT.

GOLD ROCK.—*Silver State*, June 4.—Doctor Pollard, of Sacramento district, brought specimens of ore from a ledge recently discovered in that district to town yesterday, which are rich in free gold. The ledge from which it was taken is situated about a hundred yards south of the old Limerick mining camp, and if it continues much more similar to the specimens exhibited here, Doc. Pollard will soon be a bloated millionaire.

WHITE PINE DISTRICT.

STARTED UP.—*White Pine News*, June 12: The Eberhardt & Aurora company started up their mill last Sunday evening. Everything about it is in splendid working order, and a very successful run is anticipated.

NEW TUNNEL.—The San Jose mining company, at Egan canon, are making preparations to start an extensive tunnel, for the purpose of draining and working their mine to better advantage. The Burleigh drill will be used, the

mechanery for which is now at the mine and is being put up.

VIRGINIA MINE.—Work on this mine is steadily progressing, and so far with the most flattering results.

CHERRY CREEK.—The Cherry Creek Consolidated M. & M. Co., G. F. Williams superintendent, are having ore from the Exchequer mine worked at the Thompson mill, under the superintendence of Capt. Kimball. It was thought this ore from this mine was too base for mill process, but it has been demonstrated that the ore can be easily worked, and the mill is now turning out some fine bullion.

Arizona.

MINING INTELLIGENCE.—*Arizona Citizen*, June 5: The Papago Indians have for years brought here for sale more or less gold dust, but we never expected that this class of mining would be entered into in this section of country to any extent. Not long ago some very good placer gulches were discovered in the Santa Rita mountains, and since that time old California miners have been dropping in there, and a steadily increasing stream of gold has been coming into Tucson, until now it is becoming a very considerable resource, and every day numbers of people are seen going in that direction with pack animals loaded with provisions and tools.

Fred Hughes brought in last week 7 ounces of gold and says that the next time he comes in he shall have 3 pounds. Mr. Music brought in a handsome lot and says that he is more than paying his expenses and has to pack his dirt some distance. He is preparing for the rains and says when the miners get water they will make from \$10 to \$20 per day. Billy Wood took out in 2 days last week \$25, and all who go there seem to be well pleased with the prospects.

Southwest of Tucson, in what is called the Papago country, there seems to be quite extensive gold fields also, and it is from this section that the Papagos have obtained most of their gold. To give some idea of the gold that is coming into this market, one firm has purchased over \$3000 in dust during the last month.

We were shown this week a nugget about one-half gold and silver, taken from a placer claim of Rea, Smith & Co., just below a fine ledge they have, that assays well in both metals. This is rather a rare combination to be found in placer nuggets, and gives evidence that there is something very pure in the way of both these precious metals near at hand.

We have heard that a new discovery has been made in the Pinal mountains about 10 miles from the Silver King, that bids fair to be as good as that famous mine. We have been unable so far to get any particulars.

In the Truman district work is being pushed on the Georgia mine with satisfactory results; vein from 6 to 8 ft solid, with a fine grain of galena ore. At the Lost mine they are sinking a new shaft.

Tully, Oshea & Co. have been running their smelting furnace this week night and day on good looking copper ore. The pure copper they are running out is good to look at.

Tom Roderick came in on Monday from the Ostrich mine and brought with him \$54 in gold taken from one ton of rock worked in an arrastra. Tom says that there is plenty more of the same sort.

Colorado.

CLEAR CREEK ITEMS.—*Colorado Miner*, June 12: The mines on Democrat are nearly all in good pay and yielding well.

The Pelican and Dives are producing heavily, and turning out immense amounts of ore.

On the Pay Rock Consolidated 65 men are steadily employed, and the mine is in splendid condition.

Work is being steadily pushed forward on the Moore lode, on Sherman mountain. A shaft is being sunk on the vein, showing a good body of ore.

BROADWAY TUNNEL.—This property, on Leavenworth mountain, belonging to the Broadway mining company, working under the direction of John Hanning, is steadily improving as development progresses. The mineral from this mine is very high grade, specimen assays showing a result of 4,577 ounces, or a coin value of \$5,917.60 silver per ton. The ore vein varies from 6 to 10 inches. Next week we are promised the result of mill runs from the mine.

CLEAR CREEK MINING AND IMPROVEMENT CO.—Contracts have been let, and leases given, to develop a part of this company's property on Republican mountain. The Barbara Allen, Dryden, Peru and Cosmos lodes will receive the first attention. Huyett & Co. are working on ore in Everett, and will soon be ready to begin stoping overhead, when the mine has been placed in the proper condition. J. Warren Brown, President of the company, is giving his personal attention to the work of development, and does not intend to allow the rich veins owned by the company to remain unproductive.

THE SPECIE TUNNEL. Brown mountain, under the management of Robert L. Martin as superintendent, is making rapid progress on its way to the Atlantic lode, one of the rich ore channels of Brown mountain. One ton of first-class ore lately taken from the deep shaft on this mine gave a return of \$1,128.40, and one ton of second-class ore gave a return of \$499.20, in silver, coin value, per ton. We give these figures to show that our treasure vaults are yielding their wealth, under the magic touch of labor, the royal jewel of manhood. If the Director of the U. S. mint will locate a branch mint in Denver, the resumption of specie pay-

menta will be only a question of a year, or at the farthest two years. Our mining industry, throughout the whole Territory, has a healthy and vigorous growth.

Idaho.

CONDITION OF THE MINES.—*Idaho Avalanche*, June 12: There is increased activity in mining operations during the past week, and the outlook both here and elsewhere throughout the Territory is favorable. The mills in this vicinity are all in operation, with the exception of the Cosmos, which will be running next week, and will be started on ore from the Illinois Central mine. Several new mining projects are being originated and there are indications of very active business throughout the season in both new and old mines. At the latter and many of the former there is a very large quantity of ore awaiting shipment to the mills. A lively business for the season is promised in the transportation of bullion. Although general indications are favorable for active summer's work, we would state that there is abundance of laborers both here and at South Mountain and the numbers being quite equal to the present demand, we would not advise men to come to this quarter with the expectation that they will get immediate employment. The field is large, but requires further cultivation and development in order to justify any extended emigration in this direction by those who might be hoping to realize immediately from their labors in the mines.

ILLINOIS CENTRAL.—The new assorting houses, car track and ore chute have just been completed in this mine, and active operations are in progress. A very rich quality of ore is now being extracted from the first level stopes.

POORMAN.—The guides are being put in condition for the reception of the new cage in this mine and the work will be completed in a few days. Cross-cutting will soon be commenced and from present indications the ledge promises to be very rich.

MARBOANY.—Good ore to the amount of 30 tons a day is being taken out of this mine and is being worked at the Ellmore mill. Much of it comes from the 8th and 9th level stopes. The 10th and 11th levels are being opened up and are showing a splendid quality of ore.

WAR EAGLE.—Six bars of bullion, valued at \$31,772.94, were shipped from this mine during the past week, being the results from one month's run of the Golden Chariot company's mill.

EMPIRE.—Superintendent Carter reports active work in this mine. The 6th level is being driven north and south; a winze is also being raised from No. 6 to connect with No. 5, and the ore thus far turned out is of unusually good quality.

GOLDEN CHARIOT.—Work on the late discovery ledge and in all parts of the mine continues with unabated activity, and the most favorable results are attending the operations. The entire machinery of the Golden Chariot is working successfully, and large quantities of fine ore are being turned out daily.

SOUTH CHARIOT.—The work in the 9th and 10th level drifts shows a steady improvement in the size of the ledge and the quality of the ore.

Montana.

NINE MILE MINE.—Correspondence *New Northwest*, May 28: I am happy to say that reports from Nine Mile are good. We have every reason to believe that Pilon and his company have struck it very rich—say 50 cts., 75 cts., \$1, \$2 and even \$3 to the pan. Everybody is excited. I think you had better come back. No doubt it will make a large camp and the other creek will pay, if they can get on the streak. In a week or two a large crowd will be there, and anyway there will be lots of chances of every kind for you.

Improved Dry Amalgamator.

Edwin J. Fraser, of this city, has recently patented through the MINING AND SCIENTIFIC Press Patent Agency a machine for subjecting dry pulverized ore to the action of quicksilver, in order to separate and amalgamate the metallic portion, while the lighter or non-metallic portion is carried away. It is equally useful for separating finely divided amalgam after the pulverized ore has been submitted to the dry barrel process of amalgamation.

Inside of a box or tank, having an inlet spout at one end and an outlet spout at the opposite end, is mounted one or more cylinders, upon journals bearing on the sides of the tank or box. Each cylinder extends entirely across inside of the tank, there being a narrow space between the outer rims of each, and each one is provided with a number of buckets. Between each two cylinders is secured a partition or plate, so that its lower edge will dip into the mercury and will be just cleared by the buckets of the first cylinder, while its upper edge extends above the surface of the quicksilver for the purpose hereafter described.

The cylinders and rings are covered with copper, so as to give a large amalgamating surface. The tank will be kept filled with quicksilver, so that the greater portion of each cylinder will move in it, and thus preserve a fresh amalgamated surface. The cylinders are geared together so that the power applied will rotate them simultaneously.

The dry pulverized ore to be amalgamated is fed into one end of the tank by the inlet spout.

As it falls on the surface of the quicksilver, the buckets of the first rotating cylinder will catch it and draw it under the surface of the quicksilver and around with it, so as to transfer it to its opposite side and beyond the accompanying partition. During the passage through the body of quicksilver the particles of ore are brought into direct contact with the mercury and the amalgamated surface of this cylinder and buckets, thus insuring the amalgamation of the particles of metal. As the ore is carried past the lowest point in the revolution of the buckets, the particles which have not become amalgamated will begin to rise on the opposite side of the cylinder, where they will be directed by the partition plate to the surface on the side opposite the first cylinder and within reach of the buckets of the cylinder, which again catch it and repeat the process of submersion in the same manner as above described. This process will be repeated as often as there are cylinders in the tank. The worthless portion of the ore will finally be carried to the surface at the outlet spout, from whence it can be removed. By this means the ore is thoroughly subjected to the action of the quicksilver, and any particles of metal which it contains are amalgamated.

This machine is simple and light, so that it can be easily transported to points where it is impracticable to transport large amalgamating machinery, and such as is usually employed for amalgamating in the wet way. It also offers the advantage of providing a means of amalgamating ores at points where water cannot be obtained.

New Books.

"Designing and Construction of Machine Gearing" is the title of a work which has been laid on our table by A. L. Bancroft & Co. It is intended as a mechanics' and students' guide in the designing and construction of general machine gearing, such as eccentrics, screws, toothed wheels, etc. Considerable space is also given to the drawing of rectilinear and curved surfaces, with practical rules and details. The work is edited by Francis Herbert Joynton, author of "The Metals Used in Construction."

As an index of the contents we give the following titles of chapters: "Of the Eccentric Curves," "Of the Screw," "Of the Construction of Toothed Wheels," "Details and Calculations Connected with Shafts, Pedestals and Pulleys," "A Selection of Geometrical Problems Useful to the Mechanical Draftsman and Designer," "Definitions of Terms Used in Preceding Problems." A large number of drawings are given in the latter end of the book. The work will be a very useful one to aspiring mechanics and students.

We have also received from Bancroft "Navigation, in Theory and Practice," by Hon. Henry Evers, LL.D., Science and Art College, Plymouth, author of "Steam and the Steam Engine," "Nautical Astronomy," etc. The work contains some 260 pages and is intended to give the student, as far as possible, a clear insight into the theory and practice of navigation. The writer says he has endeavored to make the subject as easy, practical and perspicuous as possible by presenting the definitions, illustrations, etc., in every variety of aspect. He has certainly gone into much more minute details than is usually the case in works of this character, and he leaves nothing unexplained. The contents are divided up into the following general heads: "Definitions and Preliminary Illustrations," "The Compass and its Declination," "The Log, Log Line and Log Glass," "Plane Sailing," "Traverse Sailing," "Current Sailing," "The Day's Work," "Parallel Sailing," "Middle Latitude Sailing," "Mercator's Sailing," "Great Circle Sailing," "Sailing to Windward or Plying to Windward," "Oblique and Current Sailing," "Specimens of Government Examination Papers, Etc." The different branches under each of these comprehensive titles are clearly and minutely treated, with full explanations in simple language. Everything is illustrated with various examples, the solutions of which are given. The chapter on great circle sailing is particularly full, and that on oblique and current sailing is in itself a sufficient inducement for any one interested to buy the book.

Another interesting book from Bancroft's is an English work on "Handreiling Out Square to the Plank, without a Falling Mould." The system explained is that discovered and taught at the Mechanics' Institution, Liverpool, by John Jones, staircase builder. The work contains seven large plates of handrails with full instructions for working them, as practiced by the author in London, Liverpool and Manchester. The author states that having, on a certain occasion, more than a thousand feet of handrails to make, he studied how to get the wreaths out with less labor and timber and with more accuracy than cutting them out individually; he then discovered that any wreath could be cut out square from a plank of the same thickness as a circle described round a section of the handrail. All wreaths are cut out square from the plank with square joints, and so accurate are the bevels and joints that the rail may be cleaned up ready for polishing before it leaves the bench. He taught this method at the Mechanics' Institution, Liverpool, to staircase hands in 1847, and since then all whom he has instructed have adopted it to the rejection of other methods. This work is a handsome one, well printed on good paper.

POPULAR LECTURES.

Economy of the Vegetable Kingdom.

Sixteenth Lecture Delivered before the University of California College of Agriculture, on Wednesday, February 10th, by Prof. C. E. BESSEY.

Transmission of Forms.

It has been advanced by some breeders that the male transmitted certain characters mainly relating to the exterior of the animal, while the female transmitted characters relating to the interior. And there are many cases which seem to admit of such a theory. The color of the cock is usually transmitted to his offspring; the ram transmits his peculiarities of horns and fleece, and the bull the presence or absence of horns. These facts, for such they seem to be, can, however, be explained equally well in another way.

Of Prepotency.

If we cross a number of varieties, we find that instead of the offspring always showing a blending of the characters of both parents, in many cases the young animal or plant more nearly resembles one parent than the other; that is, one parent has transmitted more characters than the other, or has transmitted them with more force.

Thus, when crossing the short-horn bull upon the native cow, the grade offspring is more of a short-horn in its characteristics than it is a native. We say, in this case, that the short-horn bull is prepotent, and to this power of transmission we apply the term prepotency. Now, prepotency may belong to either parent, in fact, it may belong to both parents. The sire may be prepotent, so far as certain characters go, but the dam may be prepotent in other characters. Now, this prepotency tends to give uniformity or fixedness to a race or breed. Darwin makes the observation that in certain families the effect of the prepotency of some ancestor is seen in some distinctive character. He says, "It would appear that in certain families some one ancestor, and after him others in the same family, must have had great power in transmitting their likeness through the male line; for we cannot otherwise understand how the same features should be so often transmitted after marriage with various females, as has been the case with the Austrian emperors, and as formerly occurred in certain Roman families with their mental qualities. The famous bull Favorite is believed to have had a prepotent influence upon the short-horn race. It has always been observed with English racers that certain mares have generally transmitted their own character; whilst other mares of equally pure blood have showed the character of the sire to prevail." Now, this prepotency may come into action independently of any supposed influence of long breeding—so that it cannot be referred to habit, as some would have it. Some of Darwin's examples are interesting and instructive. In chapter fourteen of his work on the variation of animals and plants, he says: "The truth of the principle of prepotency comes out more clearly when certain races are crossed. The improved short-horn, notwithstanding that the breed is comparatively a modern race, are generally acknowledged to possess great power in impressing their likeness on all other breeds, and it is chiefly in consequence of this power that they are so highly valued. Godine has given a curious case of a goat-like breed of sheep from the Cape of Good Hope, a ram from which produced offspring hardly to be distinguished from himself when crossed with ewes of twelve other breeds; but two of the half-breed ewes, when put to a merino ram, produced lambs closely resembling the merino breed."

Here, in the first place, the goat-like ram was prepotent, but his offspring, when mated with as strong a breed as the merinos, were not able to transmit their characters. It is also on record that of two races of French sheep, the ewes of one, when crossed during successive generations with merino rams, yielded up their characters far sooner than the ewes of the other. In other words, the prepotency of the merino rams was greater in the one case than in the other; which necessitates this conclusion, that prepotency is the excess of the power of transmission which one parent has over the other. It is evident that each parent tends, with a certain force, to transmit its characters, and it will transmit them unless the force is met by one superior to it. It is simply a matching of force against force, the stronger force winning here as elsewhere.

Referring again to the examples given by Darwin. In South America there is a breed of cattle called the *Niata* breed, with certain marked peculiarities. "When these are crossed with common cattle, though the *Niata* breed is prepotent whether males or females are used, yet the prepotency is strongest in the female line. In making reciprocal crosses of *pouter* and *fantail* pigeons, the *pouter* seems to be prepotent, through both sexes, over the *fantail*." These examples will perhaps be sufficient to show that the transmission of peculiar character is due to some power or force in one or the other of the parents, and not that one parent invariably transmits certain characters and the other certain others.

In plants, prepotency holds as fully as in animals. "When *Nicotiana paniculata*, a hardy annual species from Peru (three feet high) and *N. vincoflora*, (a smaller, two feet high, tender perennial species, also from South America) are crossed, the character of *paniculata* is almost completely lost in the hybrid; but if *N. quadrivalvis* (a still smaller, one and one-half feet, North American hardy annual) be crossed with *N. vincoflora*, this latter species, which was so prepotent before, now in its turn almost disappears under the power of *N. quadrivalvis*. In this case, evidently *vincoflora* possesses more of this force of transmission than *paniculata*, hence it is prepotent, but *quadrivalvis*, possessing more of this force, is prepotent over *vincoflora*. It would be interesting to know what would be the result of a cross between *paniculata* and *quadrivalvis*. Another case in plants shows well the prepotency one form may have over another and how this influence may last for a long period of time. Mr. Darwin fertilized a purple sweet pea (*Lathyrus*) with the pollen of the Painted Lady sweet pea. The greater number of hybrids almost exactly resembled the Painted Lady variety and this resemblance continued in grandchildren and great-grandchildren—though the later generations showed more and more of the purple color of the other ancestor.

Intercrossing.

It appears to be a plan of nature, in both the animal and vegetable kingdom, that in fertilization, the sexual cells shall come from different organisms. The various arrangements in orchideaceous plants are the most well-known examples of this, but it is now known that in many other orders of plants simpler, but equally effective means are provided for securing cross-fertilization, and it is the opinion of the best vegetable physiologists that this cross-fertilization is the rule, and that cases of continual or habitual self-fertilization are quite rare. In the higher animals, the individuals are divided into two groups—in the one, the male sexual cells are developed—in the other, the female cells. The result of a fertilization in such a case must always be a sort of cross—each animal possessing its individual peculiarities. In the lower forms, where both kinds of sexual organs are found in the same individual, it might be supposed that no such cross-fertilization existed, but even here it is found that fertilization takes place by the congress of two of these hermaphrodite individuals—each fertilizing the other.

(To be Continued.)

Mexican Mines.

A correspondent of the *Chronicle*, who has just returned from Mexico, furnishes the following interesting news from that republic:

The silver mines in the State of Sinaloa, as well as in the adjacent States, are yielding better now than they have done at any time since the early days of mining on the Pacific coast of Mexico, when the mines were worked chiefly by European Spaniards. Many of their old abandoned mines are being worked by Americans, with very profitable results, and I confidently believe that no other country offers such abundant opportunities for profitable enterprise to the experienced miner who possesses a little capital. But there is not much probability that many Californians or others will undertake mining in Mexico whilst such exaggerated opinions prevail in this country and elsewhere regarding the danger to life and property there. The country got a bad name from the experiences of many Californians and others during a very disturbed and disorganized state of the country, and very naturally there is a want of confidence in the Government and a prejudice against the people. I allude to the period of

The French Invasion.

When the disturbances extended even to the mining districts. Prior to that time the local revolutions, or "Pronunciamentos," very rarely extended beyond the agricultural districts and large towns, mining not being interrupted or impeded in any way. And incredible as it may seem, the miner is as safe in his life and property in the mining districts of the Pacific coast of Mexico at the present time as he would be in California or the adjacent States and Territories. Of the mines which are now yielding profitably, there is the "Refugio," in Lower California; the "Tajo," the "Conato Senores," the "Alacran," and the "Gnada-lupe de los Reyes," in the State of Sinaloa; the "Balopitis" mine in the State of Chihuahua, and the "Promontorio" near Alamo in the State of Sonora. The latter mine is being worked on a large scale by an English company, and it is said to be paying very well. Besides the large amounts of silver bullion extracted at the company's "hacienda" they ship large quantities of ore to England which contain both silver and copper. Besides the mines which I have named—and which are owned chiefly by the Americans—there are many other valuable mines owned by Mexicans; also, many of inferior note, which are paying well, with good prospects ahead. It is a significant fact that the mills throughout the mining districts are doing well, and that much of their gains arise from "custom work," which they get from miners who are not able to erect mills of their own. There are now

Two Foundries and a Large Machine Shop at Mazatlan, where mining machinery is made,

in addition to what is ordered from here, indicating pretty clearly that there must be some activity in mining enterprises. Some of the silver bullion is shipped direct to Europe via Panama. The copper mines near Mulege in Lower California are said to be yielding profitably. The shipments of merchandise from this port to Mexican ports of the Pacific have increased of late, and there is good reason to believe that there will continue to be yearly accessions to the business. Many articles of American manufacture (hardware especially) are now being used in place of those of European manufacture. The consumption of the products of California is steadily increasing, some of which are mining powder, fuse, wine, fruit, vegetables, etc. Besides there is always a demand for foreign goods from the bonded warehouses of this city. Mazatlan, which is the principal Mexican port on the Pacific coast, has lost much of its commercial importance of late years, as many drawbacks have occurred to more than counterbalance the mining prosperity. The first of these was the French invasion and the consequent disorganized and revolutionary state of the country during and for some time subsequent to that period. Then the completion of the railroad from Vera Cruz to the City of Mexico, and the construction of good wagon roads from the latter place to such large interior towns as Durango and Guadalupe, causing a diversion of a large amount of commerce from Mazatlan to the City of Mexico. Thence the

Removal of the Seat of Government

From Mazatlan to Orlizacan, together with the emigration of many families from Mazatlan and vicinity to Tepic and adjacent country after



Stevens' Patent Lamp.

the capture and execution of the celebrated and much dreaded Indian, Lozada, who had held despotic sway over that portion of the State of Jalisco for some fifteen years in defiance of the Federal government. The Mexican government is evidently becoming stronger of late, as evinced by the increased strength and efficiency of her army. This improvement may be traceable to the circumstance that of late years there has been no evasion of the payment of full duties by European importers. But if a leak has been stopped in this direction, it is now breaking out in another, as by all accounts a large amount of contraband is now being carried on, especially on the Atlantic coast. This is the natural result of the unwise policy of Mexican legislators who have offered a premium for smuggling by a ridiculously high tariff on many articles of merchandise.

STRANGE PHENOMENA.—Mr. Braham recently exhibited the following to the London Chemical Society: He exhausted a glass receiver, and, after allowing the air to re-enter through a large opening until equilibrium was restored, he closed the opening and connected the vessel with a pressure gauge. In the course of a minute the mercury now rose one inch. A converse experiment was made by pumping air into a glass vessel, allowing it to escape, and then closing the opening. In a short time there was an appreciable pressure again within the vessel. The assembled chemists offered different modes of explanation of these phenomena, proving them to be in need of investigation, to prove what was true.

A MINER just in from Star City reports to the *Silver State*, the Sheba mine as looking splendidly. The developments in this mine are now of sufficient extent to justify the erection of hoisting works, which will be built immediately.

Stevens' Patent Lamp.

The accompanying cut represents a new improved library lamp, which is designed to meet a demand for an ornamental hanging lamp, adapted to both high and low ceilings, which gives a full reflection of the light upon the table or desk, and at a price that brings it within the means of the mass of housekeepers.

This lamp can be suspended from the ceiling to any desired height from the table, by lengthening or shortening the chains that connect the frame to the yoke.

The light is reflected by a fourteen-inch porcelain shade, which is held by a ring at the top, so that the full power of the light is thrown upon the table, thus obviating the dark shadows cast when supported from the bottom, as is the case in ordinary lamps.

The fount can be taken out of the cup without removing the shade. These lamps are furnished in French bronze, verde antique, Etruscan or extra gilt. It consumes no more oil than an ordinary kerosene lamp, while the inventor claims that it gives double the amount of light. An extension spring is furnished with the lamp when desired, by means of which the lamp can be raised or lowered at pleasure. The inventor is Elisha Stevens, of Cromwell, Connecticut.

What it Will Amount To.

Few people have an idea, unless they have had occasion to look into the matter, of the sum to which a regular saving, however small, each day will amount to in a term of years when invested at compound interest. The following table shows what would be the result at the end of fifty years, by saving a certain amount each day, and putting it at interest at the low rate of six per cent.

Daily saving.	The result.
One cent.....	\$ 950 00
Ten cents.....	9,504 00
Twenty cents.....	19,008 00
Thirty cents.....	28,512 00
Forty cents.....	38,016 00
Fifty cents.....	47,520 00
Sixty cents.....	57,024 00
Seventy cents.....	66,528 00
Eighty cents.....	76,032 00
Ninety cents.....	85,536 00
One dollar.....	95,040 00
Five Dollars.....	475,200 00

At the average rate of interest paid by our California savings banks, these sums would be nearly doubled. This table is worthy of careful study. It conveys a very important lesson to everybody, and especially to the young men of the present age.

NEW PROCESS FOR TELLURIDE ORES.—A. M. Rouse is the inventor and maker of works for the treatment of tellurium ore, just constructed, on a small scale, at Austin Smith's Novelty mills, in this town. It is now ready to go into operation and test its adaptation to the Sunshine ores by breaking the affinity between the tellurium and the other metals. The process includes crushing, roasting, pulverizing in water, by ball mill, and amalgamation at three different points. One hundred pounds of quicksilver is in use constantly, and no stopping for cleaning up. Canon coal is used, costing, laid down at the mill, \$9.50 per ton, by the car load. Nerie Valle is the capitalist of the concern; and the capacity of the works being only from one to two tons per day, no ores will be treated except those belonging to him. He is an owner in the Charcoal and Excelsior mines at Sunshine, than which there are none better. If the process is a success larger works will be erected, and the public become sharers in the benefit.—*San Juan Reporter*.

ANTIQUITY OF IRON.—At a recent meeting of the Philosophical Society of Glasgow, Dr. Ferguson, the President, took occasion to refer to the recent discoveries of archaeological records and remains of Egypt, Mesopotamia, China and India, and concluded by maintaining that abundant proof existed that in the remotest time to which inquiry extended, the inhabitants were familiar with the use of iron and steel; that there was not a trace of evidence of a stone age, still less of a bronze and iron age following; and that it was evident the stone, bronze and iron theory must be sent to the limbo of false and exploded notions.

WHAT BECOMES OF DRIFT COAL.—Dr. Kane, in his arctic explorations, found beds of lignite, or brown coal, that were smoldering along their edges, having evidently been fired by spontaneous combustion; which leads to the deduction that the coal along the line of anticlinal axes of the Mississippi valley coal fields was consumed at the abscission of the valleys of the Ohio, Masoni, and Mississippi commenced and the coal veins were exposed; that these, fired by spontaneous combustion, smoldered as the cutting down of these valleys progressed.

M. PELIGOT, a clever French chemist, claims to have discovered the lost art of producing the beautiful shade of blue which is so conspicuous in many of the ancient ornaments found in Egypt. He analyzed some of the enamel, and then by synthetical experiments has succeeded in ascertaining the proportion of silica, oxide of copper, lime and soda that will produce the marvellous compound.

USEFUL INFORMATION.

Cheap Amethysts.

There is no necessity of wearing violet colored pieces of glass made to imitate smethyst jewelry, as the genuine article is now quite cheap. The large number of amethysts that have been thrown into the market since 1872, from Brazil, has caused a great depression in their value. The first lots sent to Europe brought from \$500 to \$600 per arroba, of thirty two pounds weight; but as the quantity increased the price rapidly receded, and finally decreased to absolutely nothing. At present no offer can be obtained for any lots on hand.

The glass imitation loses its polish very soon, and this shows its utter worthlessness, while the real article, consisting as it does of quartz crystals colored by manganese, is so hard that it will never lose its polish.

Perhaps some of our readers would like to know how to recognize the genuine from the imitation: look at the stone through a magnifying glass, and if you see the least air bubble, it is glass. No real gem of whatever kind ever shows an air bubble. If there is no air bubble, it may be taken as genuine. However as there are sometimes small pieces of glass without air bubbles, a decisive test is necessary. This consists in the use of a piece of an old file: if this will scratch the gem it is glass, if it does not scratch it, it is amethyst, as this is harder than steel, while glass is always softer.

BOYTON'S LIFE SAVING DRESS.—The inventor of the life-saving dress recently so successfully tested by Captain Paul Boyton is M. C. S. Merrimen, of New York City. It is of solid vulcanized rubber made in two parts—a tunic with hood and gloves attached, and pantaloons with boots attached. The dress is secured by a water tight joint at the waist and only the eyes, mouth and nose are exposed. It is inflated by means of five small tubes, which can be reached conveniently. When the upper chamber is inflated it makes a complete air pillow, upon which the head can rest. The wearer is kept dry and comfortable. Swimming is impossible; but he lies easily upon his back, and propels himself in any direction by means of a double-bladed paddle. A small India rubber bag contains provisions and a few needful articles.

UTILIZING OLD RUBBER.—A new industry has just sprung up in Northborough, Mass. Old rubber boots, shoes, blankets, etc., are collected, ground up and manufactured into cloth. In connection with the above we clip the following from the query column of the *Scientific American*: A young man has lately experimented on vulcanized rubber (old shoes, etc.), and has obtained (by the action of certain reagents) several substances of different colors. I send you samples of five of those colors. What do you think about them? Ans: May not the colors be due to the substances put in, and not to the bodies gotten out by the various reagents? For example, the brilliant yellow color on examination proved to be chromate of lead, which certainly does not exist in old rubber shoes.

PLATING WITH ALUMINUM.—According to John A. Jeancon, of Newport, Ky., metal surfaces may be plated with aluminum by the following process with great facility: Dissolve any desired quantity of a salt of aluminum, such as the sulphate, muriate, nitrate, acetate, cyanide, etc., in distilled water, and concentrate the solution to 20° Baumé, (at 50° Fahrenheit) in a suitable vessel to hold the article to be plated. The battery to be used should either be four pairs of Smee's zinc-platinum, or three of Bunsen's zinc-carbon, with the elements connected for intensity, and a plate of aluminum attached to the negative wire. The solution should be slightly acidulated with its appropriate acid, heated to 140° Fahrenheit, and kept at that temperature during the operation.

TO REMOVE A TIGHT FINGER-RING.—In case a finger-ring becomes too tight to pass the joint of the finger, the finger should be first held in cold water to reduce any swelling or inflammation. Then wrap a rag soaked in hot water around the ring to expand the metal, and lastly soak the finger. A needle threaded with strong silk can then be passed between the ring and finger, and a person holding the two ends and pulling the silk, while sliding it around the periphery of the ring, will remove the latter. Another method is to pass a piece of sewing silk under the ring, and wind the thread in pretty close spirals and closely around the finger to the end—that below the ring—and begin unwinding.

UNITING GLASS TO IRON.—The invention of Mr. J. Hartley, of Ormskirk, consists in the uniting glass to iron and other materials by means of a preparation named glazune, in order to render glass available for various general useful purposes in which it has not hitherto been employed, by a process of supplying it with uniform attachment to and support by the iron and other materials to which it may be united, and thereby reducing its liability to fracture when subject to pressure and concussion, and entirely removing its liability to conchoidal fracture.

AQUA-PORTIS, applied to the surface of steel, produces a black spot; on iron the metal remains clean.

FOR THE HENSES.—A patent has recently been granted for a method of refreshing horses while in harness, which consists in making this bit hollow, and having perforations in it. A rubber tube extends from one side of the bit to the carriage, and by pressing a rubber bag which contains water, the driver is enabled to refresh his horse whenever he chooses without stopping. For saddle horses the water bag is suspended from the horse's neck, or upon the pomel of this saddle.

TO CLEAN GOLD CHAINS.—Put this chain in a small glass bottle with warm water, a little tooth powder and some soap. Cork the bottle and shake it for a minute violently. The friction against the glass polishes the gold, and the soap and chalk extract every particle of dirt and grease from the interstices of a chain of the most intricate pattern; rinse it in clear cold water, wipe with a towel, and the polish will surprise you.

A GELATINOUS substance frequently forms in sponges after prolonged use in water. A weak solution of permanganate of potassa will remove it. The brown stain caused by the chemical can be got rid of by soaking in very dilute muriatic acid.

ABOUT VINEGAR.—It was an observation made by Soehle, but the fact has recently been published as a new discovery, that ordinary brown vinegar will keep bright and clear for any length of time if heated to the boiling point for a few minutes.

Next year will be our centennial. The Japanese have already celebrated their 2535th anniversary.

GOOD HEALTH.

Dyspepsia Foreshadowed.

To be able to sit down to a well-spread table and eat to one's satisfaction three times a day, without any discomfort whatever beyond that of hunger, with a good appetite when the next time for eating arrives, is a blessing and a happiness; and yet there are multitudes, apparently in good health, who have not known what it is for years to take a single meal without its being followed in an hour or two, or more, with torments, actual torments, enough to make a wise man mad; torments which subvert the whole character, souring the heart, embittering the temper, destroying confidence, and turning the sweetest affections into worm-wood and gall. A character naturally placid grows petulant and irritable; the loving heart becomes estranged by groundless suspicions; the cheery face is changed into oppressive sadness, while all that is glad and joyous and hopeful goes out at length in the night of melancholy, despair or suicide. Many a household once happy has become a very pandemonium; the husband a tyrant, the wife a perfect virago and an unendurable shrew.

Such are some of the influences which a diseased stomach has on the mind, temper and the heart. Multitudes of suicides are caused by dyspeptic disease. "Cross" people, the ill-natured, those who are always growing or complaining of something or somebody; inveterate fault finders, upon whose face a genial smile never played, whose hearts are strangers to the humanizing influence of warm sympathies, who have no forbearance, no allowances, no consideration, no love, many such are not thus by nature, but have been molded into wretched "forms" like these by the slow influences of insidious disease, brought on by self-indulgence and unrestraint in the matter of eating and drinking; not deliberately always, but generally perhaps, unconsciously, or in ignorance. These things being so, no rational mind can fail to feel that it is a wisdom and a duty to guard against the causes, and watch vigilantly against the indications which induce and accompany the formation of a disease which is thus capable of subverting the whole character, and making a wreck of happiness and heart and life together.

The almost universal cause of dyspepsia is eating too often, too fast, and too much. The general rule should be:

1. Eat thrice a day.
2. Not an atom between meals.
3. Nothing after two o'clock, but a piece of cold bread and butter and one cup of hot drink.
4. Spend half an hour at least in taking each meal.
5. Cut up all meats and hard food in pease-sized pieces.
6. Never eat enough to cause the slightest uncomfortable sensation afterward.
7. Never work or study hard within half an hour of eating.

The most universal and infallible indication that a person is becoming dyspeptic, is some uncomfortable sensation coming on uniformly, sooner or later, after each meal, whether that be in the stomach, throat or anywhere else. The formation of wind in the stomach, indicated by eructation, belchings, or otherwise, demonstrates that dyspepsia is fixing itself in the system. Then there is only one course to pursue, and that is infallible: eat less and less at each meal, until no wind is generated and no other uncomfortable sensation is experienced in any part of the body. No medicine ever cured confirmed dyspepsia; eating plain food regularly and living out of doors industriously, will cure most cases.—*Hall's Journal*.

Rest.

Multitudes of earth's toiling millions have died while striving to make enough money to retire from business, and in a beautiful cottage on their own little farm to spend the remnant of their days in rest, in having nothing in particular to do. Perhaps one in a million of the hoppers does make money enough to enable him to retire to his country seat, and for a year or two, while he is fixing it up to his notion, all goes on charmingly, but when everything is completed to his mind and he has nothing more to take up his attention, he eats and sleeps and lounges around for a few months longer, falls into disease and dies; or if he has unusual force of character and power of endurance, he notices that both health and happiness are passing from him, and treading this to the true cause of an inactive body and an unoccupied mind, he resolves to "sell out" and plunge again into the vortex of business.

Recently an old schoolmate—yonder, graduating in the same class thirty-seven years ago—writes that "both body and mind are worn out; the slightest physical labor exhausts him," and, "any effort to think or study or even read, so wears the brain that life is felt as a burden." He withdrew from his professional duties, which he had performed in the place for twenty-five years, with honor to himself, having secured the love and confidence and respect of all who knew him. He gave up his calling for the purpose of obtaining rest, as a means of health.

The number of families is increasing every day, who give up housekeeping as a means of rest from family cares, and resort to that miserable and most unwise mode of life, boarding at a hotel or in some private family, to get more dissatisfied than ever in a few months, meanwhile falling into bad health and bad habits of various kinds.

All these classes of persons fail, miserably fail in their object, because they mistake the physiological meaning of the word "rest." Neither body nor brain are safely, truly and happily rested by doing nothing. The only healthful rest, as long as our physical and mental constitution remains as it is, is to be busy. Men of force and industry will everywhere tell you, "It is the hardest thing in the world to do nothing." No mortal man was ever made to be a loafer, to be a miserable drone. The true idea of rest is recreation, a making over again, a return to our accustomed vigor; and this is accomplished, not by allowing the machine to come to a standstill, for inactivity is rust and ruin to all mechanical contrivances, and death to all physiological structures. The true object of rest is recuperation, and that is best brought about as to the body, by exercising a different set of muscles; and as to the brain by calling into requisition a different set of organs and powers, causing the mind to act upon new objects. A better plan is not to get into the unhealthy conditions named, and they are avoidable by giving two hours daily to the exercise of a different class of muscles or to the investigation and study of objects of comparatively trivial importance and of a wholly different nature. The student should ride on horseback, or cultivate fruit and flowers; the merchant should employ his mind in liberal studies, in active personal and elevating charities, while the over-taxed and worried wife should pay a visit daily to some prudent friend, some cheery neighbor or suffering sister or child; the men in all cases being to spend two or three hours daily in open air activities wholly differing from the ordinary business routine.—*Watchman and Reflector*.

Unhealthy Foundations.

Dwellings built on solid and close foundations are always unhealthy. An instance is recorded of a locality in Illinois, where there were three settlements within visiting distance of each other, altogether containing about thirty families. One fall every family of the three settlements (with one exception) was sick with the prevailing fever of the season. The excepted household had an upper floor to their house (a half story) which was used for sleeping in by all the family, consisting of parents, three children and a workman, and they all escaped the fever. All the rest of the inhabitants lived in one story houses, and of course slept and kept all the stores on one floor. In a house with a close solid foundation, we found that things would mold if left standing for a few days. Preserves, placed upon a top shelf, in a short time became moldy; but when placed in the second story they all kept well. A barrel of flour was left standing on the floor; when it was about two-thirds used, the sponge failed to rise, and as a consequence we lost two bakings of bread, it not being fit to eat. The barrel and flour were then taken out of doors and placed in the sun, so that the air could circulate freely around and under it, and after standing thus about six hours, it was replaced on the floor and set on two strips of boards one inch thick. By this means the flour was wholly restored and rendered good to the last. I could cite many other instances.

All receptacles for foul air under or near a dwelling should be very closely attended to, and so opened as to be thoroughly ventilated, as the instances cited very fully illustrate.

DOMESTIC ECONOMY.

How to Remove Spots and Stains from Woven Fabrics.

Taking out grass and other spots from clothes is an application of chemistry which has a practical interest for everybody. It demands a certain acquaintance with solvents and reagents, even though we may not understand the laws of chemical affinity on which their action depends. The general principle is the applying to the spot a substance which has a stronger affinity for the matter composing it than this has for the cloth, and which shall render it soluble in some liquid so that it can be washed out. At the same time it must be something that will not injure the texture of the fabric or change its color. The practical hints we shall give are condensed from a variety of foreign sources.

The best substances for removing grease or oil are: 1. Soap. 2. Chalk, fuller's-earth, eteate or "French chalk." These should be merely diffused through a little water to form a thin paste, which is spread upon the spot, allowed to dry, and then brushed out. 3. Ox-gall and yolk of egg, which have the property of dissolving fatty bodies without affecting perceptibly the texture or colors of cloth. The ox-gall should be purified, to prevent its greenish tint from degrading the brilliancy of dyed stuffs, or the purity of whites. Thus prepared it is the most effective of all substances known for removing this kind of stains, especially for woolen cloths. It is to be diffused through its own bulk of water, applied to the spots, rubbed well into them with the hands till they disappear, after which the stuff is to be washed with soft water. 4. The volatile oil of turpentine. This will take out only recent stains; for which purpose it ought to be previously purified by distillation over quicklime.

An earthy compound for removing grease spots is made as follows: Take fuller's-earth, free from all gritty matter; mix with half a pound of the earth, so prepared, half a pound of soda, as much soap, and eight yolks of eggs well beaten up with half a pound of purified ox-gall. The whole must be carefully triturated upon a porphyry slab; the soda with the soap in the same manner as colors are ground, mixing in gradually the eggs and the ox-gall previously beaten together. Incorporate next the soft earth by slow degrees, till a uniform thick paste be formed, which should be made into balls or cakes of a convenient size, and laid out to dry. A little of this detergent being scraped off with a knife, made into a paste with water, and applied to the stain, will remove it.

Tar and pitch produce stains easily removed by successive applications of spirits of turpentine, coal tar, naphtha, and benzine. If they are very old and hard, it is well to soften them by lightly rubbing with a pledget of wool dipped in good olive oil. The softened mass will then easily yield to the action of the other solvents. Resins, varnishes, and sealing wax may be removed by warming and applying strong alcohol. Care must always be taken that, in rubbing the material to remove the stains, the friction shall be applied the way of the stuff, and not indifferently backwards and forwards.

Most fruits yield juices which, owing to the acid they contain, permanently injure the tone of the dye; but the greater part may be removed without leaving a stain, if the spot be rinsed in cold water in which a few drops of aqua ammonia have been placed, before the spot has dried. Wine stains on white materials may be removed by rinsing with cold water, applying locally a weak solution of chloride of lime, and again rinsing in an abundance of water. Some fruit stains yield only to soaping with the hand, followed by fmnigation with sulphurous acid; but the latter process is inadmissible with certain colored stuffs. If delicate colors are injured by sopsy or alkaline matters, the stains must be treated with colorless vinegar of moderate strength.

Fresh ink and the soluble salts of iron produce stains which, if allowed to dry, and especially if afterwards the material has been washed, are difficult to extract without injury to the ground. When fresh, such stains yield rapidly to a treatment with moistened cream of tartar, aided by a little friction, if the material or color is delicate. If the ground be white, oxalic acid, employed in the form of a concentrated aqueous solution, will effectually remove fresh iron stains. Acids produce red or other stains on the vegetable colors, except indigo. If the acid has not been strong enough to destroy the material, and the stains are fresh, the color may generally be restored by repeated soakings in dilute liquor ammonia, applied as locally as possible. Photogreppers frequently stain their clothes with nitrate of silver. The immediate and repeated application of a very weak solution of cyanide of potassium (accompanied by thorough rinsings in clean water) will generally remove these without injury to the colors.

CREAM APPLE PUDDING.—Take a deep tin pudding dish and cover it with a layer of the best pie crust. Have some good, tender apples cut fine and spread over the paste a layer of apples, with sufficient sugar for sweetening, and cinnamon and nutmeg to taste; again a layer of apples, etc., until your dish is filled, when you pour over it a teaspoonful of cream, add your cover and bake to a light brown.



W. B. EWER..... SENIOR EDITOR.

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San Francisco:

Saturday Morning, June 19, 1875.

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The Fourth of July.

If the inherited patriotism of three genera-
tions failed to remind us of the recurrence of
our national birthday, the notes of preparation
which come from every side would impress the
fact that the anniversary of Independence is at
hand. California, though yet in her youth as a
member of this confederation, which had its
christening in the last century, falls behind
none in her devotion to its principles and
reverence for the memory of its creators.

From all sections of the State we note ar-
rangements being made, and by the time this
number of the PRESS is placed in the hands of
our readers, decisive action will have been
taken by many for the proper observance of
the day. We notice by one of our exchanges
that some over proper correspondent is averse
to the waiving of powder and indulgence in the
post festum headach. But we apprehend that
few Americans will be willing to forego the
traditional bell ringing, cannon firing, drum
beating and speech making celebration of Inde-
pendence which has always marked the day as
the brightest in our calendar.

The present year is a particularly memorable
one, marking, as it does, a century since the
first blood was shed in that struggle which an-
other twelvemonth stamped with the impress
of independent nationality, the prelude to one
of the most eventful dramas in the world's
history. '75 was to '76 the needful nursery
which gave our ancestors training for that
irrevocable plunge which was to make or mar
their fortunes.

The ninety-ninth anniversary of the inde-
pendence of the United States! What a deal
of crystallized progress, of condensed history
is contained in these words. To us they are
pregnant with much. What would they be if
they could be heard by those now hushed in
death? We can understand the meaning of the
lines which Dr. Holmes puts in the mouth of
his heroine of Bunker Hill:

"Tis like stirring living embers, when, at eighty, one
remembers
All the aching and the quakings of "the times that
tried men's souls;"
When I talk of *Whig and Tory*, when I tell the *Rebel*
story,
To you the words are ashes, but to me they're burning
coals.

San Salvador Mines.

In our last issue we stated in some remarks
on San Salvador mines that our informant
would give us some further details of the Loma
Larga mine. We have since had a call from
Mr. Flint, who recently arrived from these
mines, and who is quite sanguine that if the
requisite capital to work the mines was forth-
coming some very rich properties could be
developed. The mineral districts of San
Miguel and Santa Rosa extend over an area of
500 miles. The country is hilly and broken,
but most of the mines are accessible by wagon
roads. There are a number of old mines there
which were worked by the Spaniards as deep
as could well be done without machinery.
Lately some impulse has been given to mining
and several of these mines have been opened,
which are now yielding ore of good quality.
No quartz machinery is in use however, and
only a few arrastras are running. Mines in
San Salvador cannot be renounced by fore-
igners; they have to be either purchased or rented.
The ores are easily worked, being principally
chlorides and sulphurates.

The Loma Larga, the principal mine there,
is fourteen leagues from the sea shore, by a
good wagon road. The nearest port is La
Union. The ores have averaged, our informant
states, from \$600 to \$2,500 per ton. The ores
which have been worked there in a rude way
have yielded \$80 per ton in an arrastra. The
mine has been extended on the vein 500 yards.
There is plenty of water and wood sufficient
for all purposes, to which the owner has an ex-
clusive right.

The mine was formerly worked by one
Gorral, who extracted some \$500,000 above
expenses. When he got down deep enough to
require machinery he sold it for \$50,000. This
parties having no capital afterwards sold to
the present owner, General Gonzalez, President
of San Salvador, for \$56,000. Including the
purchase money, he has spent upwards of
\$100,000 on the mine, getting it in order. It
was full of water and after this was removed
new timbers were put in. This long tunnel
which was intended to drain the upper part of
the mine has been put in order, cleaned out
and nearly all re-timbered, and work is still
being done on it. This tunnel only taps the
mine seventy feet from the surface, while the
deepest workings are 300 feet. Another shaft
has tapped the vein 800 yards from the old
shaft. While the mine is being put in order
about half a ton of ore a day is extracted by
being brought up on the backs of Indians, who
climb up notched timbers in a primitive way.

General Gonzalez has a small steam engine
and pump on the mine, and is blasting and
sinking on the new shaft. He wants some
practical mining men to take hold of the mine
with him and purchase a two-thirds interest.
Our informant states that it is a *bona fide* con-
cern, and if some practical man with money
would take hold of the mine and work it
properly, he could make a considerable profit.
The vein in the Loma Larga averages three feet
four inches in width, the ore containing silver
and some gold. There are several other mines
near by with broader veins but lower grade
ores.

Any one who is interested enough to inquire
further concerning these mines can call on
John F. Flint, United States Consul at San
Salvador, Central America, at present residing
at 331 O'Farrell street, in this city. He has
with him maps and plans of the mines show-
ing the workings, etc., and numerous samples
of the ore. To go to the mines will require an
expense of about \$500, and two months' time
to go and return.

Our Mineral Resources at the Centennial.

We are happy to state that the Smithsonian
Institution intends securing as complete a col-
lection as possible to illustrate the mineral
resources of the United States and the chief
mining and metallurgical products at the
International Exhibition, to be held in Phila-
delphia in the Centennial year 1876. This col-
lection will constitute a portion of the govern-
mental display, made by the executive depart-
ments, in accordance with the executive order
of March 5th, 1875, and an act of Congress of
March 3d, 1875. A representation of the great
variety of mineral productions of the country
has not yet been systematically collected and
exhibited by the general government. Such a
collection, formed and arranged with skill and
discrimination, is important for the purpose
of a general view of the extent and variety of
these productions at the exhibition, and will
constitute a portion of the national museum at
the Smithsonian, where it will be permanently
arranged after the exhibition.

At each of the great international exhibitions
abroad, the respective governments caused
liberal and methodical displays of mining in-
dustry and its products to be made co-
ordinately with agriculture and its products.
These displays were not only of great direct
service to the countries making them, but ad-
vanced the knowledge of geology, mineralogy,
mining and metallurgy. In making such col-
lections, the governments of Europe had the
advantage of the aid of organized corps of
mine engineers in the service of the State. In
the absence of such an organization in the

United States, a great part of the labor of ob-
taining a just representation of its mineral
wealth must be left to voluntary patriotic
effort.

Although the Smithsonian Institute is aware
of the great difficulty of obtaining the collec-
tion referred to, especially in the limited time
remaining, it confidently asks and relies on the
heartily and patriotic co-operation of mine
owners, superintendents, engineers, geologists
and all who are able to contribute to the success
of the object in view. The collection now in
the museum will be freely used for the purpose.
The expenses of transportation and exhibition
will be defrayed by the Institution, under suit-
able restrictions, and due credit will be given
in the exhibition and catalogue both to the
locality and contributor. The organization
and general direction of this work have been
conferred to Professor William P. Blake, New
Haven, Conn., to whom all correspondence relat-
ing to it should be addressed. Professor
Blake is so well known in mining and scientific
circles that no assurance is needed that he will
perform the work in a satisfactory and able
manner. We hope that the mine owners of
the Pacific coast will take an interest in this
matter, and an active interest. They ought to
send a collection from here which will open
the eyes of the world to our mineral resources,
of which so little is known on the other side of
the mountains. The iron and coal industries
will of course be well represented at the Cen-
tennial, and our gold and silver should be also.
Our mineral products are so varied and exten-
sive that we should get up an exhibition to do
credit to the coast, and now that the govern-
ment has taken hold of the collection of speci-
mens, etc., those interested should respond
heartily.

Machinery on the Comstock.

To give casual readers an idea of the amount
of pumping and hoisting machinery being put in
on the Comstock, we gather from the last sum-
mary of the local papers a few items relating
to it. At the Dayton mine the erection of the
new and massive pumping and hoisting ma-
chinery is being driven to completion as fast as
is consistent with the thoroughness and dura-
bility of the work. The new and powerful air
compressor on the Sierra mine, now being put
up, when once in operation, will be the most
powerful and complete on the line of the Com-
stock. On the Globe Consolidated a new and
powerful pump is being placed in position,
which it is confidently believed will be amply
sufficient to drain the water from the lower
levels, as soon as it is ready to start. At the
Lady Washington the heavy new pumping and
hoisting machinery is being put into working
position as fast as is expedient and consistent
with perfectly secure and substantial construc-
tion. On the Consolidated Virginia the erec-
tion of the new hoisting and pumping ma-
chinery is making rapid headway, all the men
that can be worked to any advantage being
employed on the works. The Caledonia mine
machinery for the hoisting works at the new
shaft continues to arrive almost daily, and its
erection is being pushed to completion as fast
as the nature of the work will permit. At the
Buckeye mine the boilers for the new machin-
ery are in place, and the erection of the pump-
ing machinery is making rapid headway. On
the Utah mine the erection of the new hoist-
ing machinery is rapidly approaching comple-
tion, all the laborers and mechanics being
employed that can be worked to advantage.
Grading on the Prospect mine for the new
hoisting works is now completed. The new
hoisting works on the Empire mine will soon
be in working position. New pumps are being
put in the Imperial-Empire mines. In the
Overman the new pumps are working splen-
didly, lifting a small river of water, and are
fast gaining on the flow, so there now appears
a fair probability of soon getting it again under
complete mastery. On the Savage the new in-
cline machinery is working splendidly. These
few items, from one issue of a local paper
show that the mechanics of this coast get a
pretty good share of work from this one mining
district alone.

DOUBLE SHEET.—We shall issue twenty-four
pages in the next number of the MINING
and SCIENTIFIC PRESS, which will con-
tain the revised statutes of the United States
relating to mining. It will also contain an ex-
haustive article on lead, with very full tables
for the determination of lead ores, prepared
expressly for the Press by Mr. Henry G.
Hanks. Extra copies of this number will be
printed and sold for the usual price—ten cents.
The revised statutes of the United States are
now printed in our mining law pamphlet, with
all the government laws relating to mining.
Price, 50 cents.

The railroad track is being rapidly laid out
from Spadra. About nine miles of road is
finished. The whole road to San Geronimo
pass will soon be ironed and in running order.
The men are now laying about a mile of track
per day.

THE COAST REVIEW for June contains the
proceedings of the National Board of Under-
writers and other matters important to the in-
surance classes.

THE Cincinnati equatorial telescope, made in
Munich for the observatory, has arrived, and
will be placed in position this week.

San Francisco Enterprise.

The Construction of a Model Mill.

Keeping well abreast with other branches of
mechanics, the wheel-wright has made improve-
ments which entitle him to a first rank among
our progressive artisans. California wheat has
a reputation which is not confined to any section,
but maintains for itself a place in the markets
of the world. By the use of improved milling
facilities, we are able to make a flour worthy of
our wheat. The demand for flouring and grist
mills is rapidly on the increase on the Pacific
coast. To meet this demand, the firm of
Messrs. Joseph Wagner & Co., of this city,
have turned their attention, and they are now
supplying all kinds of milling machinery and
ready to furnish estimates or contract to order
anything from a sixteen-inch portable mill to
the largest class flouring mill, at their estab-
lishment, Nos. 113 and 115 Mission street.

Messrs. Wagner & Co.

Manufacture one of the best machines now in
use for extracting oats, barley and cookie from
wheat. We refer to this improved barley and
grain separator. This ingenious device is the
invention of Mr. M. O'Brien, junior member
of the firm, and has but recently been patented.
The improvement which distinguishes this
separator from all others is simple but most
effective. By means of an overflow screen
attached, the capacity is increased from forty
bushels per hour, the maximum allowed for
ordinary separators, to 150 bushels per hour.
The capacity is regulated by spouts, which can
be fixed to separate any desired number of
bushels per hour.

To give some idea of the facilities possessed
by this house for constructing mills, we might
say that a little less than two months since
Messrs. Wagner & Co. contracted with Mr.
Jacob Samm to put up a mill for him on First
street, corner of Clay, Oakland. It is now
completed and ready for grinding. The build-
ing which contains the mill is forty by sixty
feet, with an addition for an engine room, and
three stories high. An examination of the
premises conveys an excellent idea of the

Model Mill.

It is fitted with the most approved machinery
throughout, has five run of stone and will turn
out 200 barrels of flour in twelve hours. The
mill, which faces on First street and the water
front, is admirably situated to receive grain and
deliver flour either by vessel or rail, as a side
track of the C. P. R. R. runs along First
street.

The wheat after being received is taken from
the bin and subjected to a rougher to remove
the straw; then elevated, run into a suction leg
and after being submitted to three suction
passes into the

O'Brien Separator.

Where all the barley, oats, etc., is removed;
from this separator it goes to the smut ma-
chine, one of the "Eureka" pattern, for which
Messrs. Wagner & Co. are the agents on
this coast, where it is cleaned of smut. It is
then carried to the wetting conveyor and thor-
oughly wetted. This is a phase of milling un-
known to millers of the Eastern States and is
made necessary by the peculiar dryness of the
California wheat, which requires a good degree
of moisture to fit it for grinding. It is now
elevated to the wetting bin where it is allowed
to stand from twelve to twenty-four hours.
This raises the outer and toughens the inside
coat of the berry of the grain. It is then sent
through the amutts a second time to remove
the outside coat, already loosened, leaving the
berry perfectly clean. The grain is then run
into stock hoppers over the mill stones and
ground. As it comes from the stones the flour
is put into the bolt chest where it is separated
from the bran and middlings. The middlings
are then put through a La Croix purifier which
separates all the light bran and fuzz from them,
and the residue, which contains a large amount
of the richest gluten of the wheat, is reground,
and what was formerly only an inferior grade
of flour is made by this improved process into
the best brands. The

"Excelsior" Bran Duster.

Another first class machine of the kind, for
which Messrs. Wagner & Co. are agents, then
takes charge of the bran. What is saved by
this machine is put into superfine flour. After
the flour is ground and graded it is ready for
the "Eureka" packer, a machine which will
pack for delivery 150 barrels per day.

The milling machinery is driven by a fine
engine, manufactured by the Union Iron works,
of one hundred horse-power.

We have been thus particular in noting the
process of manufacturing flour at this mill as
it is done by the most approved machinery
worked on the most approved plan. Con-
structed as the mill has been in so short a time
and yet so admirable in all its arrangements
and perfect in all its details, it reflects a great deal
of credit upon the contractors and upon the
city which affords encouragement to their en-
terprise and skill.

LEAD.—As we will issue a double sheet next
week, we have concluded to defer the publica-
tion of Mr. Hanks' article on lead until
then, so that it can be given entire in one issue.
The table accompanying it are quite exten-
sive and interesting, and the whole article will
be well worth preserving.

Hints on the Washoe Process.

(Continued from last week.)

The Straining of Quicksilver, Cleaning of Amalgam, and Retorting—Continued.

Even at a cherry-red heat, however, the retort gradually gets out of shape, and once out of shape it soon bursts or cracks. To preserve the original shape as long as possible I found it advantageous to hang the retort on four slings. Each of these is a semi-circular cast-iron brace, on which the retort rests. Wrought iron rods, so attached that they can be renewed if burned out, are fastened to the cast iron braces, one on each side of each brace. These rods pass through the brick work, and through flat bars of iron on top, and have, above all, loosely fitting nuts. Of the flat bars on the top of the brick work, four pass across over the retort on the top of the brick work, and two lie likewise, one on each side, and thus the retort is hung on four braces, attached to one common support. If it becomes bulged at all, the string nearest the distorted place may be raised by means of the nuts, and in the next heat the retort will resume its proper shape. In this way, and by a careful and moderate heat, I was able to make retorts last one and a half years in constant use.

The Saving of Slimes and Subsequent Treatment.

By slimes or slime I do not mean to include any slimes whatever from the pan-tailings. If the ore has been properly and exhaustively worked, there is not left in any part of the tailings from the pans any gold or silver that can be recovered by working these tailings, unless they be roasted, or exposed to action of air and moisture for many years. The slimes here spoken of have never come in contact with quicksilver and have never been worked at all; they are carried off mechanically by the waste water that leaves the last tank below the battery, and they assay, as a rule, about sixty per cent. as much as the ore. Generally the assay buttons from the slimes are worth much less per ounce than from the ore, i. e., they contain proportionally less gold. The percentage of slimes varies with the amount of clay, and also depends much on the quantity of water used, and the method of settling. In hard ores, with careful settling, the slimes amount to two or three per cent. of the weight of the ore. The gold in the slimes is very light and flat, the silver occurs largely in refractory sulphurets, and also in a very finely divided state. The slime from ore worth \$16 a ton or upward, may be worked with profit. In one's own mill, working one's own ore, it would be economical to raise to a supply tank above the battery all the water escaping from the tanks, and let it pass again, with the additional water necessary, through the battery. Thus there would be no loss in slimes, as none would leave the mill. But frequently such a change cannot be made in an old mill. In such cases it is necessary to build slime-yards outside the mill. I built my first one in the summer of 1868, after studying a year on the best way to save the slimes; and subsequently I added others, constituting a series, in each of which in succession all the battery water settled before finally escaping. By means of a bull-wheel, rope, car and railroad, the slimes were delivered, when they were to be worked, directly to the pans. The richest of the slimes settled in the first yard, since none of them had ever been in contact with quicksilver or worked in any way, and they were kept entirely separate from the pan-tailings. Working these slimes by themselves, it is difficult to obtain over sixty per cent. of the assay value, even when large amounts of chemicals are used. Moreover the loss of quicksilver is very large. But by mixing ore and slimes in equal proportions more body can be given to the pulp, and in this way I obtained almost as high a percentage as on ordinary ore, and saved much of the quicksilver that would have been lost. The gain was so decided that, not having a mine, I bought ore to mix with the slimes.

(To be Continued.)

THREE of the Black Hills party who recently had property destroyed by the military, have sued the Government officers who destroyed their property, and claim damage to the amount of \$22,000.

THE P. M. S. S. Co. are to inaugurate a new line between this city and New Zealand. The *Granada* will be the first steamer to sail in the line during the coming month.

Short Lectures on Patents.

No. 9.—By JNO. L. BOONE, of Dewey & Co's MINING AND SCIENTIFIC PRESS Patent Agency.

Trademarks.

"S—T—1860—X."

It would be impossible to choose a more appropriate heading for a lecture on trademarks than the one above written. Nearly every person who is familiar with the English alphabet has read it on fences, on houses, on sign-boards, on rocks by the roadside, on the mountain, in the forest, and on the plain, and many a brain has been fruitlessly puzzled in a vain endeavor to discover its meaning. No trademark was ever more effectively advertised. Its very style indicates that there is a significance in its meaning, and this causes it to attract the attention of every person who sees it. The proprietors of this trademark became wealthy and thus the prediction of the trademark that the proprietors had a sure thing in 1860, ten years from the beginning of their enterprise, was verified. Its proprietors inaugurated a system of advertising that has grown to be almost universal.

A trademark may be a word, letter, figure, symbol or character. In order to be patentable it must not be generic of the article it is to represent; neither can it be descriptive, but it must be entirely foreign to both the article and its constituents. For instance, it has been decided that Wine Bitters cannot be held as a trademark because the word wine is descrip-

tion of a patent, or certificate of registration which has all the force and effect of a patent, for the protection of trademarks, and the matter was taken out of the hands of the Clerks of the United States District Courts and placed where it ought to be, under the supervision and control of the Commissioner of Patents.

A certificate of registration or patent is therefore now issued to protect trademarks, and they are subject to examination and rejection for proper causes the same as applications for mechanical patents. Under the old method a person in California could have his trademark registered in the Clerk's Office of the District Court in California and another person could record the same trademark in the Clerk's Office of any other District Court in the United States without question or examination, and the recording would literally amount to nothing. As the law now stands a trademark can be fully and completely protected. Many persons contend that a trademark can be copyrighted and that a copyright is all that is required for its protection. This is entirely a wrong idea. If a trademark is registered according to law it is an infringement of the right of the proprietor for any other person to use that trademark on the class of goods for the protection of which the patentee claims it. If it is only copyrighted and a person should come into possession of a number of printed marks of the same kind, he could not be prevented from using them in any manner he might see fit, and he could place them upon any articles he desired to without infringing the rights of the copyright or in any way laying himself liable. The law has provided a special protection for every class of invented and original productions, and this pro-

A Colorado Lake.

Among the many beautiful views which the photographer accompanying Prof. Hayden's last expedition to Colorado has made it possible for us to admire is one of Upper Twin lake in the Sawatch range of mountains. An engraving on this page gives an idea of the placid loveliness of the lake and its romantic surroundings, as seen by the artist and transferred to paper by the aid of his camera.

The crest of the divide at the head of the south branch of the Little Platte, says Prof. Hayden, presents a fine view of the valley of the Arkansas toward the West, with the grand range of the Sawatch on the west side like a gigantic wall, with its wilderness of peaks, upward of 13,000 and many of them 14,000 feet. Nestled at the base of the Sawatch, at the mouth of the Lake Creek gorge, are the beautiful Twin lakes, separated from each other by a belt of moraine deposit only about 200 yards wide, with a small stream flowing from one to the other, 20 feet wide. The upper lake is one mile in length and half a mile in width. The greatest depth found by sounding was 76 feet.

To the southeast may be seen distinctly the ranges about the San Luis valley, with Uncompahgre peaks rising far above all the rest. To the east we have the South Park full in the foreground, looking like an immense meadow. The ridges which run across it in different directions are softened down by the distance. Pike's peak, with the ranges of mountains on either side, shuts off the vision from the broad plains beyond; it rises so far above the rest that it becomes a most important landmark for a radius of fifty or eighty miles in every direction.

To the northeast and west is the splendid group of peaks of which Mount Lincoln is the crowning one; while to the northwest are the sources of the Arkansas with the Tennessee pass and its associated ranges of mountains. The Blue River range can be seen dimly beyond. Such are the geographical features of this remarkable region, and I describe them from time to time, to convey to the reader the fact that the variations are kaleidoscopic, and from every important mountain peak a fresh and equally grand view may be obtained.

DAMAGING RAINS—SUSPENSION OF HARVESTING.—The last week has been a bad one for the farmers. The storms of the 15th and 16th have caused serious damage throughout the State. The accounts that come from various quarters are of remarkable uniformity. Hay has suffered most; large quantities were baled and stacked upon the ground, much of which will be spoiled. The uncut grain is beaten down and damaged to some extent and that in stacks is in a still worse condition. Dry feed and summer fallowed grain are also injured. Harvesting is generally suspended until the weather clears up; and when it is resumed it will be more irksome and wasteful on account of the lodged grain. Some crops, however, have been greatly benefited by the storms. Hops, tobacco, potatoes and corn will, no doubt, give a larger yield on account of these rains. Fruit is reported to be beaten from the trees to some extent, but the damage in this quarter will probably be slight. Much anxiety is felt concerning the extent of the damages from this unusual storm.

Progress at the Suto Tunnel.

The following is the report of progress in the Suto tunnel, for week ending June 8, 1875:

Number of feet in tunnel, June 1..... 9,680

Number of feet driven during week..... 70

Distance in June 8..... 9,650

Details of work performed are as follows, heading being 8x10 feet:

Holes drilled..... 443

Holes blasted..... 133

Aggregate depth..... 2,528 feet

Average depth..... 16 7/10 feet

Powder consumed..... 1,247 lbs

Explosives consumed..... 690

Car Loads..... 438

ROCK.—Tough conglomerate, greenstone base with angular pieces of trachyte.

[Signed] A. SUTRO, Gen. Supt.

Two miles of track have been laid on the Vaca valley railroad. The work is now suspended for lack of ties.



UPPER TWIN LAKE, COLORADO.

tive of the article bitters and forms a part of a real name which any one can use that makes a bitter out of wine, but Excelsior Wine Bitters or I X L Wine Bitters are subjects of legal trademark because the words Excelsior and I X L are neither descriptive or generic, but are entirely foreign to the article bitters. A personal name is not the legal subject of a trademark. Smith's Rye Whisky could not be patented as a trademark. The rule is that in order to render a trademark patentable it must contain a word which is coined for the intended case. The Patent Office refused to register the phrase "American Sardine," which the applicants intended to place on cases resembling sardine boxes but which contained another kind of fish, because the mark was intended to deceive the public. The name under which a patented article was sold during the existence of the patent was refused registration because it had acquired a distinctive meaning and had lost its character as an arbitrary symbol. "When a device becomes public property its name must also," and this is the case even if the name was coined for the purpose when it was adopted, and might have originally been the proper subject of a patent. The law is thus strict in order to protect the public from deception and imposition. Previous to 1870 there was no special legal provision regulating the manner of securing to proprietors the right to a trademark, and the only formality employed was to file a copy of the proposed trademark in the office of the Clerk of the United States District Court, pay a fee of two dollars and a half and receive a receipt therefor. Occasionally a person who placed a higher estimate than usual on a trademark would apply for and obtain a mechanical patent covering it, in which case the patent was issued "for a trademark" and the fees required were the same as were required in mechanical cases. But the law of 1870, which went into effect in July of that year, made special provisions for the issuance

tion is as thorough and complete in one class as it is in another. A design patent or a trademark patent is as effective to ward off infringements of the thing patented as a mechanical patent is to protect the inventor in the possession of his invention, while their cost is less. The quality of invention required to produce a new design or trademark is inferior to that required to produce a new and useful piece of mechanism or to unravel a mechanical problem, yet it is often the case that the two former are the most profitable to the patentee. A trademark soon identifies itself not only with the article upon which it is placed but also with the proprietor. If we speak of Mr. Brown who manufactures bitters called "The I X L Bitters," we are apt to call him the I X L Bitter man, especially if we are at a loss to call his proper name at once, and when this is the case we can safely calculate that Brown's bitters are pretty thoroughly advertised, for every such remark is an advertisement for him. The best trademarks are those which most readily attract the attention of the public, and much ingenuity is displayed in getting up some of our present day trademarks, especially some of the burlesque designs and comic mottoes. It matters not, however, what a trademark is, whether it be a word, figure, character or design, its persistent use upon the article it is to represent will finally connect the one with the other in the minds of consumers, and the mark will become valuable as a part of the stock in trade of the manufacturer or proprietor.

A trademark remains in force for thirty years from the date of registration, and at the expiration of that time it can be re-registered for a further term of thirty years, but when the trademark is also secured in a foreign country its protection in this country will cease simultaneously with the foreign protection, without reference to the original term of the grant.

Miscellaneous Notices.

Tenth Industrial Exhibition of the Mechanics' Institute, S. F., 1875.

PRELIMINARY ANNOUNCEMENT.

The Board of Managers of the Tenth Industrial Exhibition has the pleasure of announcing that an Industrial Exhibition will be held, under the auspices of the Mechanics' Institute, in the city of San Francisco, to be opened on Tuesday, the 17th of August, 1875, at 11 A. M., and to continue open at least one month thereafter.

In making this public announcement, the Managers desire that those who intend to exhibit should send in their applications for space as early as possible, so as to avoid the necessity of excluding, as has been the case heretofore, the many desirable exhibitors who are unusually tardy in making applications.

The forthcoming Industrial Exhibition will be the tenth held under the auspices of the Mechanics' Institute, and the Managers are justified in saying that it will undoubtedly surpass in completeness of detail and general arrangement any heretofore held.

The last Exhibition was attended by 700,000 visitors, attracted hither by the fame of these Industrial Fairs, and for the purpose of investigation, business and pleasure.

All the available exhibiting space was applied for several weeks before the day of opening, and the Managers were compelled to deny admission to many desirable exhibitors.

The Board of Managers desire particularly that the arts, the industries and natural products of the country should be well represented at the forthcoming exhibition, and no pains will be spared to make these classes of exhibits a special feature there.

The Exhibition will be held in the building constructed for that purpose in 1874, but it will be materially enlarged and improved in many details for the Exhibition of 1875.

The space under roof will exceed 180,000 square feet, or about four and a half acres, exclusive of the Horticultural Garden, which will occupy 24,500 square feet additional.

The location of the Exhibition Building, on Eighth street, between Market and Mission streets, cannot be surpassed for convenience and accessibility, and can be approached from every part of the city by means of the various lines of street railroads, any of which bring visitors within two blocks of the entrance gate.

The utmost care has been exercised in providing for ample ventilation and light, and during the evening the building is brilliantly illuminated by over 5,000 gas lights.

The promenade avenues are broad, and 3,000 seats are provided for the comfort of visitors, for whose convenience there is also an excellent restaurant, under the management of a first-class restaurateur.

Every afternoon and evening the best orchestra the city can supply will discourse excellent music under the direction of an accomplished leader.

The building is always well attended by visitors, and during the last Exhibition over 29,000 were daily admitted for a number of days, and under no similar circumstances at the same exhibition, the mechanic, the inventor, producer or business man so advantageously place himself before the people of the Pacific Coast.

Persons desiring to obtain information, or to make application for space, should address "Managers of Tenth Industrial Exhibition, San Francisco, California," or make personal application as below.

It is expected that the various transportation companies will convey goods intended in good faith for exhibition, at half the usual rates.

Exhibitors from abroad, if they have no agent or consignee in San Francisco, can consign goods and mark the same to the "Manager of the Tenth Industrial Exhibition, 17 Post street, San Francisco," and they will be stored, if they arrive before the day of opening, free of expense, but no charges or expenses for freight or forwarding, etc., will be paid by the Managers.

In order to secure space, application should be made on or before July 20th, 1875.

Blanks will be furnished on application.

Premiums will be awarded as follows, viz: 16 gold medals, 50 silver medals, Society Diplomas, Certificates of Merit and Special Premiums, as the Board may determine.

Blanks for space can be obtained at the Mechanics' Institute on application by letter or otherwise; and any information will be given, by applying to any member of the Board of Managers, as below:

A. S. HALLIDAY.....113 Pine street.
JAMES O. PATRICK.....122 Battery street.
HENRY L. DAVIS.....421 California street.
D. E. HAYES.....213 Fremont street.
ASA R. WELLS.....Mechanics' Mill.
P. B. CORNWALL.....Cor. Spear & Eason streets.
OSCAR KELLOGG.....516 California street.
GEORGE FAULDING.....414 Clay street.
RICHARD SAVAGE.....139 Fremont street.
W. P. STOUT.....604 Merchant street.
J. H. MACDONALD.....217 Spear street.
J. P. CURTIS.....320 Jackson street.
R. B. WOODWARD.....Woodward's Gardens.
JAMES SPIERS.....311 Howard street.

To the Librarian of the Mechanics' Institute, or to J. H. CULVER, Secretary, 27 Post street, San Francisco.

Rules and Regulations of the Tenth Industrial Exhibition, Mechanics' Institute, S. F., 1875.

1. The Pavilion will be open for the reception of goods on Monday, August 2d. The exhibition will be open to the public on Tuesday, August 17th, at 11 o'clock A. M.
2. Applications for space must be made on or before July 20th, stating character of exhibit, amount and kind of space required—wall, table or floor. And, if cases, state length, width and height of case. Blanks will be furnished for this purpose, and a clerk will be in attendance at the Library of the Mechanics' Institute, every day from 12 to 1, and 7 to 10 P. M.
3. All persons presenting articles for exhibition must have them registered by the receiving clerk, who will give a receipt for the same, which receipt must be presented when the articles are withdrawn, at the close of the Exhibition.
4. Judges will be appointed by the Board of Managers, immediately upon the opening of the Exhibition, to examine all articles presented, in accordance with Article III, and the Managers will award premiums on such articles as the judges shall declare are worthy, which will be delivered as soon as they can be prepared. Due notice will be given of the announcement of premiums.
5. The mornings of each day, until 10 o'clock, will be appropriated to the Judges, and no visitors will be admitted during the time thus appropriated, except at the special request of the Judges, or by permission of the Managers.
6. Articles intended for sale may be labeled accordingly, but cannot be removed until the close of the Exhibition, except by written permission of the Managers.
7. Steam power will be provided, so that machinery

of all kinds may be seen in actual operation, and every facility possible will be given to exhibit working machinery to the best advantage.

8. The name of every article must be attached by the exhibitor to it.
 9. Articles intended for exhibition must be entered and placed on exhibition on or before Saturday, August 21st.
 10. Portable articles will be received, or may be removed at any time during the exhibition, with the consent of the Managers.
 11. The most effectual means will be taken, through the agency of the Police and otherwise, to guard and protect the property on exhibition; and it will be the purpose of the managers that all articles shall be returned to the owners without loss or injury. Still, all articles deposited will be at the risk of the owners.
 12. In case of any misunderstanding, application may be made to the Managers, who will at all times be in attendance.
 13. The Managers are desirous that articles should be presented early. Those from abroad, intended for exhibition, should be properly packed, and if not consigned to exhibitor's agent, must be marked, "MANAGERS OF TENTH INDUSTRIAL EXHIBITION, SAN FRANCISCO, CAL." All articles thus received, arriving too early, will be stored free of cost to the exhibitor, and the Managers will have them duly placed in proper position for exhibition. No freight charges will be paid by the Managers; but exhibitors are notified that arrangements are being made with various transportation companies to repay freight charges on evidence of goods prohibited.
- Information will be furnished by addressing MANAGERS OF TENTH INDUSTRIAL EXHIBITION, SAN FRANCISCO, CAL.

LEVI, STRAUSS & CO., Patent Riveted Clothing,



14 & 16 Battery St., San Francisco.

These goods are specially adapted for the use of FARMERS, MECHANICS, MINERS, and WORKING MEN in general. They are manufactured of the Best Material, and in a Superior Manner. A trial will convince everybody of this fact.

Patented May 12, 1873.
USE NO OTHER, AND INQUIRE FOR THESE GOODS ONLY. cow-bp

DAVID WOERNER,



COOPER,

No. 104 and 112 Spear St., San Francisco.

Wine Casks, Tanks, Tubs, Pipes, Beer Barrels, etc., Manufactured at Short Notices and LOW RATES.

LUMBER for CASKS, etc., TANKS, etc. Steamed and Dried if required. cow-hp.

Office of Drain Pipe Works,

S. W. Corner Sacramento and Montgomery Sts., S. F.

DRAINS

CONSTRUCTED In any part of the State, and

Work Warranted

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The National Gold Medal

WAS AWARDED TO

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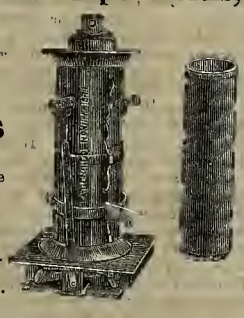
UNITED STATES,

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VIENNA MEDAL

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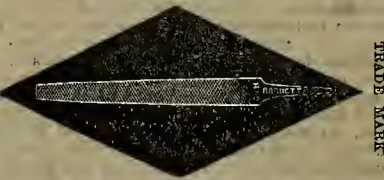
423 PINE STREET,

(Between Montgomery and Kearny.)

Persons engaged in the following business can have their Signs Painted at contract prices, for goods or articles in which they trade, viz:

Merchant Tailors, Gents' Furnish'g G'ds, Bootmakers, Furniture Dealers, Hatters, Jewelers, Hotels, Piano Fortes, Wine Merchants, Etc., Etc.

BLACK DIAMOND FILE WORKS.



G. & H. BARNETT,

Manufacturers of Files of every Description

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Philadelphia, Pa.

Sold by all the principal hardware stores on the Pacific Coast. 18v25-ly

SANBORN & BYRNES,



Mechanics' Mills, Mission Street,

Ret. First and Fremont, San Francisco. Orders from the country promptly attended to. All kinds of Stair Material furnished to order. Wood and Iron Turners, Billiard Balls and Ten Pins, Fancy Newels and Balusters. 26v8-3m-lp

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Pioneer Screen Works,

Removed to 32 Fremont Street, near Market.



J. W. QUICK, Manufacturer of perforated sheet metals of every description, at reduced rates. Mill owns a nailing Battery Screens extensively, can contract for large supplies at favorable rates. This is the only establishment on the Coast devoted exclusively to the manufacture of Screens.

Bronze Turkeys

Gohlbers, 30 to 40 pounds, Hens 15 to 20 pounds.



Emden Geese

40 to 50 pounds per pair at maturity.

LEGHORNS,

BANTAMS

HOUDANS.

BEGGS, fresh pure, packed so as to hatch after arrival on any part of the Coast. For Illustrated Circular and Price-List, address

[Please state where you saw this advertisement.]

Female Complaints should be cured, as they often are, by a few doses of Ayer's Sarsaparilla.

M. EYRE, Napa, Cal.

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For Diseases of the Throat and Lungs, such

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The few compositions, which have won the confidence of mankind and become household words, among not only one, but many nations, must have extraordinary virtues. Perhaps no one ever secured so wide a reputation, or maintained it so long, as AYER'S CHERRY PECTORAL. It has been known to the public about forty years, by a long continued series of marvellous cures, that have won for it a confidence in its virtues, never equalled by any other medicine. It still makes the most effectual cures of Coughs, Colds, Consumption, that can be made by medical skill. Indeed the CHERRY PECTORAL has really reached these dangerous diseases of their terrors, to a great extent, and given a feeling of immunity from their fatal effects, that is well founded, if the remedy be taken in season. Every family should have it in their closet for the remedy and prompt relief of its members. Sickness, suffering and even life is saved by the timely protection. The prudent should not neglect it, and the wise will not. Keep it by you for the protection it affords by its timely use in sudden attacks.

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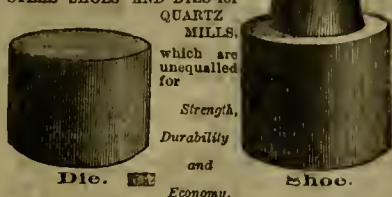
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88 Liberty street, N. Y.
Examination solicited.

OAKES'S PATENT



Quicksilver Strainer.

Patented January 26, 1875.

For description see MINING AND SCIENTIFIC PRESS, March 6, 1875.

For Cleaning Quicksilver Before Using it for Amalgamation.

Mill-men are invited to examine the Patent Quicksilver Strainer at the office of the Agents,

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To Suppl. of Quartz Mills and Mining Men generally:

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These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pan being filled the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Setters made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

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The well known full weight and superior quality of the Quicksilver produced at the New Almaden Mines, having induced certain unscrupulous persons to offer their inferior productions in tanks having our Trade Mark "A," notice is given to consumers and shippers that Quicksilver, A brand, guaranteed weight, can be purchased only from THOMAS BELL, or his duly appointed sub-agents.

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New Almaden, April 5th, 1875.



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MINING SHAREHOLDERS' DIRECTORY

ASSESSMENTS.—STOCKS ON THE LIST OF THE BOARDS

Company.	Location.	No.	Am't.	Levied.	Delinq't.	Sale.	Secretary.	Place of Business.
Belmont M Co	Nye Co Nevada	5	1 00	May 10	June 14	July 6	O H Rogers	402 Montgomery st
Celestino S M Co	Washoe	12	3 00	May 10	June 12	July 1	R Wegener	414 California st
Dayton G & S M Co	Washoe	8	1 00	June 08	June 15	Aug 5	W E Dean	419 California st
Empire M & M Co	Washoe	18	1 00	May 28	July 2	July 2	W E Dean	419 California st
Empire M & S Co	Washoe	5	Washoe	June 10	July 31	Aug 1	C R Gye	308 California st
Florida S M Co	Washoe	2	75	June 15	July 20	Aug 10	W E Dean	400 Pine st
Gold Mt G M Co	Bear Valley Cal	5	50	May 1	June 5	July 1	J P Cavalier	513 California st
Huhn & Hunt S M Co	Ely District	11	50	May 7	June 15	July 9	T L Kimball	409 California st
Idaho M Co	Idaho	13	1 00	April 23	May 15	July 1	R Higgins	402 Montgomery st
Iowa M Co	Washoe	3	10	May 13	June 14	July 7	A C Cooper	402 Montgomery st
Jacob Little Cons M Co	Washoe	1	10	May 31	June 10	July 20	W R Townsend	330 Pine st
Julia G & S M Co	Washoe	22	2 00	May 12	June 15	Aug 3	A Noel	419 California st
Kearney M Co	Washoe	12	2 00	May 19	June 15	Aug 1	W R Townsend	419 California st
Kossuth M Co	Washoe	4	1 00	June 12	June 15	Aug 21	E E Swift	419 California st
Lady Bryan M Co	Washoe	7	1 00	May 10	June 10	June 29	E E Swift	419 California st
Leviathan M Co	Washoe	5	50	May 29	July 6	July 28	E E Swift	507 Montgomery st
Marble M Co	Washoe	10	Washoe	June 10	July 16	Aug 1	J L Jennings	419 California st
Nevada G & S M Co	Washoe	1	25	June 3	July 8	July 27	Joseph Maguire	419 California st
Nevada Land & M Co	Elko Nev	17	20	May 14	June 19	July 8	Wm H Watson	302 Montgomery st
Ninewa O & S M Co	Washoe	0	50	April 16	May 19	June 8	W R Townsend	340 Pine st
Original Gold Hill M Co	Washoe	29	2 00	May 12	June 15	July 1	J M Cullen	419 California st
Pack S M Co	Washoe	3	50	April 4	May 9	July 28	W M Holmes	401 California st
Pack S M Co	Ely District	9	1 00	May 3	June 10	July 1	E E Elliott	419 California st
Rock Island G & S M Co	Washoe	8	1 00	May 19	June 21	July 12	J W Clark	419 California st
Rock Island G & S M Co	Washoe	1	1 00	April 27	May 15	June 1	J W Clark	419 California st
Sierra Nevada S M Co	Washoe	41	09	May 31	June 5	June 24	R Wegener	414 California st
Silver Cori M Co	Idaho	9	1 00	April 24	May 31	June 21	O B Higgins	402 Montgomery st
Silver Hill M Co	Washoe	5	2 00	June 6	Aug 4	Aug 4	W E Dean	419 California st
Southern Charlotte M Co	Idaho	1	75	June 10	Aug 13	Aug 13	W E Dean	419 California st
Utah S M Co	Washoe	10	2 00	June 1	July 9	July 30	W E Dean	419 California st

OTHER COMPANIES—NOT ON THE LISTS OF THE BOARDS

Champion Cons M & S Co	Nevada	1	00	May	July	July	J M Buntington	311 California at
Cherokee Flat Blue Gravel M Co	Cal	34	5	April 23	May 29	June 19	O R Bogart	402 Montgomery at
Chrysopsis G & S M Co	Washoe	10	05	May 7	June 10	June 26	A Noel	419 California at
Che G & C Co	Grass Valley Cal	5	00	April 23	May 26	June 19	W Bradwell	53 California at
Combination G & S M Co	Inyo Co Cal	6	10	April 22	May 27	June 16	D Winger	Merchants' Ex
Compositional M Co	Washoe	1	25	June 9	July 13	July 3	M Landars	507 Montgomery at
Cherry Creek M & M On	Nev	3	25	May 18	June 13	July 15	D F Verdinal	409 California at
Corrillers G & S M Co	Mexico	20	10	May 8	June 18	July 3	Henry R Reed	321 Washington at
Ed M Co	Cal	2	00	June 3	July 1	July 1	W H Hart	413 California at
El Dorado W & D G M Co	Cal	9	10	June 3	July 1	July 22	H Elias	416 Montgomery at
Emma Hill Cons M Co	Utah	2	00	June 14	July 9	Aug 19	L O Fowler	302 Montgomery at
Equitable Tunnel & M On	Utah	10	25	May 12	June 16	July 7	C S Henly	Merchants' Ex
Elyon M Co	Humboldt Cal	10	00	June 1	July 1	July 1	H J Hargrave	220 Montgomery at
Fresno Q M On	Fresno Co Cal	2	25	June 14	July 24	Aug 14	R Wegman	414 California at
Geneva Cons S M Co	Nevada	25	25	May 13	June 14	June 30	T T Millikan	309 Montgomery at
Old Run M Co	Washoe	12	15	June 5	July 10	July 30	O Palmer	41 Market at
Old Gate Cons M Co	Utah	6	00	April 28	May 12	June 22	H B Gouffon	Merchants' Ex
Iahn S M Co	Inyo Co Cal	1	10	June 1	July 3	July 3	Daniel Scott	331 Montgomery at
Illinoi-Central M Co	Idaho	3	75	May 21	June 21	July 12	R H Brown	402 Montgomery at
Lady Washington M Co	Washoe	4	00	June 16	July 20	Aug 9	O K Kibbe	419 California at
Lake & Quiver Silver M Co	Cal	10	00	May 10	June 18	July 5	Andrew Baird	518 California at
Prieto M Co	Cal	3	00	June 2	July 18	Aug 1	S H Hargrave	6 Montgomery at
Minnis Tunnel & M Co	Utah	1	5	April 28	June 1	June 22	H B Gouffon	Merchants' Ex
Mount Savage M Co	Utah	2	10	June 12	July 26	Aug 17	D F Verdinal	409 California at
North Carson S M Co	Cal	2	25	May 12	June 16	July 7	Nathan Leach	416 California at
Northley Hill & Central Hill M Co	Cal	2	00	June 18	July 18	Aug 6	W H Hart	311 California at
Omega Table Mountain M Co	Cal	6	5	June 8	July 13	Aug 2	David Wilder	Merchants' Ex
Oreline M Co	Grass Valley Cal	5	2	May 30	June 6	July 28	G P Thurston	513 California at
Oreline M Co	Grass Valley Cal	4	1	00	May 21	June 22	Geo P Thurston	315 California at
Oreline Cons M Co	Kearney Nev	1	00	April 23	May 23	June 23	Wm Willits	419 California at
Red Jacket M Co	Idaho	7	00	May 21	June 25	July 16	Geo W Thill	419 California at
Rocky Bar M Co	Washoe	10	10	April 22	May 27	June 27	J P Cavalier	513 California at
Scorpion S M Co	Washoe	25	May 28	June 30	July 21	G R Spinney	320 California at	
South Central Cons M Co	Cal	1	00	June 15	July 15	Aug 1	W H Hart	419 California at
South Overman S M Co	Washoe	2	50	May 11	June 12	June 19	D Winger	Merchants' Ex
Star King S M Co	Elko Co Nevada	11	25	May 21	June 26	July 17	L Karlan	Merchants' Ex
Tabla Mountain Alpha M Co	Cal	7	10	June 5	July 18	Aug 2	Leander Leavitt	401 California at
Equitable Tunnel & M Co	Utah	10	25	May 12	June 16	July 7	Wm Seall	419 California at
Union Gravel M Co	Nevada Co Cal	10	10	May 24	June 14	Aug 2	T B Winger	320 California at
Virginia Cons M Co	Inyo Co Cal	10	10	April 21	June 1	June 28	T B Winger	316 California at
Weaverville D & H M Co	Cal	6	1	00	May 4	June 7	H Rogers	330 Pine at
Win Penn Cons G & S M Co	Washoe	3	25	May 19	June 19	July 2	F Pope	421 Montgomery at
Winniford Cons M Co	Nevada Co Cal	3	25	May 12	June 12	June 21	Wm Hargrave	Merchants' Ex
Zucatero G M On	Calaveras Co Cal	3	10	April 27	June 3	June 21	L Hermann	Merchants' Ex

MEETINGS TO BE HELD

Name of Co.	Location.	Secretary.	Office in S. F.	Meeting.	Date.
Alpha Cons M Co	Washoe	Wm Willis	414 California at	Annual	June 21
Alpha S M Co	Washoe	O D Squire	Stevens' s Bldg	Special	June 23
Alpha Cons M Co		B Curry	207 Montgomery at	Annual	June 22
Cybrs-polio O & S M Co		Called by Directors	419 Calif r- 1st	Special	July 7
Florence M Co		Sec't Station	220 Montgomery at	Annual	July 17
Imperial S M Co		A H Kox		June 25	June 25
Imperial S M Co	Washoe	W E Dean	413 California at	Annual	June 14
Mohorany M Co	Idaho	Called by Trustees	402 Mont'ry at	Special	July 17
Imperial S M Co	Butte & Cal	Chas S Maler	Merchants' Ex	Annual	June 21
Panper M Co	Idaho	Called by Trustees	402 Mont'ry at	Special	July 1
Pride of Washoe G & S M Co	Washoe	Wm E Moody	414 California at	Special	June 30
Imperial S M Co	Washoe	Chas M Co	211 California at	Special	July 17
Washington & Greole M Co	Ely Id	F D Cleary	Merchants' Ex	Annual	July 14

LATEST DIVIDENDS (within three months)—MINING INCORPORATIONS.

Name of Co.	Location.	Secretary.	Office in S. F.	Amount.	Payable.
Bolcher M Co.	Washee	H. O. Kihbe,	419 California st	3 00	Jan 11
Black Bear Quartz Co.	Cal	W. Oliver		25	June 17
Charlier M & N Co	Cal	Frank Swift	401 California st	40	Nov 16
Chas E Virginia M Co	Washee	Chas H Fink	419 California st	10 00	June 11
Crown Point M Co	Washee	C E Elliott	419 California st	2 00	Jan 12
Diana M Co	Cal	C. C. Fasset.	220 Clay st.	1 00	Jan. 25
Edwards M Co	Cal	A. Jennings	401 California st	1 00	Jan 15
Eureka Consolidated M Co	Nev	W W Traylor	419 California st	1 00	June 1
Excelsior M & M Co		Frank Swift	419 California st	1 00	April 10
Jederson S M Co		O. A. Sankey	331 Montgomery st	1 00	May 15
Leopard M Co		R H Brown		1 00	June 16
Manhattan S M Co	Nevada	Chas S Neal	419 California st	1 50	June 14
Northerton Sells M & M Co		W White	419 California st	1 00	June 13
Reeds W Co		L E plan	409 California st	50	June 25
Rye Ratch M Co	Nevada	D F Verdinal	409 California st	50	Mar 5

LEATHER

[WHOLESALE]

WEDNESDAY M., JUNE 16, 187

Santa Cruz Leather, 8 D.	2
Cuntry Leather, 8 D.	2
Stockton Leather, 8 D.	2
Jodot, 8 Kil, 1 doz.	\$50 00
Jodot, 11 to 13 Kil, per doz.	88 00
Jodot, 14 to 19 Kil, per doz.	82 00
Jodot, 20 Kil, 1 doz.	92 00
Cornellian, 12 to 15 Kil.	57 00
Cornellian, 12 to 15 Kil.	83 00
Cornellian Females, 12 to 13 Kil.	71 00
Simon Ulmo, 12 to 15 Kil.	69 00
Simon Ulmo Females, 14 to 15 Kil.	70 00
Simon Ulmo Females, 16 to 17 Kil.	73 00
Simon, 24 Kil, 1 doz.	65 00
Simon, 24 Kil, 1 doz.	72 00
Robert Calf, 7 and 9 Kil.	35 00
French Kip, 8 and 9 Kil.	1 00
California Kip, 7 and 9 Kil.	40 00
French Sheep, all colors, 8 dms.	8 00
Eastern Calf for Backs, 8 dms.	1 00
French Sheep, all colors, 8 dms.	5 00
Sheep Runners for Linings, 8 doz.	5 50
California Kneest Sheep Linings.	1 75
Best Jodot Calf, 8 doz. Legs, 8 pair.	4 00
Best French Calf, 8 doz. Legs, 8 pair.	4 00
French Calf Root Legs, 8 pair.	4 00
Harness Leather, 8 D.	30
Best Bridle Leather, 8 D.	48
Skirting Leather, 8 D.	30
Welt Leather, 8 D.	30
Snit Leather, 8 foot.	17

METALS.

[WHOLESALE]

WEDNESDAY M., June 16, 187

Scotch Pig Iron, 3 ton.	45 00	20 48
White Pig, 3 ton.	20 00	20 46
Oregon Pig, 3 ton.		
Refined Bar, good assortment, 3 D.		
Boiler, No. 1 to 4.		
Plate, No. 5 to 8.		
Sheet, No. 10 to 14.		
Sheet, No. 16 to 20.		
Sheet, No. 22 to 24.	5 6	
Sheet, No. 26 to 28.	5 6	
Horse Shoes, per doz.	7 50	8
Nail Rod.		
Nail Rod.		
Norway Iron.		
Coiled Iron.		
Other Irons for Blacksmiths, Miners, etc.		
COPPER.		
Braziers.	34 00	
Sheeting, Old.	37 1/2	
O'Neil's Pat.	37 1/2	
Sheeting, New.	40 00	
Sheeting, Yellow.		
Sheeting, Old.		
Composition Nails.	24 00	
Composition Bolts.		
STEEL.—English Cast, 3 D.	20 00	
Anderson & Woods' American Cast.		
Drill.		
Flat Bar.	18 00	
Flow Steel.	9 00	
THE PLATE.		
10x14 I O Charcoal.	12 00	20 12
10x14 I X Charcoal.	14 00	20 14
Roofing Plate I O Charcoal.	11 00	20 11
Roofing Plate I X Charcoal.	30 00	20 30
Anstralian.	23 00	20 23
ZINC.—By the Case.		
zinc, Sheet 1x3 ft, No 1 to 10	do	do
do do 7x10 ft, No 1 to 10	do	do
do do 8x1 ft, No 8 to 10	do	do
do do 8x1 ft, No 11 to 10	do	do
NAILS Assorted sizes.	4 25	8
QUICKSILVER, per lb.	65 00	

WOODWARD'S GARDENS embraces an Aquarium, Hortum, Art Gallery, Conservatories, Tropical House, Menagerie, Seal Ponds and Skating Rink.

BACK VOLUMES of this paper can be had for \$3 each including 26 numbers.

Gold. Legal Tenders. Exchange. Etc.

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[Corrected Weekly by CHARLES SUTRO & Co.]

SAN FRANCISCO, June 16, S P.

LEGAL TENDERS in S. F., 11 A. M., 86¾ to 87¼.
 GOLD in N. Y., 116¾
 GOLD BARS, 890. SILVER BARS, 4 and 4½ per cent.
 count.

EXCHANGE on N. Y., $\frac{3}{4}$ per cent. premium for gold; London bankers, 49; Commercial, 49 $\frac{1}{4}$; Paris, five francs per dollar; Mexican dollars, one and two per cent. count.

QUICKSILVER in S. F., by the flask, per lb, 65c@70c,

dis- WOODWARD'S GARDENS embraces an Aquarillum, Mu-
num, Art Gallery, Conservatories, Tropical House

Menagerie, Seal Ponds and Skating Rink.

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including 26 numbers.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

[FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.]

By Special Dispatch, Dated Washington, D. C., June 15th, 1875.

FOR WEEK ENDING JUNE 1st, 1875.

MACHINE FOR BENDING HORSE SHOES.—Arthur Barton, Nevada, Cal.

AMALGAMATOR.—Wm. H. Carson, San Jose, Cal.

ATTACHMENT FOR COOKING STOVES.—Frank Enos, Mineral City, Nevada.

ENDLESS ROPE TRACTION RAILWAY.—A. S. Hallidie, S. F., Cal.

FUME BATTERY.—D. F. Hawkes, Timbuctoo, Cal.

CUTTER HOLDER FOR METAL LATHES.—J. R. Mitchell, Hayward, Cal.

SLOW MATCH FOR LIGHTING FUSES.—Adam S. Wall, Graniteville, Cal.

PROCESS FOR PREPARING COCOANUT FOR DOMESTIC USE.—Alex. P. Ashbourne, Oakland, Cal.

TRADE-MARK.

FOR MATCHES.—John W. Tucker, S. F., Cal.

The patents are not ready for delivery by the Patent Office until some 14 days after the date of issue. Note.—Copies of U. S. and Foreign Patents furnished by DEWEY & CO., in the shortest time possible (by telegraph or otherwise) at the lowest rates. All patent business for Pacific coast inventors transacted with perfect accuracy and in the shortest possible time.

General News Items.

Last Sunday morning, as one of Montgomery Queen's circus wagons, from which the horses had been unhitched, was being moved down Carson street, Virginia, by three of the attendants, those in charge lost control and the ponderous vehicle dashed down the steep incline at a terrific rate of speed and finally plunged into a dwelling house on I street. In the front room a young lady named Gilmore was in bed with her little niece. The wagon broke through the front of the house, completely demolishing it, and severely injuring Miss Gilmore.

JACK COTTON and Mrs. Norton, the chief and accomplice in the Santa Barbara Co. tragedy, passed through this city on Monday for Santa Barbara. They were arrested at Wadsworth, Nev., where Jack had found employment after fleeing from the scene of his crime.

A CHILD in Auburn, Placer Co., was attempting to pick the inside out of a giant powder cap with a pin, some days ago, when the cap exploded, blowing off part of the thumb and forefinger on his right hand.

HORACE B. CLAFLIN, John Claflin, Daniel Robinson, Dexter N. Force and W. H. Talcot, merchants of New York, have given bail in \$20,000, under indictments against them for silk smuggling.

ATELL has been transferred from Utah to New Mexico as Governor, and the President has appointed as his successor among the Mormons George W. Emory, of Massachusetts.

CONGRESSMAN-ELECT Wm. S. King, indicted in connection with the Pacific Mail subsidy, was admitted to bail on Saturday last in Washington, in the sum of \$5,000.

IDA DAMEBONS, aged 14 years, who was fishing in a skiff tied to the ferry boat at Knight's Landing, last Friday afternoon, fell overboard and was drowned.

JOHN P. GARNER, a prominent merchant of Boston, suicided last week. No cause attributed. Wealth abundant—family relations agreeable.

THE State Teachers' Convention was held in San Jose last week.

A REVIVAL is in progress in Stockton.

Agricultural Items.

THE Novato ranch, in Novato valley, half way between Petaluma and San Rafael, and about twenty-five miles from San Francisco, is offered for sale. It contains about 15,000 acres of land.

THE Olympia, W. T., Farmer says: Cherries will soon be ripe; wild strawberries are ripe and seem to be plenty this year, but it is said that plums will be rather scarce.

A BUNCH of oat stocks six and one half feet long, grown this year on a ranch near Watsonville, was shown to the editor of the Pajaronian the other day.

PREPARATIONS are being made for putting the swamp lands to the south of Bakersfield, along the Kern Island canal, in a high state of cultivation.

JAMES FULTON sold last week to Jacob Keithly sixty-nine acres of land, half a mile from the depot, at Fulton, for \$10,000 in gold coin.

THE work of planting orange orchards was never more vigorously prosecuted in Los Angeles county than at the present time.

THE grasshoppers are doing considerable damage to crops at Eagleville, Modoc county.

Industrial Items.

MR. DAVIS, of Salinas City, is burning a fine brick kiln in the southern part of the town, near his residence. The kiln is 50 feet long, 40 wide, and 14 high, and contains about 350,000 brick.

THE Directors of the Woodland, Clear Lake and Humboldt railroad are at work securing the right of way for the section between Woodland and Capay.

THE town council of San Buenaventura has granted a gas franchise to leading citizens. It provides that works shall be erected within 18 months.

THERE is talk of establishing a wine cellar at Fulton. One-half the stock of \$10,000 is already taken.

THE Union understands that there is something more than talk in the matter of establishing woolen mills at San Diego.

THE Anaheim hotel is to cost \$40,000, will be three stories high and contain eighty rooms.

THANKS "FROM THE DEPTHS OF THE HEART."

WELLINGTON, LORAIN CO., O., Aug. 21, 1874.

Dr. R. V. PIERCE, Buffalo, N. Y.: Dear Sir—Your medicines, Golden Medical Discovery, Dr. Sage's Catarrh Remedy, have proved of the greatest service to me. Six months ago no one thought that I could possibly live long. I had a complication of diseases,—scrofula, manifesting itself in eruptions and great blotches on my head that made such sores that I could not have my hair combed without causing me much suffering; also causing swollen glands, tonsils enlarged, enlarged or "thick neck," and large and numerous boils. I also suffered from a terrible Chronic Catarrh, and in fact I was so diseased that life was a burden to me. I had tried many doctors with no benefit. I finally procured one-half dozen bottles of your Golden Medical Discovery and one dozen Sage's Catarrh Remedy, and commenced their use. At first I was badly discouraged, but after taking four bottles of the Discovery I began to improve, and when I had taken the remaining I was well. In addition to the use of Discovery I applied a solution of Iodine to the Goiter or thick neck, as you advise in pamphlet wrapping, and it entirely disappeared. Your Discovery is certainly the most wonderful blood medicine ever invented. I thank God and you, from the depths of my heart, for the great good it has done me. Very gratefully,

Mrs. L. CHAFFEE.

Most medicines which are advertised as blood purifiers and liver medicines, contain either mercury in some form, or potassium and iodine variously combined. All of these agents have strong tendency to break down the blood corpuscles, and debilitate and otherwise permanently injure the human system, and should therefore be discarded. Dr. Pierce's Golden Medical Discovery, on the other hand, being composed of the fluid extracts of native plants, barks and roots, will in no case produce injury, its efforts being strengthening and curative only. Sarsaparilla, which used to enjoy quite a reputation as a blood purifier, is a remedy of thirty years ago, and may well give place as it is doing, to the more positive and valuable vegetable alternatives which later medical investigation and discovery has brought to light. In Scrofula or King's Evil, White Swellings, Ulcers, Erysipelas, Swelled Neck, Goitre, Scrofulous Inflammations, Indolent Inflammations, Marcurial affections, Old Sores, Eruptions of the Skin and Sore Eyes as in all other blood diseases, Dr. Pierce's Golden Medical Discovery has shown its great remedial powers, curing the most obstinate and intractable cases. Sold by all dealers in medicines.—Com.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- J. L. THARP—San Francisco.
- B. W. CROWELL—California.
- A. C. CHAMBERLAIN—Tulare, Fresno and Inyo Counties.
- JOHN ROBERTSON—California.
- A. C. KNOX—California.
- G. W. MCGHEE—Santa Clara county.
- CHAS. T. BELL—California, Oregon and W. T.
- D. J. JAMES—Abstralian Colonies.

A COMPLIMENT.

PLAINSBORO, MICHIGAN CO. CAL., June 22, 1874. DEWEY & CO.—Gentlemen: I herewith tender my grateful acknowledgments for the energy, promptness and efficiency which you have displayed in procuring my patent.

Although you were entire strangers to me when I first communicated with you, I soon felt satisfied you were gentlemen of integrity, and shall always be happy to represent you as such. Very truly yours,

H. W. RUCKER, M. D.

CAMPO, SAN DIEGO CO., CAL., July 3d, 1874. Messrs. DEWEY & CO.—Gentlemen: To-day I received the patent and other papers of my animal trap, that you so successfully worked through the patent office for me, for which please accept my best wishes. The chances are that I will have another application for you to make for me before long. I am well satisfied with your manner of doing business, and I think inventors of this coast stand in their own light when they do not put their business into your hands.

I remain yours truly, A. M. GASS.

SANTA CLARA, CAL., April 6th, 1875.

Messrs. DEWEY & CO.—Gentlemen: We have just received Patent No. 160,535, for J. T. Watkins & Co's Mammoth Road Grader, which was patented through your Agency. It is the bestest and best that we have ever received. We feel proud of it and thankful to you for the care and attention that you have given it, and when we have anything to do in that line of business we will surely give you a call. Very respectfully,

J. T. WATKINS & Co.

The Mining & Scientific Press.

Started in 1860, is one of the oldest weekly journals now published in San Francisco. It has been conducted by its present proprietors for ten years, during which period it has been repeatedly enlarged and constantly improved. The active and steadfast efforts of its publishers have gained for its conduct an amount of practical experience greater than any other publishers have accumulated on this coast, of a weekly journal.

The sum paid by us for the best editorial talent obtainable for our special class journal; for engravings, for interesting news and correspondence, and for printing a large-sized, handsome sheet, is unequalled by that of any other American weekly west of the Mississippi. As a PRACTICAL MINING JOURNAL it has no rival on this Continent.

It is the only MECHANICAL, and the only SCIENTIFIC journal of the Pacific States. Miners, Assayers, Millmen, and Metallurgists in the United States should take it. Pacific Coast Mechanics, Engineers, Inventors, Manufacturers, Professional Men, and Progressive and Industrial Students should patronize its columns of fresh and valuable information. Mining Engineers, Superintendents, Metallurgists, Mine Owners and Mine Workers throughout the world should profit by its illustrations and descriptions of New Machinery, Processes, Discoveries and Record of Mining Events. Intelligent thinkers throughout the land, in high or humble situation, who would avoid literary trash for genuine information, should SUBSCRIBE AT ONCE.

DEWEY & CO., No. 224 Sansome street, S. F.

UNITED STATES

Mineral Land Laws, Revised Statutes, and Instructions and Forms Under the Same.

We have just issued a pamphlet containing the general mineral land laws of the United States, with instructions of the Commissioner of the Land Office. The contents of this pamphlet comprise all of the Government laws with relation to mineral lands of interest to the mining community, as follows: Mining Statute of May 10th, 1872, with Instructions by the Commissioner of the Land Office; Mining Statute of July 26th, 1866; Mining Statute of July 9th, 1870; Forms required under Mining Act of May 10th, 1872, as follows: Notice of Location; Request for Survey; Application for Patent; Proof of Posting Notice and Diagram of the Claim; Proof that Plat and Notice remained Posted on Claim during Time of Publication; Register's Certificate of Posting Notice for Sixty Days; Agreement of Publisher; Proof of Publication; Affidavit of \$500 Improvement; Statement and Charge of Fees; Proof of Ownership and Possession in Case of Loss or absence of Mining Records; Affidavit of Citizenship; Certificate that no Suit is Pending; Power of Attorney; Protest and Adverse Claim; Non-Mineral Affidavit; Proof that no Known Veins Exist in a Placer Claim, etc. There is also given the U. S. Coal Land Law and Regulations thereunder. The work comprises thirty pages, and will be sold, post-free, for 50 cents. It should be in the hands of every one having any mining interests. DEWEY & CO., Publishers of MINING AND SCIENTIFIC PRESS, S. F.

N. B.—We have also added to the above publication, the REVISED STATUTES OF THE UNITED STATES, so far as relates to Mining Laws.

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The Large Circulation of the MINING AND SCIENTIFIC PRESS extends throughout

the mining districts of California, Nevada, Utah, Colorado, Arizona, Idaho, Montana, British Columbia and to other parts of North and South America. Established in 1860, it has long been the leading Mining Journal of the Continent. Its varied and reliable contents giving it a character popular with both its reading and advertising patrons.

Mining and Other Companies.

Geneva Consolidated Silver Mining Company.

Location of principal place of business, City and County of San Francisco, State of California. Location of works, Cherry Creek Mining District, White Pine County, State of Nevada.

Notices.—There are delinquent upon the following described stock, on account of assessment (No. 5) levied on the 13th day of May, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
George W. Bihrens.....	5	300	\$ 75 00
George W. Bihrens.....	6	200	50 00
I T Milliken, Trustee.....	10	78	19 50
I T Milliken, Trustee.....	14	50	12 50
I T Milliken, Trustee.....	20	2079	519 75
I T Milliken, Trustee.....	67	100	25 00
I T Milliken, Trustee.....	68	100	25 00
I T Milliken, Trustee.....	69	100	25 00
I T Milliken, Trustee.....	70	100	25 00

Names.	No. Certificate.	No. Shares.	Amount.
I T Milliken, Trustee.....	71	100	25 00
I T Milliken, Trustee.....	83	100	25 00
I T Milliken, Trustee.....	84	100	25 00
I T Milliken, Trustee.....	85	100	25 00
I T Milliken, Trustee.....	86	100	25 00
I T Milliken, Trustee.....	87	100	25 00
I T Milliken, Trustee.....	92	3000	500 00
I T Milliken, Trustee.....	93	1800	450 00
I T Milliken, Trustee.....	94	741	185 25
I T Milliken, Trustee.....	134	1750	437 50
I T Milliken, Trustee.....	135	4000	1000 00
I T Milliken, Trustee.....	136	8375	1343 75
Charles Camden.....	23	312	78 00
Charles Camden.....	43	1250	312 50
Robert Merrill.....	24	1000	250 00
M W Kales, Trustee.....	99	500	125 00
M W Kales, Trustee.....	100	500	125 00
M W Kales, Trustee.....	101	500	125 00
M W Kales, Trustee.....	102	500	125 00
James T. Maclean.....	36	750	187 50
James T. Maclean.....	38	45	11 25
H Barroilhet.....	32	1250	312 50
Camilo Martin, Trustee.....	33	1250	312 50
Robert McBeth.....	34	1250	312 50
D M Kenfield.....	35	1250	312 50
George F. Celsie.....	41	1250	312 50
A H Sullivan.....	117	100	25 00
C D Sullivan.....	118	250	62 50
S M Tholl.....	47	625	156 25
Jeremiah Callaghan.....	63	625	156 25
C B Land.....	54	313	78 25
Jas Thos Boyd.....	58	230	57 50
John Hahn, Trustee.....	126	125	31 25
J L Laporte.....	61	156	39 00
A H Rytherford.....	63	250	62 50
George Treat, Trustee.....	64	1000	250 00
George Treat, Trustee.....	65	1000	250 00
J W Phillips, Trustee.....	65	100	25 00
William Condon.....	128	125	31 25
Joseph Moigg.....	129	125	31 25
James Parsons.....	130	125	31 25
W C Leonard.....	131	125	31 25
Alexander Taylor.....	132	100	25 00

Nevada Land and Mining Company—

Location of principal place of business, San Francisco, California. Location of works, Spruce Mountain Mining District, Elko County, State of Nevada. Notice is hereby given, that at a meeting of the Board of Directors, held on the 14th day of May, 1875, an assessment (No. 17) of Two cents per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, Rooms 5 and 6, No. 302 Montgomery street, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 19th day of June, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on the 28th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors, WM. H. WATSON, Secretary.

Orleans Mining Company—Location of

Principal place of business, San Francisco, California. Location of works, Grass Valley Mining District, Grass Valley, Nevada County, California. Notice is hereby given, that at a meeting of the Board of Trustees of said company, held on the 31st day of May, 1875, an assessment, No. 5, of two dollars per share was levied upon the capital stock of said company, payable immediately in gold coin of the United States of America to the Secretary, at the office of the company, room 8, No. 315 California street, San Francisco, California.

Any stock upon which said assessment shall remain unpaid on the 8th day of June, 1875, shall be delinquent, and day as delinquent, and unless payment shall be made before, will be sold on the 28th day of June, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office—Room 8, No. 315 California street, San Francisco, California.

Umpire Tunnel and Mining Company—

Principal place of business, San Francisco, California. Location of works, Big Cottonwood District, Salt Lake County, Utah.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of May, 1875, an assessment (No. 4) of Five (5) cents per share was levied upon the capital stock of the corporation, payable immediately in United States currency, to the Secretary, at the office of the company, No. 531 California street, San Francisco, Cal., to the Superintendent.

Any stock upon which said assessment shall remain unpaid on the 1st day of July, 1875, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on Monday, the 2nd day of August, 1875, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

Office, Room 1, No. 531 California street, San Francisco, California.

Virginia Consolidated Mining Company—

Location of principal place of business, San Francisco, State of California. Notice.—There are delinquent upon the following described stock, on account of assessment levied on the 21st day of April, 1875, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Certificate.	No. Shares.	Amount.
Edward Mohan.....	18	425	\$49 50
Edward Mohan.....	192	24	2 40
Thomas Bertrand.....	187	58	58 80
John McHenry.....	168	227	22 70
Catherine Fitzpatrick.....	65	227	22 70
John Mallon.....	43	100	10 00
Mrs Mary Bertram.....	170	454	45 40
J L Osgood.....	39	340	34 00
W O Bradley.....	139	114	11 40
E Chenot, Trustee.....	35	5000	500 00
E Chenot, Trustee.....	145	454	45 40
A F Benard, Trustee.....	25	100	10 00
A F Benard, Trustee.....	25	127	12 70
A Wingard.....	174	100	10 00
A Wingard.....	49	100	10 00
A F Benard, Trustee.....	98	140	14 00
A F Benard, Trustee.....	104	50	5 00
A F Benard, Trustee.....	142	227	22 70
John J Mountain.....	124	100	10 00
John J Mountain.....	125	100	10 00
John J Mountain.....	134	50	5 00
J W Pearson.....	157	10,325	1,032 50
A F Benard.....	188	100	10 00

And in accordance with law, and an order of the Board of Directors, made on the 21st day of April, 1875, so many shares of each parcel of said stock as may be necessary, will be sold at public auction at the salesroom of Maurice Dore & Co., No. 325 Pine street, San Francisco, on the 28th day of June, 1875, at the hour of 12 o'clock, m., of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

Office, No. 318 California street, San Francisco, California. (Room No. 13.)

Iron and Machine Works.

San Francisco Boiler Works,

Will Remove about June 1st, to N. W. Cor.
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LEWIS R. MEAD.....Secretary

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24v22-3m JOSEPH MOORE, Superintendent.

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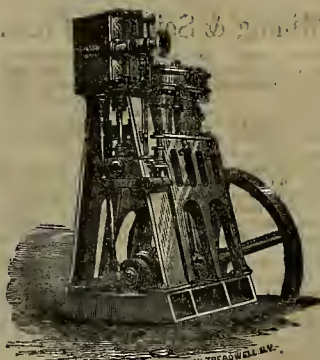
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Castings, Brass Ship Work of all kinds, Spikes, Sheathing
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Gensets of superior tone. All kinds of Cocks and Valves, Hy-
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SERS, &c.

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standingly, parties about to erect Reduction Works as to
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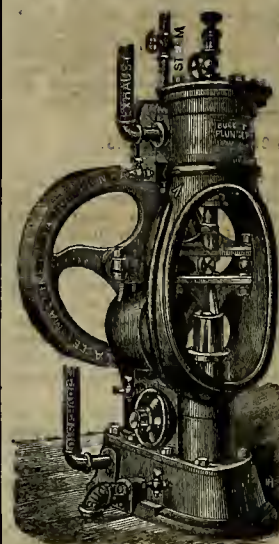
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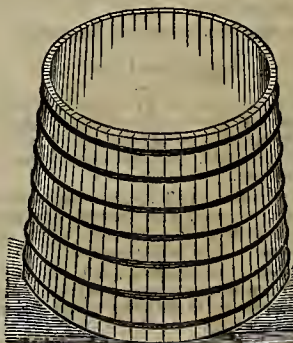
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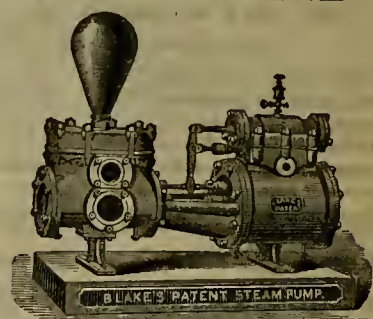
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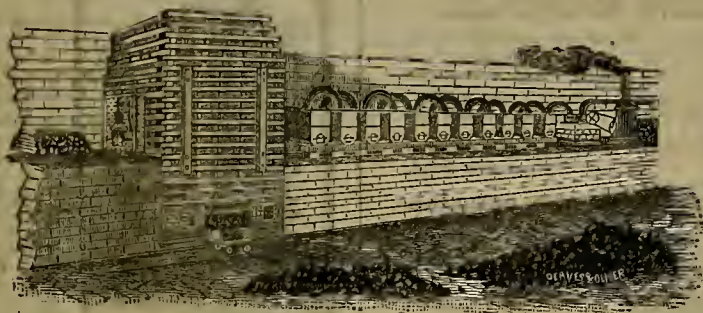
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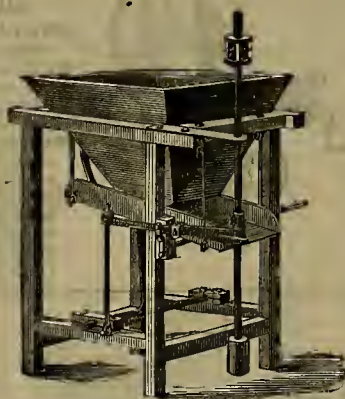
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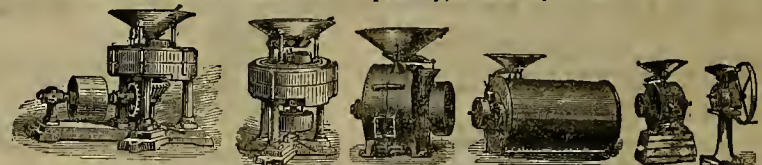


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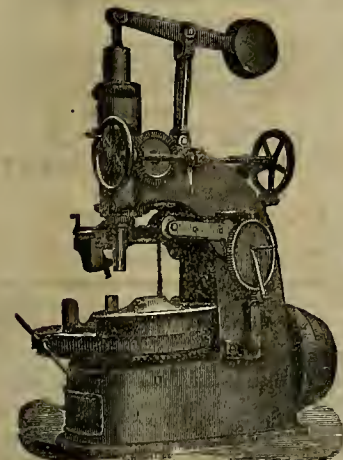
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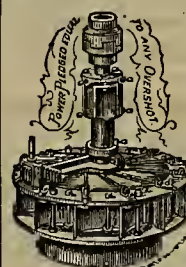
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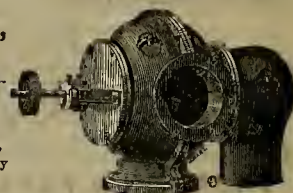
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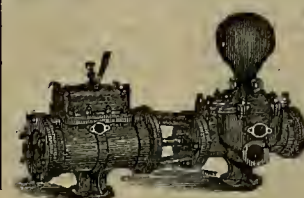
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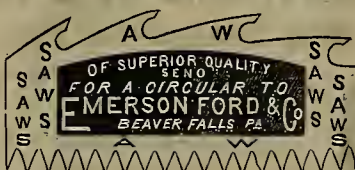
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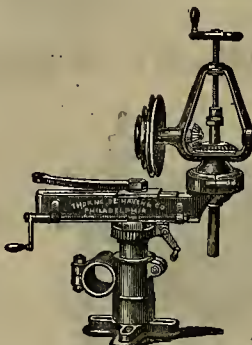
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SAN FRANCISCO, SATURDAY, JUNE 26, 1875.

VOLUME XXX
Number 26.

California Geology.

The Great Plunges on the Tertiary.

At the last meeting of the California Academy of Sciences, Mr. Amos Bowman, formerly of the State Geological Survey, read a paper on the above subject, as follows:

I wish to call attention to the facts, which may be observed and confirmed by residents of nearly every portion of the State, going to show that California has risen out of the sea at the dawn of our creation, that is to say, the creation of the mammals of the tertiary period, and that since this comparatively recent event it sank out of sight again, under the sea, bodily.

Only the mountain tops of the coast counties rose above the surface. The movement was gradual, and affected at least ten degrees of latitude along the shores of the Pacific slope.

This conclusion is so well borne out by the record that, however novel or unsupported it may appear when stated for the first time, I advance it fearlessly, though at present without attempting to follow it up by an elaborate array of proof. It is one of those great truths which, when once announced, can be studied and verified by everybody, and which will stay true for all time.

It first interpreted itself to me during my coal reconnaissance last autumn, when, standing upon one of the highest summits of the coal measures at Napa, in the Monte Diablo coal region, I got a bird's-eye view of the peaks of the overlying tertiary between the coal mines and Suisun Bay, there opened up like a book.

A horizon of marshes, bogs and forests is seen swallowed up by the sea, buried under and covered up by half a mile's thickness of sea sediment, in the upper strata, densely impregnated with the remains of marine life. Like a flash the similarity in position and of subsidence under the sea of a dozen different coal regions widely apart, which I had visited, bearing the same relation to the underlying cretaceous and the overlying tertiary rocks, then for the first time occurred to me.

The last, and most interesting addition to this page of our geological history came to my notice more recently.

A few weeks ago I presented to the Academy of Sciences some stone relics of the earliest known inhabitants of the globe. This conclusion, as a matter of fact, is not stated on my own authority unsupported, but on that of paleontologists, which I will not dispute, because I see no reason for disputing them at this time. It rests in the fact that the formation is identified as upper tertiary or pliocene. The authority is Lesquereux principally, who determined the palms and other extinct forest leaves of our ancient rivers, and Whitney, in volume one of the Geological Survey.

The locality from which these stone mortars, pestles, stone knives, ornaments, etc., were derived, as was stated when they were presented, is the Oroville and Cherokee mesa of Butte county. I remarked, in presenting the stone knife, that, of my own knowledge, the formation was pre-glacial.

Coal deposits and coarse gravel underlying the Oroville mesa, succeeded by finer material, the upper portion of which is an auriferous gold bench, preceding in age the volcanic and the glacial periods of California, testify to the same convergence in the early tertiary, and to the same grand plunge into the sea during the middle and the latter part of the tertiary, the proof of which I saw in so many places in connection with the coal regions explored last autumn.

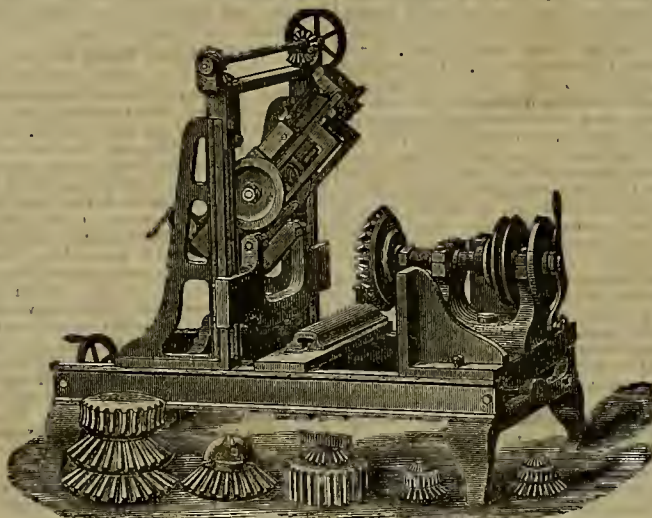
The contemporaneousness of the submersion in Butte county, and elsewhere in the interior, with that at Monte Diablo, and throughout the coast counties, is based not merely on the fact that there are coal beds of wide distribution marking the former emergence, found alike in both places, but that the underlying rock is cretaceous, so determined by marine fossils, and that the formation at both places comprises the tertiary which were deposited before the advent of the volcanic period. The latter constitutes a sort of geological landmark in California, of the end of the tertiary and of the lowest subsidence of the land, since which time we have had the ice period, and a new emergence of 2,000 feet, which is still in progress.

The stone relics of human origin here presented—to which I add to-night another, of a curious trough-shaped utensil of granite, given me by E. J. Davis, of Cherokee—show that the country was inhabited during the latter part of this subsidence, these relics having been covered up by 600 feet of brackish and fresh water submarine sediment. It is safe to say brackish in general, because in portions of the great valley, as at Livermore pass, brackish water shells have been found in the same formation, while at other places where the tide could ebb and flow, as at Kirker's pass, salt water miocene and pliocene shells are imbedded, the fresher waters farther in the interior.

living near that beach whose mortars did not all get covered up by the waves, to have entitled ancient Cherokee to a town charter.

A New Gear Cutting Machine.

A good circular grinding or gear cutting engine is a tool that is considered almost indispensable in every machine shop of the present day. While improvements have been made in almost every tool in common use, there seems to have been no change for the better in the construction of circular gear cutting machines until recently. The newly invented Peer gear-

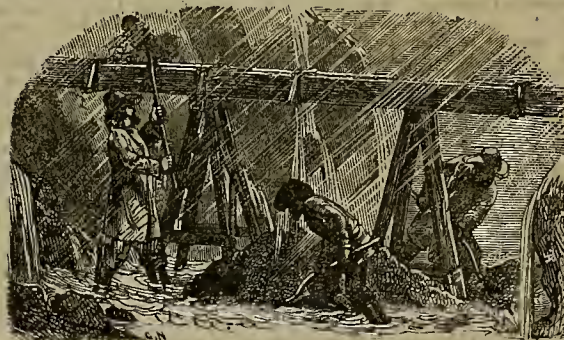


PEER'S GEAR CUTTING MACHINE.

terior having destroyed, in the upper beds of the tertiary, the marine and brackish water mollusks that flourished there when the lower and the underlying cretaceous strata were deposited.

The formation of Oroville and Dogtown Table mountains extends over hundreds of

cutting machine, herewith illustrated, has an expansive rotating cutting tool, whereby all classes of gear wheels can be cut on the same machine, dispensing with the several tools employed for that purpose. The machine is so constructed that it can be adjusted in a few minutes for all kinds of work, whether bevel,



SLUICING IN A RAIN STORM.

square miles, as far into the interior as Shasta county, and consists of sandy clays and gravels horizontally bedded and generally conformable as near as the eye can make out to the underlying cretaceous.

The particulars concerning the ancient beach dwellers of Cherokee, belonging to the formation just described, are published in the "Overland Monthly" for July. It is only in consequence of the fact that the streams of that vicinity, Dry creek and Cherokee ravine, have cut through the volcanic capping, and exposed in Mesilla valley a fine geological section through the entire tertiary series, beginning with the surficial strata on top, to the coal at the bottom, including a portion of the cretaceous, that hydraulic mining is rendered practicable along the edges of the mesa, and that ancient Cherokee was ever discovered.

Probably fifty of these mortars have been unearthed at Cherokee. They are too common to be of any value, or to be a curiosity there. Allowing one stone mortar for each tribe or family, there must have been people enough

This machine was patented by John A. Peer, of No. 32 Fremont street, in this city, through the MINING AND SCIENTIFIC PRESS Patent Agency. The little brass model which was made, turned out handsome little brass gear wheels as perfect in shape as could be made in any way. The machine, no doubt, will greatly cheapen the manufacture of all kinds of gear wheels, as in a few minutes it can be adjusted to the smallest and to the largest wheels, and is not liable to get out of order. It does its work perfectly true, and is so simple that any machinist or pattern maker can operate it. Instead of three cuts, each is finished by one cut and one adjustment, giving the proper draft for moulding. Instead of the ordinary solid milling tool, the Peer machine has an expansive rotating cutting tool. The follower which holds the cutting tool has the form of the pitch line on one side, the cutting edge of the tool being made to correspond with that of the follower, with a slight projection for clearance. Any machinist can shape the cutting tool in a few minutes; as the cutting tools wear, however, an ingenious device keeps them adjusted to the work. All kinds of wheels can be cut vertical or horizontal without removing the work from the center upon which it is turned, and the tool is passed through only once to complete each cog. One machine will cut patterns for wheels of all sizes, or dress cast iron wheels taken from the sand.

With one of these machines a bed twelve feet long can swing a wheel sixteen feet in diameter in making patterns. The scale is graduated by eighths from one-quarter inch up to four inch pitch. Mr. Peer says he can make clock or watch wheels equally true with machine wheels; rack-bars and fluted rollers of every degree of fineness, and many other kinds of work too numerous to mention can be made. Wheels of brass or wood, twelve inches or less in diameter, are cut from the solid block more cheaply, and in less time than would be required to make the drawings, besides saving the cost and time of making patterns. In swift running machinery, where one wheel of wood meshes in with another of iron of like diameter, the endurance is increased, and the noise and jar incident to iron gearing in iron is greatly diminished. These wooden wheels are secured to the shaft by two flanges clamping the wood. This machine makes mitre gear of a solid block of hard wood cut upon its end, and heavy wooden wheels, after the cogs are mortised in the usual way, are cheaply and perfectly finished. The followers are standard, and the pitch-line is preserved, so that the wheels can be duplicated without samples or drawings. This machine can be seen at work at the address given above.

Sluicing.

The accompanying engraving will give to those of our readers not familiar with placer mining an idea of what placer miners have to endure in working during the winter storms. It will also, perhaps, bring back to the minds of many memories of early days in the mines, when money was more plenty than it is now-a-days. Standing up to the knees in muddy water and pitching gravel into a dripping sluice overhead is not much fun at any time; but when it is accompanied with a pelting rain storm the discomfort is rather increased. But when the water is plenty and the dirt rich, these little inconveniences are overlooked, and the hardy miner rejoices at the rain and only wishes it to continue. Little of this class of mining is now done in California, the shallow placers being mostly worked out and those that remain are principally worked by Chinamen.

THE "Cromer" is a new location a short distance north of Gold Canon, over the first range of hills and immediately below the Devil's Gate. A shaft is sunk to the depth of 60 ft, at which point the ledge is 8 feet wide, and is being taken out for milling. Assays indicate that it will mill \$40 or \$50 to the ton.

At the Utah mine, on the Comstock, the new and powerful pumping machinery is nearly all in place. The pump columns for the first lift of 275 feet, will be 14 inches in diameter, and will be capable of hoisting a small river of water, when once in full operation.

CORRESPONDENCE.

Australian Notes.

(From our Regular Correspondent.)

Messrs. Editors.—Continuing my description of the various Australian colonies, I arrive at Queensland, which, though inferior in point of area and population, as well as in other matters, to the provinces of South Australia, is yet superior to it in point of revenue, numbers of live stock, etc. This, although the youngest branch of the Australian family, is progressing so rapidly, and has such a solid basis on which to rest that I should not be surprised if in another quarter of a century she were to take first or second place. It is only a few years since she separated from the mother colony of New South Wales, and now she seems to progress at a more rapid rate than any of the group. This, of course, is partly due to the enormous amount of unsettled territory within her borders.

On referring to the map you will find that this colony lies immediately to the north of New South Wales, and embraces the whole of the north-eastern quarter of the Australian continent. On the eastern coast, as might naturally be expected, there are a number of sea-ports which, like those in New Zealand, are not of very great extent at present, but which, like them, will no doubt increase in size and importance as the years roll on and the surrounding country gets permanently settled. The capital city is Brisbane, situated on a river of the same name, not very far north of the New South Wales boundary. The principal part of it is built on an alluvial flat jutting out into the river. You will gather from the comparatively limited population, and the fact of its recent settlement, that the city is not a large one, nor its buildings very substantial or elegant. Nevertheless it has its advantages in the eyes of intending emigrants, inasmuch as its prosperity is indicated by the fact of there being scarcely a house to let in the place, whilst comfortable accommodation for travelers is exceedingly scarce.

A somewhat similar description would answer for the towns of Ipswich, Maryborough, Rockhampton and Bowen, only that they have a smaller population. This is the colony where sheep herders—squatters, we call them—can still obtain leases of stations of enormous size. I heard lately of two young men who recently left Victoria obtaining a tract of 300 square miles, and that at a comparatively nominal rental. Of course this is not in the richest or most accessible part of the colony, but that it can be obtained anywhere is a fact that speaks volumes. There is, about seventy or eighty miles inland from Brisbane, an immense undulating table land, called the "Darling down," where the soil is said to be of the richest kind, and of fabulous depth. This, I need hardly say, is all taken up.

In addition to the immense extent of country suited for pastoral and agricultural purposes, there are vast tracts which competent authorities say contain innumerable gold bearing reefs, requiring only time, patience and money to develop them. A payable tin mine has already been discovered and profitably worked, whilst the Peak Down copper mines have been a success. Timber is present in such quantity and quality that I am informed by a gentleman in the Melbourne timber trade there is no pine imported, a native substitute having been discovered. Cedar trees of fair quality abound on some of the rivers, measuring in some cases fourteen or fifteen feet in diameter.

The cultivation of the sugar cane has been here largely entered into, and some of the oldest colonists think that this will form one of the staples of the country. Already I believe the trade has reached to the extent of some 5,000 tons of sugar per annum, and its only limit seems to be the obtaining sufficient cheap labor. At present they use Kanaka labor, imported from the South Sea Islands, but the supply is limited, and their introduction is looked upon with great jealousy by Great Britain. Coolie labor seems to be the only suitable kind obtainable, and about this there is, as every one now knows, a great deal of difficulty.

Queensland has a patent law, which it derived from the mother colony of New South Wales, and therefore for which it can scarcely be held responsible, although it is of a very objectionable nature, requiring the large sum of £20 to be deposited before the authorities will even receive an inventor's application for a patent. If, however, the patent is once granted, it holds good for fourteen years without any further payment, so that if an invention be a good one, and suited to the requirements of the place, a patent for it is likely to prove very profitable, although requiring somewhat of an effort to pay for it in the first instance. Any invention advantageously affecting the squatter, (wool, hides, skins or meat,) the sugar manufacturer or the miner, should pay well here if judiciously worked. E. W. Melbourne, May 3d, 1875.

Coal Fields of Puget Sound.

From the letter of a correspondent of the *Bulletin*, we extract the following information about these coal fields: A reaction in the right direction has taken place among the leading men of the sound, with the object of developing the resources of the Territory in conjunction with capitalists in San Francisco and elsewhere. The most prominent feature of this development is the unlimited confidence in the vast coal fields on Puget sound. Some facts on this subject will satisfy your readers that this confidence is well founded. The foothills and mountain ranges at the head of

Puyallup Valley

Is discovered to be an extensive coal field, containing immense veins of the finest domestic steam and gas coal. This coal field is located about thirty miles from Tacoma. The Directors of the Oregon Steam Navigation company contemplate building a narrow gauge railroad from Tacoma to their valuable claims there, to connect with the Northern Pacific railroad at Tacoma to Kalama, on the Columbia river. There is no doubt but this is one of the most valuable discoveries of coal yet made on the sound. This railroad will pass through the beautiful and fertile valley above named, that is now coming into prominence as admirably adapted for raising hops to great advantage. The valley is twenty-five miles long by a breadth of seven miles. This coal field will be of great importance to Tacoma as a shipping point for this valuable coal, by sea and land.

The Seattle Coal and Transportation Company has passed through the painful experience of many similar companies in their early attempts to succeed.

The mine is now thoroughly organized, with ample capital and is in good working order, with the reasonable certainty of grand results in the near future. The mine is located seventeen and one-half miles from Seattle, three miles beyond Lake Washington. The shipping point is the bay of Seattle. The coal is brought from the mine to Lake Washington, three miles by railroad; then across that lake ten miles in barges that carry eighteen cars; then a railroad portage of half a mile; then three miles across Lake Union; then a mile of railroad that lands the coal at the depot, where it is either put on board a vessel from the care or placed in the bunker, that holds 1,000 tons. Four round trips are made every day to and from the mine, bringing fifty tons each trip. At present eighty miners are employed and fifty-five outside men, such as drivers, mechanics and laborers. The company pay about \$10,000 a month for wages and improvements. The company have 1,000 acres of coal lands in one body. Two tunnels are opened for half a mile each, and both are in working order; they run in such a gentle incline as to drain themselves. The two veins run for three miles, and have each an average of four and a half feet of pure coal. There are other veins not yet opened, some of them containing seven and others ten feet thickness of coal. There are well defined veins connected with this mine that measure in all thirty-two feet of solid coal, that will take half a century to work out. At the shipping depot there are workshops for making cars, including carpenters, blacksmiths, mechanics and men for putting the coal on board vessels. C. B. Shattuck has charge of the transportation departments, and W. H. Taylor looks out for the weighing and other responsible duties. The improvements inaugurated for the further development of the mine are on an extensive scale. Two large barges are ordered that will carry sixty cars, or 120 tons of coal each; a powerful locomotive is on the way to take the place of a small one at the mine. A large steamer for towing is to be built immediately to take the place of an inferior one, so that by the first of July there will be 300 tons of coal sent out from the mine daily; by the month of August there will be 400 tons, and by October most probably 500 tons, or 3,000 tons a week. The coal is excellent for domestic purposes and very good for steamships, locomotives and furnaces. D. W. Jones is the superintendent of the mine. O. Coeter is the responsible hook-keeper. Captain Jackson has charge of the steamer on Lake Union, and Captain William Bailey is master of the steamer on Lake Washington.

This mining camp is a regular village, containing numerous houses, and quite a number are being built. There will be a hundred more men employed in two months. A well supplied store is kept by the company for the accommodation of the miners and others. Miners are paid \$1.25 a ton; good miners make an average of \$4 per day; carpenters get from \$3 to \$4; drivers get from \$2 to \$3; common laborers get from \$30 to \$40 a month and board. There is a good demand for all these classes of men. Competent, reliable men of good habits can get constant employment and make money. Married men are preferred as being more steady and permanent. The large majority of the men at the mines are single, of a roving disposition—here to-day, away to-morrow—fulfilling the old proverb, "A rolling stone gathers no moss." The gentlemen composing this company are principally San Francisco capitalists. Three vessels are loading coal at present at the wharf for San Francisco, that will average 1,000 tons each.

The Renton Coal Mine

Is located on Cedar river, a mile from the head of Lake Washington, and the same distance from the mouth of Black river, on the divide between Cedar river and White river. The mine

was commenced to be opened about twelve months since. Fifty miners and others are employed. Seventy-five tons of coal are taken out daily, put into a bunker and screened as they descend; then they are put in cars from the bunker, sent by rail two miles to Black river, put on barges, and towed by steamer down Black river into Duwamish river, thence to Seattle and put into a large bunker on the wharf, that holds 1,200 tons, to be shipped to San Francisco as vessels arrive, three of which are daily expected. The distance from the mine to Seattle is twelve miles. The main tunnel was opened 600 yards two months ago; since then ten rooms have been opened. The vein of coal now being worked is seven feet thick of solid coal. The coal ranks among the best for domestic purposes and is well liked for raising steam.

By the first of July the company will be in a position to ship 100 tons a day. The claim contains 730 acres of coal lands. Some of the veins, so far as known, are better than the one opened. The company is a joint stock one, known as the Renton coal company. It is composed of a numerous list of shareholders, who are entitled to a certain quantity of coal yearly, in proportion to the number of shares that each holds, at eight dollars a ton, in addition to the dividend on the profits of the company. The directors and shareholders are all San Francisco people. The mining camp is a little village composed of numerous cottages for the men, a large dining hall, a good store, comfortable quarters for the superintendent and hook-keeper. The company have a profitable saw-mill, own five barges and a steamer for towing. To all appearance the mine is in a healthy condition, and the prospects decidedly favorable. Mr. Robins is in charge at present as superintendent, and W. C. Dripps is the confidential hook-keeper. A stage from Seattle runs to the village every morning and returns in the evening, charging two dollars for the round trip.

The Talbot Coal Mining Company.

This mine is on the same divide as the Renton mine, between Cedar and White rivers, and three-quarters of a mile from Black river. The mine was opened early in November; 225 feet of tunnel were cut before coal was struck. The tunnel is now 535 feet long; twenty miners are employed and sixteen outside men; 600 tons of coal are in the bunker ready for being forwarded to Seattle for shipment to San Francisco. The coal is taken from the mine to the bunker in cars by rail a third of a mile long, then from the bunker to Black river, a short distance, in cars, put on barges and towed to Seattle by way of Black and Duwamish rivers, twelve miles in all. The company owns 320 acres of coal lands. The tunnel opened has a vein ten feet thick of pure coal of the best kind for domestic uses and steam purposes, as well as for ordinary blacksmith work. The company is composed of Messrs. John Collins, John Leary, James McNaught and Michael Padden—all Seattle men. Mr. Padden is the superintendent of the mine. The substantial and economical manner in which the work is done proves the superintendent to be the right man in the right place.

Cedar Mountain Mine

Is located on the same divide as Renton and Talbot mines, six miles above Renton mine, and, like it, near the margin of Cedar river and running into the mountain that forms the divide. It has only been partially opened as yet, but there is no doubt that it contains an immense quantity of coal of a superior kind. The vein shows a thickness of coal from nine to twelve feet in different places. There are 220 acres of coal lands connected with the mine. The mine has been lately purchased from Messrs. McAllister and George, of Seattle, by a San Francisco company, for \$25,000. It will form a valuable contribution to the coal business of Seattle and Puget sound. Active operations will commence for opening the mine as soon as it is settled that the Seattle and Walla Walla railroad is to be built that far. There is every reasonable certainty that that road will be built twenty miles this summer, extending to the outside limits of this mine. The road is already graded seven-eighths of the twenty miles. When built it will give an immense impulse to the coal trade and other enterprises in and around Seattle. Should it be built this summer there will be 1,000 tons of coal sent from these mines to Seattle daily for shipment, or 300,000 tons a year; 750 men employed in working them, and that will only be the beginning of the future grand development of this important industry extending along the whole line of the sound.

The Clymer Mine

Is located near the junction of Cedar and Black rivers, a short distance from the head of Lake Washington. It is an old mine, but was never worked to advantage. Dr. A. Bagley and Messrs. A. Treadwell, J. R. Robbins and S. P. Andrew have lately bought the mine from C. Clymer, the latter retaining a share. They are all Seattle men, and have commenced in earnest to open the mine and work it effectively. There are 340 acres of coal lands owned by the company. The tunnel is not sufficiently opened to form a correct opinion as to the thickness of the vein. The owners claim that there are seven feet of solid coal in the vein. When the Seattle and Walla Walla railroad is built the first twenty miles, this company will have ample facilities for sending their coal to Seattle for shipment.

Other Coal Mines.

There are four other coal mines on Stillagna-mish river, and one on Snohomish river not

yet worked, that are extensive, and valuable coal for common house purposes. On the Skagit river a most valuable coal mine has been discovered, and is partially wrought by six miners, in which J. J. Conner, of that place, has an interest. It has been fully tested that this coal is equal to the famous Bloesberg and Cumberland coal for blacksmiths. The company are now supplying a large number of blacksmiths on the sound with this coal, and will soon be in a position to meet the entire wants of the Territory at moderate rates. Competent judges say the same coal will make the best of gas and coke beautifully. It is a soft coal, and requires to be shipped in bags or barrels. It is obvious to the close observer that there is in this district of Puget sound, from Puyallup river, coming out from Mount Rainier, to Bellingham bay, underneath Mount Baker—a distance of more than one hundred miles—an almost inexhaustible storehouse of the best of coal for almost every requirement of the human family in the shape of fuel. The reflecting mind, when contemplating the future development of these vast coal fields, the mountains of iron, the magnificent forests, and the extensive ship building on Puget sound, can easily foresee a grand development of these industries along the whole line of the beautiful, varied and extensive waters of the sound.

Mariposa Estate.

We have recently made inquiries, says the *Mariposa Gazette*, respecting the grand tunnel enterprise of the Mariposa company on the Merced, and have come in possession of many interesting facts. As long ago as 1858 or '59, Dr. Adelberg suggested the advisability of a tunnel from the Merced river at the Benton mills, along the line of the vein of quartz which was known to exist from the river to the Pine Tree and Josephine mines, and from these last, continuing southwardly, to Mount Ophir, Princeton, Agua Frio, and even to the extreme southerly limits of this estate. The suggestion was not acted on at the time, but some years after was again brought to the notice of the Mariposa company. A tunnel was commenced and then abandoned, and the enterprise was permitted to rest until June, 1873, when the work was in reality commenced.

The tunnel was carried on with occasional interruptions until June, 1874, and then, after a rest of six months, was again resumed, until now it has reached a length of 800 feet. The work at the commencement was easy, but as the drift advanced, the ground became harder, until at 440 feet, hard blue slate was encountered, and has since continued. The course of the tunnel being parallel to the stratification, in blasting the powder loses seventy-five per cent. of its effective force on the "centre outs."

Had it not been for the Borleigh rock drill it is almost fair to say that the work would have been abandoned long since, as competent miners estimate the cost of running it at \$70 per foot. With this tunnel once in on the vein, which it is expected to strike at 1,000 or 1,200 feet, the cost of carrying it on will be defrayed out of the vein itself, for, with a down grade to the mill, and absence of handling the ore twice, the quartz can be delivered at the "spaller" for less than \$2 per ton, and the cost of milling will not exceed that amount, as the principal item of expense in milling is done away with, or reduced to a minimum by using the water power of the Merced.

As we mentioned in our last issue, steps are now being taken to bring in a ditch, and we understand that most of the drilling on its line will be accomplished by the Burleigh drill. The ditch, besides furnishing power to the Benton mills, will also supply the means of working the placers above the banks of the river, which are now useless for the want of water. The amount of extra power to be derived from the increased fall, will be nearly 1,000 horse-power. And it is part of the policy of the Mariposa land and mining company to utilize this power by milling the quartz furnished by the series of veins from the Merced river to Agua Frio, thus avoiding the enormous expense for fuel of about \$20,000 yearly for each mill. Thus at no greatly distant day we shall see Princeton rock going its winding way to the Merced!

We have by no means lost faith in the future of this splendid property, on which, as yet, comparatively speaking, only a few scratches have been made. The future stands before us, and under the new regime it promises to be a grand one.

MINEING STRIKE.—"An important mining strike," says the *Silver City Times*, "was made on Saturday in the Amazon mine, which adjoins the Genesee and Alhambra on the south. The drift struck a rich body of ore, which, in color and character, can hardly be distinguished from that of the Consolidated Virginia. Yesterday morning the drift had cut four feet into the vein, and the face was still in splendid ore. The strike created considerable excitement, and many are of the opinion that we are to have a genuine bonanza on this end of the great lead." A letter from the mine states that the vein is full seven feet with blue clay walls.

PRESERVATION OF ROPE.—The following process for preserving rope has been patented on the Continent: The rope is steeped in a solution of 600 grammes of sulphate of copper, 200 grammes of sulphate of zinc, and thirty grammes of glycerine evaporated to dryness, the whole mixed with twenty-four litres of boiling water in a close vessel.

SCIENTIFIC PROGRESS.

Some Recent Observations on Magnetism.

In our last issue we gave, from *Iron*, an account of some recent and interesting observations in regard to magnetism. We continue the subject in the present issue as follows:

In Professor Helmholtz's laboratory at Berlin, M. Holz has recently been studying the causes of variation in magnetic coercive force (see *Pogg. Ann.*); examining the magnetic properties of iron bars obtained by the electrolytic method, and comparing with steel bars. He finds that the former, through heating, acquire a greater specific gravity; the molecules are less apart, and the permanent magnetic moment is diminished nearly a half. Steel bars, on the other hand, acquire a less specific gravity through heating and hardening; the molecules are further apart, and the magnetic moment is considerably increased. This change of magnetic force, arising from change in density, readily explains (as M. Holz points out) the effects observed by M. Wiedemann in studying the relation between magnetization and torsion. He found that the permanent magnetism of steel bars decreases through torsion; that the temporary magnetism increases through detorsion; and that iron bars cut with a hawk saw are untwisted by magnetization. Now, torsion condenses the bar, so the magnetism must decrease, owing to increase of the specific gravity. Detorsion has the opposite effect, and in magnetizing the iron bars referred to, an expansion must take place which results in detorsion.

Coercive force is, doubtless, to be regarded as a passive force, like friction, hindering the movement of molecules in any direction, and it seems natural to suppose that its intensity will diminish when the temperature is raised, the heat favoring magnetization when the magnetizing force is superior to the force which tends to bring the molecules to their position of equilibrium; and demagnetization, when the molecular force is superior. Supporting this view, M. Gangain states, in one of his interesting series of notes on magnetism to the French Academy, that he has been able to increase magnetism, under certain conditions, by means of heat. He first magnetized small bars of steel, keeping them a few instants with one end in contact with one of the poles of a permanent magnet. He then ascertained their magnetic state (by his special method); then he renewed the contact, and heated them with a spirit lamp; put out the lamp and let the bars cool before detaching them. He then found the magnetization much greater than when the bars had not been heated. The increase of magnetism only takes place if the bar remains in contact with the magnet while cooling. The total magnetism (as well as the permanent) was considerably increased by the heating, but the magnet had only to be removed a few seconds for a portion of this increase to disappear.

It is known that some specimens of native platinum not only act on the magnetic needle, but are magnetipolar, like true magnets. The auriferous sands of the Oural, after some washings, leave a residuum in which gold is associated with ferruginous substances. To separate the latter (at least in part) the workmen use a natural magnet of magnetic oxide of iron got in the mine of Blagodat. Now, after this magnet has ceased to act, a magnet of native platinum will further extract ferruginous grains in considerable quantity. Analysis of these magnets of native platinum have shown that they always contain iron in considerable proportion. M. Rose thought the iron alone was insufficient to account for the effects, and that they must in part be due to the iridium present. The subject has been recently gone into by M. Dautree. He has succeeded in producing these magnets artificially by electrolysis; in which he fused platinum with a quarter of its weight of iron (twenty-four grammes of platinum and six grammes of iron). Polar magnetism appeared very markedly in the cast, and in the fragments of this when it was broken. The remarkable point is that only certain proportions of the two metals give the desired result. M. Dautree made an alloy of ninety-nine per cent. iron and one per cent. platinum, but this, though strongly magnetic, gave no traces of polarity. And, on the other hand, native platinum containing only a small proportion of iron is also not magnetipolar. Further, several minerals called magnetic may be made magnetipolar by certain operations; but in the case under consideration the magnetipolarity appears immediately in the alloy, whenever the cast is sufficiently cooled, and without any touch, simply under the inductive action of the earth. The phenomenon is one which is worthy of further investigation and has some practical importance.

M. Chautard has lately observed some striking changes in the spectra of the metalloids when the gases (in Geissler tubes) were put under the influence of strong electro-magnets. The light of sulphur and selenium undergoes considerable diminution of intensity, so great, sometimes, that the spectrum, which is not very bright at the beginning, entirely disappears after a few seconds. Chlorine and

bromine, on the other hand, show an increase of brightness, under the action of the electro-magnet, and there is a development of numerous fine bright lines, especially in the green. These facts the author considers important in reference to cosmic spectroscopy and the obscure relations between magnetism and light.

The New Glass—Another Process of Producing It.

It is announced that Mr. Charles Pieper, a German inventor, has devised a way of toughening glass, which the German papers pronounce superior to that of M. de la Bastie, already described in these columns. The Pieper glass is said to be fully as strong as that of the latter inventor, and its appearance is much purer and clearer. Extended experiments upon it have begun in Germany. The Association of German Glass Makers has already entered into negotiations with Mr. Pieper for the use of his invention, suspending similar dealings with M. de la Bastie, on account of the immense price asked by him, over eight million dollars.

Hardening Glass.

In connection with the above the following will be read with interest: A process of hardening glass has been patented by Mr. Macintosh, of Westminster, Eng., a civil engineer who has devoted much time and attention to the hardening of iron, steel and alloys. Starting on the broad ground that, the lower the degree of temperature of the liquid in which certain heated bodies were plunged, the harder such bodies became, Mr. Macintosh has found that glass, graphite, uncrystallized carbon, slag and other analogous substances may be rendered exceedingly hard by means which are usually indicated for metals. Colored glass may, by this treatment, be rendered so hard as to be effectively used as a substitute for gems, and, what is curious, may be pulverized and used in the same way as diamond dust or emery powder.

In hardening the substance, the method pursued by the patentee is to place a small quantity of fused or nearly fused clear or colored glass in iron or other molds to shape the glass, and the substance is taken out of the molds and placed in platinum molds, and fused or nearly fused, and suddenly deprived of its color by frigorific mixtures of iced water and salt, or any of the freezing compounds that produce extreme cold; the sum and substance of which is that the glass is heated to a very high degree of temperature and then rapidly cooled in a very frigid fluid. A startling statement is made by Mr. Macintosh when he asserts that when the component parts of gems are treated by the above process, he is enabled to produce thereby fictitious gems even harder than real diamonds.

Curious Experiment in Instantaneous Crystallization.

It is well known that various salts dissolve in water in different proportions, and that the solution usually takes place more readily when the water is warm. After cooling, crystallization of the fluid takes place, but this may be prevented by leaving the solution in absolute quiet and protecting it from contact with the air. It is then said to be supersaturated, and the least shock, or the addition of a minute crystal of the salt, is sufficient to cause instantaneous crystallization of the whole. A curious experiment, based on the above, has recently been devised by M. Peligot: 150 parts, by weight, of hyposulphite of soda are dissolved in fifteen parts water, and the solution is turned into a large test tube, previously warmed, so as to half fill the same. Another solution of 100 parts, by weight, of acetate of soda, in fifteen parts of boiling water, is made, and this is carefully poured in on top of the first solution, so as to float on and not mingle with the latter. To the above two solutions is then added a little boiling water, and the whole is left in quiet to cool.

After the cooling is accomplished, a little crystal of hyposulphite of soda may be let down into the liquid. The fragment will traverse the acetate solution without effect thereon; but on its reaching the solution below, instant crystallization of the same will take place. As soon as the re-action in the hyposulphite is finished, a crystal of acetate of soda may be added to produce a similar result in the acetate solution.

A NEW ARTIFICIAL LIGHT FOR PHOTOGRAPHING.—The following is a description of a new artificial light for photographing, which has been recently invented in France. A quart bottle, with a somewhat large mouth, has a cork with two openings. Through one of these a tube passes to near the bottom of the bottle; through the second a larger tube, packed with iron scale, issues. Fragments of prussic acid are poured. A current of nitric oxide prepared by Deville's method—by the action of nitric and sulphuric acids on metallic iron contained in a self-regulating reservoir—is passed through the bottle, where it takes up the vapor of the disulphide. It is then led through the safety tube packed with iron scale to the burner. Excellent photographs were taken in five seconds with this light, the object being six feet distant. In photographic power the light is asserted to be superior to the magnesium or calcium light, and even to surpass the electric light itself. The products of combustion are noxious and must be got rid of.

A NOVELTY IN ORNAMENTAL SILVERING.—In Munich various objects of art have lately been displayed which are remarkable for their brilliant silver hue. It appears that they are mere plaster models covered with a thin coat of mica powder, which perfectly replaces the ordinary metallic substances. The mica plates are first cleaned and bleached by fire, boiled in hydrochloric acid, and washed and dried. The material is then finely powdered, sifted, and mingled with collodion, which serves as a vehicle for applying the compound with a paintbrush. The objects thus prepared can be washed in water, and are not liable to be injured by sulphuretted gases or dust. The collodion adheres perfectly to glass, porcelain, wood, metal, or *papier mache*. The mica can be easily tinted in different colors, thus adding to the beauty of the ornamentation.

MECHANICAL PROGRESS.

The Cold Steam Motor.

We have made several allusions to what is claimed by a Philadelphia inventor as a new motive power which is to supersede steam, by virtue of its being far more powerful and very much cheaper. It is claimed that its cost is a mere trifle, compared to the cost of steam, while it is capable of being used with the utmost safety at a pressure many times that of the ordinary use of steam.

The discoverer refuses to tell, even the capitalists associated with him, how he obtains his power; although he freely permits his associates and some of their friends, as experts, to see the machine both at rest and at work. According to reports, they find that it actually possesses wonderful power, developed in a manner which they cannot explain. They have taken the machine to pieces, watched the discoverer, Keeley, while putting in water and blowing in air, examined the vapor which issues from the machine when in operation, and found that the power amounts to a pressure of several thousand pounds to the square inch. There is no fire, no heat, and, so far as they can discover, no chemical; and they suppose that the power is obtained by decomposing water into its constituent gases by some process not generally understood. Keeley says he must keep his secret till he gets his patents. He refuses to give a name to the motor; but others, led by guess, call it "cold steam." The machine is described as about three feet high, two long, and a foot wide; and contains a number of pipes of wrought iron connected by valves. It has been seen at work by Mr. Rutherford, Chief Engineer of the United States Navy, and he, with others, signed an opinion which has been published in a pamphlet for the use of the stockholders.

We understand that neither Mr. K. nor the parties associated with him desire to part with any stock in the invention, and they express the belief that within a short time trains will be driven by the new motor on some one or more of our principal railroads. While mechanics and others are on the tips of expectation, all prefer to wait for a practical demonstration, on the principal that only seeing will lead to full confidence in the reality of the invention.

Pottery in the United States.

For the manufacture of pottery in the United States there is no lack of the very best material, and indeed there is no good reason why we should be dependent upon foreign sources for a supply of any kind of fine work. We can, at least, maintain a respectable antiquity here, for at the Delaware Water Gap specimens of cups, of early Indian work, of good form and rudely decorated, have been washed out, with stone implements. Wedgewood used clay from Georgia and Florida, and was quite jealous of the "pot works" in South Carolina in 1770. We had porcelain works in Philadelphia at that time, too, and again in 1849, but they were not sustained, although Phoenixville is doing its best to establish a factory there. Pennsylvania reports 198 establishments for the manufacture of stone and earthenware, the highest number in any state. Trenton has twenty potteries and sixty kilns, producing stone china as good as any imported. In Jersey there is an abundance of good clay from Camden county to Raritan bay. In Chester county there are establishments for mining, washing and preparing kaolin, a fine clay, equal to any from Cornwall in England, and on the Susquehanna there are mills to crush and grind fine quartz and feldspar rock, the material need in the manufacture of pottery. The decoration of our home ware is going on finely, and in time we may hope to gain artistic culture and inspiration to rival our progress in other branches of useful manufactures, and learn to depend upon our own workmen to utilize the material which lies within our own borders, instead of importing or merely imitating the products of foreign workshops and designs.

The pottery business of California is gradually becoming an important industry. The pottery clays of the State seem to be gaining favor. The deposit found in the coal beds on the northeastern slope of Mt. Diablo has been used for years, and an extensive establishment has recently been put up at the Lincoln coal mine, where equally good material for earthenware has been found. As yet, only the coarser articles are made, but with time we may hope to see large factories of porcelain in California.

The Sand Blast—New Applications.

The sand blast has, in the four years it has been in operation, wrought a revolution in all kinds of ornamental stone cutting. For cutting glass the pressure of an ordinary blower is sufficient to make either a plain, uniformly depolished surface, or copy the most delicate line engraving; while for stone and metal cutting a pressure of from 90 to 100 pounds is employed. The contractor for furnishing 250,000 head stones to the government employs the blast; and by its use completes them at the rate of 300 per day, averaging eighteen letters each.

One great use of the blast, at present, is in the manufacture of plain and colored glass signs, of all descriptions, as well as door lights of most artistic and beautiful designs. It is also beginning to be used in lapidary work of all kinds, especially in the manufacture of initial jewelry. It is also employed very largely in giving the popular "satin finish" to silver-plated ware, and, more recently, to the manufacture of glass globes, bearing elaborate and artistic patterns.

The Ames shovel works, at Taunton, Mass., are proposing to apply the blast to the cleaning of their iron from rust, etc., a process now attended with considerable labor and inconvenience. A Taunton (Mass.) tack factory, which cleans 17,000 square feet of tack plate per diem, is also proposing to apply it to the same purpose. One of its most novel applications was the recent furnishing of 200 appropriately engraved glass cards, for the glass wedding of an eccentric Englishman. Some twenty tons of five-eighth inch glass for the dome of the New Orleans custom house were recently cleaned and depolished. Such thick glass is always full of little specks of dirt, etc., on its surface; but by the use of the blast a perfectly clean surface was obtained, which transmitted a clear, pleasant light.

A New Carriage Wheel for the Road.

A new principle in the construction of carriage wheels has just been patented by Mr. Robert Pooke, of Birmingham, which is exciting some attention. In this new wheel every part consists of wrought iron, with the exception of the tire, which is formed of the best cast steel. The method of fastening the spokes (which are hollow), both in the rim and in the boss, is as simple as it is safe. The tire is constructed so as to protect the other parts of the wheel when it runs against the curbstone, or comes in contact with another vehicle. Neither in putting on the tire, nor indeed in any portion of the work, is a single bolt or nail employed, the spokes being slipped into their places in the rim and boss, and afterwards locked up by a nut, while the tire is firmly inserted into a groove in the rim. The patentee has likewise made considerable improvements in the axle-tree and boss, the strength of the former being increased at the points where it is most liable to give way, and the latter possessing accommodation for about four times the usual quantity of oil for lubricating purposes. Although made of iron and steel, each wheel is not more than two or three pounds heavier than ordinary wheels, and the cost of production is about the same in both cases. The objects aimed at by the inventor have been the light appearance and strength of the wheel as well as simplicity in its construction; and in these respects he has been highly successful. —*British Trade Journal*.

A GREAT IMPROVEMENT IN NAIL MACHINERY.

—The Cincinnati *Enquirer* says of the Haddock nail machine, that it is one of the most wonderful mechanical inventions ever introduced, that it will revolutionize the nail-making business, that the machine manufactures 25 per cent. more nails, at a saving of over 50 per cent. in labor, than any other machine in use. Quite a number of heavy capitalists have taken stock in the company, which shows their faith in the enterprise.

NEW BARREL MACHINE.—It is said that Mr. J. W. Jones, of Wheeling, W. Va., has invented a crozier that cuts, grades the thickness, squares the ends, chamfers and grooves a stave at one stroke. One machine is capable of turning out in a day eight hundred "etands" of staves, or kegs, the labor required for feeding being that of a boy only. It is automatic, in fact, and is a self-feeder to a great extent.

BENDING VS. FORGING.—It is now possible by the aid of hydraulic machinery to bend iron shafts of twelve inches diameter, when properly heated, to any required shape. The bent shafts are said to be better than forged ones, from the fact that the fibre of the metal runs in one direction continually, whereas in forged ones it is often across the line of strain.

RAPID WORK.—John Add, an ingenious inventor of New Haven, Conn., has invented and is now manufacturing a machine which will cut, bend and finish 500 staples a minute. It will take but few such machines to make all the staples needed in the country.

STAMPING MOLD BOARDS.—Mold boards for plows are now stamped at a single operation, in a press.

mine is yielding its customary rich rock. They are engaged in crushing a few loads of ore which will pay to the tune of \$10,000. The owners are also opening another lead at Skull Flat which promises quite as well as the Champion.

THOMPSON MINES.—This mine, since coming into possession of a new company, is being worked as formerly, owing to the anticipated failure of water soon. We understand that during the summer all preparations will be completed for sinking the main shaft an additional 200 ft. This is what the mine wants, and experienced miners are confident that, properly developed, this mine will prove one of the most permanent in the State.

INYO.

HAPPY VALLEY.—Panamint News, June 15: For a commencement to our report this week of the Panamint mines we will take our readers over into Happy valley to look at mines there. The Dempsey, owned by Tipton & Cannin, is situated near the head of the canon and about a half a mile northwest from the Handsou River, owned by the S. V. M. & W. Co., and is one of the oldest locations. For the amount of work done upon the Dempsey, it is showing up finely, and gives promise of being one of the leading mines in the district. The vein is from 12 to 20 ft in width; the ore is of the black sulphur character, and will assay \$60 to \$500 per ton. A good force of men are now at work in tunneling and cross-cutting the vein.

THE SURPRISE. one of the two lately bonded by E. P. Rains for \$100,000, is looking even better than was expected. We were shown a piece of ore taken from this mine a day or two ago which will probably weigh 35 pounds. It is one of the very finest specimens of black sulphur and chloride ore we have seen in this district, and is certainly good enough to dispel any doubts the best of critics may have in the richness of our ores. Since our last report (June 1st), the tunnel has been run in 10 ft further, making its total length 35 ft. The mountain at the point where the tunnel is started is almost perpendicular, and from the opening to the top, a distance of 125 ft, good ore is shown to the top, and for the whole length and width of the tunnel. The tunnel is in the vein, and is five ft in width by six ft in height. The vein, however, is at least 10 ft in width, and ore is seen all through the tunnel without a skip. The ore is considered to be worth and will work at least \$400 per ton. About 40 tons of this class of ore have been taken out from this tunnel.

From this point, for a distance of 2,000 ft, the croppings are plainly discernible, and are bearing for the whole length to the working point on the North Star, the other mine bonded by Mr. Rains in connection with the surprise, and is on the same ledge. This mine shows a vein 20 ft in width at the bottom of the canon, 1500 ft in depth, where a tunnel has been run in a distance of 60 ft, thus accomplishing in a few weeks, in the way of exploration, what it took years to do on the great bonanza mines of Virginia City. These two mines alone, if properly worked, are sufficient for themselves to make this a prosperous camp. Mr. Rains having gone below to perfect arrangements for the immediate inauguration of work upon these valuable mines, Messrs. Tipton & Cannin have been surveying for and had that as good a road as that leading up Surprise canon can be made at an expense not to exceed \$7,000 or \$8,000. The road will start from the head of Happy Valley canon and terminate at the main road in Panamint valley, about two and a half miles south of the mouth of Surprise canon. Men will immediately be set to work constructing the road.

Good mill sites have already been located, and as there is an abundance of wood and water there the probabilities are that Happy valley will prove a formidable rival to Surprise canon.

LAKE.

THE GREAT WESTERN MINE.—Russian River, June 17: Among the prominent quicker miners of this part of the state is the Great Western. It is located in Lake county, miles south of Middletown and 9 miles north of the new town of Kellogg, in Knight's valley. There are 8 tunnels in the mine, aggregating not less than 5,000 ft in length. The longest runs 800 ft along the ledge; the lowest about 275 ft below the surface. The ledge is from 10 to 64 ft wide and contains but little rock fit for the furnace. The most of the rock is so decomposed that it crumbles on being taken out and exposed to the air, so that it is necessary to make it into adobes for setting. The mine is opened well and is in working order. But little stopping has been done, and yet 10,000 tons of ore has accumulated on the dumps. With a 10-ton Luckhardt furnace and a 35-ton Green furnace the mine has yielded 1,800 flasks of metal in the last six months. Another Green furnace is about completed and the Luckhardt will be taken down and replaced with a Green furnace this summer. There will then be three Green furnaces, with a combined capacity for melting 105 tons of hard rock, or 120 tons of bessemer, every 24 hours. The mine gives employment to 15 white men and 170 Chinamen. There is a store and a butcher shop at the mine; a postoffice and a telegraph office will soon be established. The company own 1,500 acres of heavily timbered land about their mine, on which there is a steam sawmill that supplies the mine and the neighboring mines with lumber. The mining locations of the company comprise 30 ft of ground, but the most of the devel-

opments have been made at the northwest end, as the vein grows richer as it goes northwest. This fact leads the owners of an adjoining claim (an undeveloped location called the "Northwest") to expect to find as rich a deposit of ore as is now being worked in the Great Western.

MARIPOSA.

THE NORTH END.—Mariposa Gazette, June 19: From a friend who recently came through the Mariposa estate from Merced to this place, we learn that since he was there, eight months ago, the aspect of the place has entirely changed. At the first visit the neighborhood of the mills, on the river, was the "city of the dead," but now the busy hum of workmen is heard and the pleasant click, click of the air compressor, as it drives the energetic little drills 1,500 feet away.

BEAR VALLEY is looking up, the inhabitants of that pleasant little village already feel better than they thought possible a year ago. There is no doubt but that the mining interests of this county are the foundation of our prosperity, and if they are successful the other interests are bound to have a healthier tone. We have no doubt of the immense wealth under our feet, and live in the firm belief that we shall again see Princeton and Mariposa yielding their golden treasures. The only road to success is by a systematic course of mining, and that, aided by honest, watchful, economical management in all departments, from the highest to the lowest, will place the Mariposa land and mining company among the pinnoely corporations of the world.

NEVADA.

ARGENTIA.—Foothill Tidings, June 19: This extension claim on the Pittsburg lode is to be opened at once by tunnel; a contract for driving 500 ft having recently been let. The Pittsburg itself is better and better as depth is attained, the ledge being now of good width, solid, and paying well.

KENTUCKY.—Black cab rock all cut out, walls coming into proper shape for permanency, quartz looking well and on the whole the prospect looking better than ever before in the history of the mine. Such is a brief statement of the condition of the Kentucky yesterday, as drawn from conversation with several miners who work in and about the mine.

EMERALD.—This old mine, since it came under the management of Mr. David Watt as superintendent and Mr. James Bunnelleck as foreman, has gone steadily forward toward its ancient standing among the big paying mines of Gras Valley. On Tuesday a dividend of 50c a share was declared and last month the mill turned out about \$25,000 worth of bullion from less than 1,000 tons of ore. This is one of the best constructed and closest working mills in the State and the mine, which has been worked for about 22 years past, bids fair to continue its usefulness many years longer.

The sale of the Yuba mine and mill, above Washington, which we spoke of as on the tapis last week, has been consummated, and the property passes into the hands of the new owners and under the charge of Mr. Geo. Lord as superintendent, to-morrow. The principal owners now are Messrs. John and Edward Coleman, John Polgase, George Lord and D. N. Coffin, though there are several others who wished for and obtained a slice in during the pendency of the trade.

NEW YORK HILL.—Latest official information from this mine is to the following effect: The mill will be ready to start up crushing in 10 or 15 days. The rock in the main shaft is very hard, consequently sinking progresses slowly. The ledge in the drift east from the second level has excellent quality of ore and stopes west are looking excellently well, ledge very strong. The upraise, 89 feet from the tunnel, is in excellent ledge matter, showing heavy sulphur and gold freely. Next week a winze will be started from the upper tunnel to meet the upraise from the lower tunnel. This will improve the ventilation and also open out a large pay chute. During the week 65 tons of ore were raised, leaving on dumps, 167.

PLACER.

Mining.—Placer Argus, June 19: Messrs. Carroll and Duke are now working over Auburn ravine, from which they expect to get good pay. Several pans have been washed which proved to be quite valuable in colors. It has been about twelve years, we are informed, since it was washed over the last time. Whether these gentlemen make it pay or not, the cleaning out of the ravine will certainly be a benefit to the town, as the accumulated filth of a dozen years is immense, and if Auburn was not one of the healthiest places on the continent everybody in it would be sick. Imagine the stench that must necessarily arise from two or three feet in thickness of old socks, clothing, boots and shoes and all other kinds of rubbish deposited in a place, and the benefit of a general cleaning out will be apparent to every one. We hope they will make each \$20 a day. The gold that has already been taken out of the ravine within the corporate limits of the town of Auburn, is beyond computation or calculation, but it has been sufficient to make many men wealthy, and afford a good business for those who supplied the miners, and has built up the handsome town of Auburn, one of the finest, most picturesque and beautiful on the Pacific coast.

DITCH.—Placer Herald, June 19: The Auburn gravel mining and ditch company have their new ditch completed, the pipe all laid. The big flume on the line of the ditch will be finished next Tuesday, and the ground sluice before the last of the week. This company, and especially Superintendent Hobson, deserve

great credit for the energy manifested in this gigantic undertaking.

THE ST. LAWRENCE QUARTZ MILL. we understand, is kept running steadily. The company are just now mainly engaged in prospecting for the best paying chute, on which, when settled upon, they intend to sink.

It is reported that the chrome ledge has pinched out and work suspended on the mine. The mill at the Greene mine is just now shut down. We understand the suspension is only temporary.

THE JULIAN MINE. on Jenny Lind flat, continues to pay out in paying quantities. The 20-stamp mill is kept running night and day.

PLUMAS.

GREENVILLE MINING NOTES.—Plumas National, June 19: As the working of the Indian Valley mine becomes a little more systematized it begins to yield handsomely. A clean-up on last Wednesday gave \$2,500 for 12 days' run, being a net profit of about \$84 per day. This mine has flattering prospects ahead, and promises to prove a "bonanza" to the lucky owners. The Baker mine shipped \$800 this week. The Greenville mine was cleaning up when our dispatch came, with better prospects than ever before for the past two years. The Wolf creek company will have their new steam stamp mill ready to commence crushing quartz by Monday next, when we expect to hear of some rich strikes. Wolf creek is an entirely new quartz mining district, although its placer mines have been worked successfully for years past.

SONOMA.

LOCAL ITEMS.—Russian River Flag, June 17: W. R. Mathews and Mr. Bryant of the Excelsior company (Inyo district) came up from San Francisco last week, and have succeeded in settling satisfactorily with the creditors of the company in this region. Work will soon be resumed on the mine, and also on the Alhambra.

The Sussal company mean business. Work was resumed this week. Under the influence of the assessment it will be vigorously pushed till the ledge is reached. The tunnel is now in a depth of about 120 ft, having reached a point directly below the extensive croppings. The tunnel may not reach the ledge for 60 or 70 ft, however, as it is not known how great the dip is.

Nevada.

WASHOE DISTRICT.

CALIFORNIA.—Gold Hill News, June 17: The cross-cuts are being gradually extended at all points on the 1500-ft level, and lateral drifts are being run to connect the cross-cuts, so as to afford the most complete ventilation of the mine in every quarter by the time the new mill is completed, ready for the reduction of ore. On the 1400-ft level the same system of cross drifts and prospecting is being carried out, which, in connection with the various winzes already sunk and now being prosecuted at various points will make it one of the best ventilated mines on the Comstock, by the time everything is in readiness to commence the extraction of its rich ores. Sinking the C. & C. shaft is making good progress. It is now down 550 ft. A strong force of stone masons are employed on the foundations for the machinery, which are being pressed to completion with all the vigor possible. The erection of the new mill is also making rapid headway.

BELCHER.—Daily yield, 400 tons of ore. There is no change of interest or value in the character of the ore extracted, or the general appearance of the ore producing sections of the mine. The main north drift on the 1500-ft level is being rapidly driven ahead to connect with the south drift on the same level from the Crown Point, for ventilation purposes. Preparations are also being made for the commencement of ore stopping on the 1500-ft level. The main incline is down 50 ft below the 1600-ft level, the bottom in good working ground. The 1600-ft station is being opened, preparatory to commencing the development of that level. The air shaft is completed down to the 1200-ft level. The mills are all kept steadily running on ore from the mine, and everything in and about the mine is in fine working condition.

LADY BRYAN.—The south drift on the 380-ft level is being steadily advanced, following the east wall of the ledge. The west cross-cut on this level has penetrated the ledge a distance of 85 ft, the entire distance through quartz of the finest possible character, and containing some fine streaks and bunches of ore. The west cross-cut on the 80-ft level has penetrated during the week several ft of fine ore, and the appearances are excellent for finding a valuable body of pay ore at that point.

THOMPSON CONSOLIDATED.—Shaft 250 ft deep, and making good progress downward. The last 25 ft has been in very promising ledge matter, 7 ft of which, including the bottom of the shaft, is in vein material which gives assays from \$14 to over \$400 to the ton. This may develop or concentrate into a nice little bonanza of itself, but the regular main ledge of the mine lies to the westward, and the shaft is to be sunk to the depth of 500 ft before drifting for it.

UNKNOWN POINT.—Daily yield between 550 and 600 tons of ore. The ore breasts continue their usual yield, without any signs whatever of exhaustion, the indications if anything tending to show an improvement in the quality of the ore extracted, the yield for the past month being over \$50,000 above the cost of extraction and milling. The increased prospects of the ore vein on the 1600-ft level is also giving strong hopes of a paying body of ore when the ledge is reached on the 1700-ft level. The

mills are all kept steadily running up to their full working capacity, and the general outlook of the mine is certainly more prosperous than for some time past.

CONSOLIDATED VIRGINIA.—Daily yield, 600 tons of ore. The ore breasts throughout the mine are all looking well, and show no abatement in either the quantity or quality of ore extracted. No work is yet being done on the 1550-ft level, with the exception of the raising up of a winze 12 ft square for air purposes. This winze is passing through fine ore and is rapidly approaching completion. The prospecting of the upper levels of the mine is very nearly completed, so that but little now remains to be done except to extract and mill the ore. The mills are all kept running up to their full working capacity, and the yield of bullion will not vary much from \$1,500,000.

CALIFORNIA.—Sinking the main incline is making steady progress, the bottom is good working ground. Sinking the new shaft is considerably impeded by the steady, strong flow of water at the bottom. Preparations for the erection of the new and powerful hoisting machinery are being pushed ahead with all the vigor possible.

GOULD & CURRY.—The erection of the new and powerful hoisting engine is completed. This, taken in connection with the new and powerful pumping machinery recently started up, places everything in and about the mine in the finest possible working condition.

OPHRE.—Daily yield, 150 tons of ore. The ore breasts and stopes on the 1465-ft level show no change of value during the week. Driving the east cross-cut on the 1700-ft level is making steady headway, with some more favorable indications of reaching the ore vein at no distant day. The heavy dressed stone blocks for the reception of the new and powerful incline machinery, are in place ready for its reception.

SIERRA NEVADA.—Sinking the new shaft is making steady and favorable progress, the rock in the bottom blowing out finely and there being no water whatever to interfere. The erection of the new and powerful air compressors is very nearly completed.

BALTIMORE AND ANGELOAN FLAT.—The prospects of a favorable ore development in the south drift on the fourth station level is growing better every day. The body of ore recently struck by the cross-cut from the bottom of the winze below the third station level, is of a fine quality, and is gradually widening out.

CHOLLAS-POTOSI.—Sinking the main incline is progressing at the rate of two feet per day. The main south drift, on both the 1150 and 1250-ft levels, are being steadily driven forward, the face of both in porphyry. Daily yield, 70 tons of ore, of the assay value of \$29 per ton.

FLORIDA.—Struck the east clay well at the 400-ft level in the face of the main drift west, which is now going into it and the on skirts of the ledge about 7 ft. Indications very promising. The new machinery is in working position and operates splendidly.

DAYTON.—The dressed stone blocks for the reception of the machinery are all in place. The frame of the new hoisting works building, 46x100 ft in size, is finished, and the erection of the machinery can now be rapidly pushed to completion.

AMAZON.—The shaft is down 209 ft vertically, at which point a cross drift has been run 60 ft, at the end of which the ore vein was struck, developing a fine prospect of good ore. This body of ore has been penetrated a distance of 10 ft, the face of the drift still in ore.

LEO.—Excellent progress is being made in sinking the winze, which is to-day down 118 ft, following the pitch of the vein below the main tunnel level.

PHIL. SREIDAN.—The face of the drift is evidently in the outskirts or immediate vicinity of the main ledge, judging from the material now being passed through, which is soft porphyry, clay and quartz, from which assays of \$20 and over are being obtained.

JULIA.—Sinking the main shaft is making good progress, the rock in the bottom being much softer. The work of putting in another lift pump at the 1200-ft station is rapidly approaching completion.

WOOLVILLE CONS.—Sinking the main shaft is making steady progress. A considerable body of quartz with streaks of rich ore has been encountered during the week, without yet reaching the west wall of the ledge.

NEW YORK CONS.—The grading for the new and powerful hoisting and pumping machinery is about complete, and the mason work for the foundations will be commenced next Monday.

SOUTH CALIFORNIA.—The sinking of the shaft progresses at a very good rate, the rock at the bottom blasting well. The new hoisting works machinery contracted for will soon be on the ground.

SEG. GOLD HILL.—Another good body of ore, better than the first, has been run into, in drifting at the 400-ft level. It assays over \$50 to the ton, and is an important development.

SUCCEA.—The face of the west drift on the 550-ft level is still in porphyry. The ore in the face of the north drift from the old shaft continues to show an improvement.

JACOB LITTLE CONS.—The ore body developed by the west drift is opening out splendidly, with well defined wall and continued improvement in the character of the ore.

ORIGINAL GOLD HILL.—The southern cross-cut from the main south drift is now in excellent ore, which is opening out finely. North drift going ahead as usual.

Railway Progress.

Notwithstanding the fact that the continent of Europe is now well covered with lines of railroads; that 8,000 miles of railroads have been constructed in England within the last fifteen years; that France and Italy have pierced Mont Cenis to effect a closer and more direct railway union; that Austria is carrying new lines across the plains of Hungary, while Russia is occupied with extensive schemes for connecting St. Petersburg and Moscow with her Black Sea ports on the one hand and with the frontier towns of her Asiatic empire on the other—notwithstanding all this great end rapid progress in Europe, the railroad mileage of the United States, with a population of 40,000,000, fully equals that of Europe with a population of 282,000,000.

In British India about 5,000 miles of railroad have been laid down within the last sixteen years, while great achievements have been performed in the British provinces on this continent.

Official reports show that no less than 70,651 miles of railway were in use in the United States at the end of 1873. The degree to which large cities are now dependent upon railroads for the supply of food is exhibited by some startling statistics recently published in London, from which it seems that great city is fed by railroads from day to day, having never more than a few days' supply of provisions on hand at any time. A railroad strike in that city would starve the population into submission in a week. All that an invading army would have to do to completely reduce the largest city in the world would be to cut off her railroad communication for a few days. Were the full statistics of a similar character collected for our American cities, the result would no doubt be almost equally astonishing.

Great efforts are now being made to avoid the accidents which have been so alarmingly frequent during the past. Improved rails, switches, couplings, danger signals, brakes, etc., are now being introduced, the beneficial effects of which are already beginning to be felt. The introduction of the steel rail is of much greater importance than was that of the T-rail in avoiding the "snake-heads" of the old fashioned flat rail. By these and similar improvements two important objects are gained—an increase of speed and decrease of danger.

The Pennsylvania road between New York and Pittsburgh—444 miles—has recently laid down 60-pound steel rails, with improved ties, ballast, joints, etc. By the aid of these improvements, with heavy and improved locomotives, the distance is now made in eleven hours, including stops—an average of over 40 miles an hour, or double the speed of our California roads. The locomotives on this road dip up their water as they run, and there is probably no railway in the world of equal length whose passengers are carried more expeditiously, speedily or luxuriously.

Steel Rails for California.

It is gratifying in this connection to be able to state that California is also making progress in the way of railway improvement. The Southern Pacific railroad company of this State has recently contracted with the Pennsylvania steel company and the Bethlehem iron company for 10,000 tons of steel rails—5,000 from each company—to be used in continuing the line of the road south of Los Angeles in the direction of Fort Yuma, the southern terminus of the road, at the junction of the Colorado and Gila rivers. The distance by rail from San Francisco to Fort Yuma is 722 miles. At Fort Yuma the Southern Pacific will probably connect with the Texas Pacific (Col. Scott's road), and farther north, at Fort Mohave, on the Colorado river, another eastern connection is expected to be made in time. The steel rails ordered are to weigh fifty pounds to the yard, and the quantity ordered will lay 100 miles of single track, including sidings. The rails will be shipped by sailing vessels around Cape Horn.

We hope that this transaction may be but the beginning of a large trade in steel rails and iron and steel products generally between the East and the Pacific coast. The States and Territories of the Pacific slope consume annually about 300,000 tons of iron in all forms, and until they are ready to make their iron and steel it would certainly be wise for them to buy their supplies from sister States rather than from foreigners.

LEATHERETTE.—This new patent imitation of leather, which has already been fully described, is alluded to in a late number of the *British Trade Journal*, as follows:

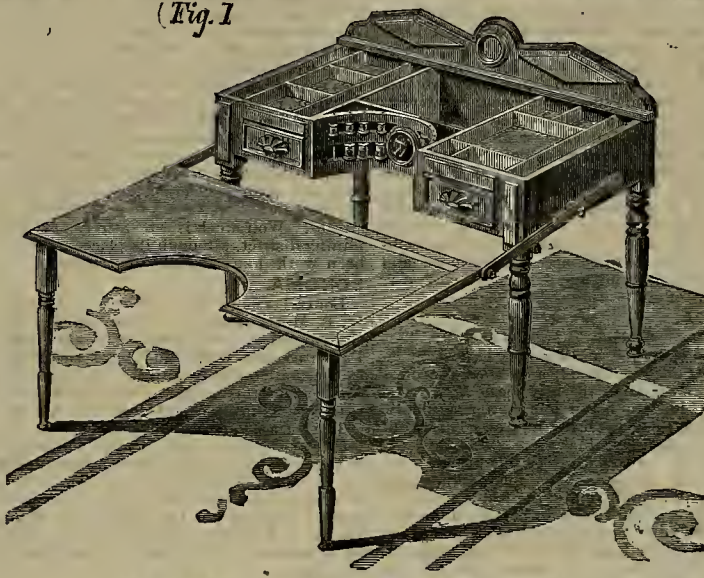
Specimens of leatherette, a capital imitation of leather, have been submitted to us during the past month, and make evident that some improvements have been effected in the manufacture which seem to justify further notice.

Briefly then, this leatherette is now dyed throughout, the surface—representing with wonderful fidelity the natural grain of leather—is more defined, and while the fabric has been strengthened, greater softness and a more leather-like feeling have been imparted to it. It is thus admirably fitted for use by bookbinders, and in many trades which have recourse to what we may term fancy leather.

Tin—Its Manufacture and Supply.

Tin plate or sheet tin forms one of the most important branches of England's domestic industry, supplying the world with this indispensable material; for millions of boxes, containing 112 pounds each, are exported annually from there, and a million boxes are yearly imported into the United States. The tin plate consists of sheet iron, alloyed and coated externally with pure tin. Sheet iron of the best quality is cut into sizes required, bent into a triangular form, heated to redness in a reverberatory furnace, dipped into hydrochloric acid, drained, and again heated to scale the whole surface. This forms the most important

(Fig. 1)



SNYDER'S LADIES' WORK TABLE, IN USE.

operation, for any trace of oxide would prevent the adhesion of the tin. They are then beaten level and smooth, passed cold through chilled rollers, immersed in lye, a weak bath of fermenting brine water, pickled by agitation for some time in a bath of diluted sulphuric acid, scoured in water with sand and hemp, and kept for use in pure water. The clean plates, dried by bran, are kept in a bath of melted tallow, called a grease pot, for an hour, and then passed through a series of rectangular pots. The first is the tin pot, containing the

for the past fifty years been closely watching this metal. But however attentively it may have been followed by men of note in mercantile knowledge, the basis of production has undergone such radical changes that all calculation has been set at naught, and the persons who took cognate from statistical arguments and confidently held tin, have quite recently experienced heavier losses on this metal than any other, if we except quicksilver, which declined fifty per cent. within the past few months.

Tin has proved all the more treacherous, both to the consumptive and speculative holder, as its use in reality has rapidly increased; but as production has also been excessive, the downward course of the article has remained unchecked, except during short periods of temporary recovery.

The English mines are becoming more and more unprofitable, yet they are struggling on.

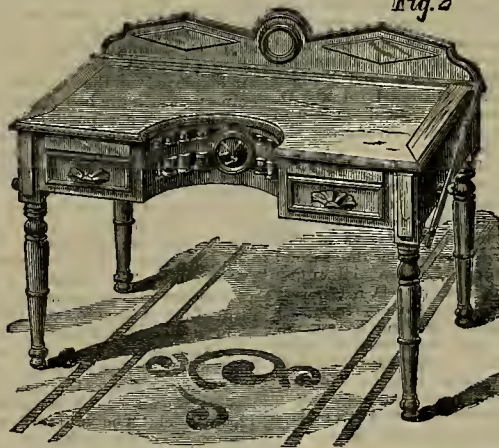
A year's stoppage in Cornwall would relieve tin production of a surplus supply of 10,000 tons. The Banca production ranges annually between 3,000 and 4,500 tons.

The Malacca supply ranges between 7,000 and 10,000 tons.

The Australian production has been rapidly on the increase. The yield of 1874 was 5,800 tons, against 2,990 in 1873.

From latest accounts the demand in Europe continues good, and the deliveries are large, but the arrivals still keep pace with them.

Fig. 2



SNYDER'S LADIES' WORK TABLE, CLOSED.

melted block tin, covered with grease, into which the plates are dipped one by one, and kept there one hour and a half; then they are put on an iron grating to drain, and dipped into a wash pot containing the fused tin. Into this the superfluous tin is removed from the surface. The plate is then lifted out, scoured on both sides with a hempen brush, dipped for a moment into the melted tin in a compartment of the wash pot to remove the marks of the brush and give uniform smoothness to the surface, and then immersed in the adjoining grease pot, where some superfluous tin is removed, and collects on the lower edge. The plate is next put into an empty pot to drain. When cool enough, the lower edge of the plate is dipped into the hot pot containing melted tin one-quarter of an inch in depth, by which the accumulation of tin on the edge is melted off, leaving a dull edge, which may be seen on all the sheets. The plates are then cleaned with bran and pecked. About eight pounds of tin is required to cover 225 plates, which weigh 112 pounds.

Few articles of merchandise have attracted as much attention during the past few years as tin. No one of the metals is so extensively dealt in by merchants and bankers at large; hence the best statisticians of Europe and America, not only in the metal trade, but in the great articles of merchandise in general, have

Upon examination of the general statistics of tin, it will be found that the supply has been considerably increased, but while this has been the case, consumption has, in spite of the dull times on the other side, been on a larger scale than was ever before known. If the general metal trade had been in full swing in Europe, consumption would probably have been sufficiently large to keep the aggregate visible supply at the same figure at which it stood January 1st.

The immediate future of tin values will therefore mainly depend on the whole course which the metal trade will take in Europe during the next few months. Speculators for a rise seem to find it too difficult to grapple with the problem of tin values with any degree of solid success; for the moment a rise of five per cent. is established, steam via the Isthmus of Suez bestens the arrival of fresh supplies, and the advance as rapidly vanishes.

The American consumption of pig tin is so small at present that little can be expected in the way of a favorable diversion on this side during the summer months, while toward fall greater briskness is likely to prevail, and may coincide with some speculative movement.

Iron filings in a weak solution of sal ammoniac, mixed with Portland cement, are said to double the strength of the latter.

Explosives.

At the last meeting of the chemical section of the Society of Arts, in England, for the present session, a day or two ago, a paper by Mr. Alfred Nobel, of Paris, on the subject of "Explosives" was read, in the absence of the author, by Mr. T. Wills. The paper commenced with a retrospective view of the history of explosives invented from time to time to replace gunpowder in blasting operations. Connected with the use of ordinary gunpowder were many advantages which rendered it a matter of difficulty altogether to supersede it; yet it had certain defects, in view of pelleting which a long series of explosive materials had been introduced, most of them having met with but indifferent success, owing chiefly to the slowness of their action. A novel class of explosives had been lately invented by Dr. Herman Spring, which, if not likely at once to be brought into practical use, presented, in a scientific sense, a peculiar and startling interest. The first practical substitute for gunpowder had been gun cotton, introduced by Schoenbein, in 1846. The idea of employing this powerful substance had at one time been almost abandoned, until the researches of certain chemists—notably those of Professor Abel—had revealed an easy means of rendering its use perfectly safe. The most formidable rival which gun cotton had yet encountered was unquestionably nitro-glycerine, invented by Sobrero, almost simultaneously with the production of the former material. Though nitro-glycerine had met with much opposition, on account of the dangers said to attend its use. These dangers had been much overestimated. The embodiment of nitro-glycerine in the solid form of dynamite had, however, after a long struggle with public prejudice, led to its very extensive employment as a blasting agent. A short description of subsequently discovered substances of a kindred nature here followed, with a comparative statement of their relative mechanical explosive powers, ascertained by means of scientifically conducted experiments. From these it would appear that the highest places on the list of practically employed explosives is filled by nitro-glycerine. The application of detonation to the discharge of blasting materials was then brought under consideration, and some full observations on the various sources of danger liable to occur during the manufacture, transit, storage, and use of nitro-glycerine and other explosives occupied the remainder of the paper.

Ladies' Work Table.

The accompanying illustrations represent a new ladies' work table, patented by C. E. Snyder, of Minneapolis, Minn. The lid of the table, as shown in Fig. 1, is readily convertible into a lap board by the side arms turning on a pivot, and resting, when down, on pins in the table legs. The legs of the lap board serve as supports for the table lid when up, and are then folded under, out of sight, as indicated in Fig. 2. If desired, the clep board can be detached from the table and used independently, in which case the elongated side arms become legs. The conformity of the table to the shape of the lap board gives a beautiful design for the former, and at the same time admits of a very convenient arrangement.

The recess in front is used for a double row of spools, retained in place by brass standards. The center piece forms a pin cushion. This recess may be tastefully ornamented. The divisions over the right hand drawer may be used for writing utensils, those over the left drawer for "notions," while the division between will hold a large quantity of out end baited work. The inventor may be addressed, as above, by those who desire to manufacture these tables.

Cost of Reduction.

We give to our miners, says the *White Pine News*, the rates charged at Eureka for the reduction of ores, which will aid some of our mine owners in estimating what kind of ores will pay for shipment and reduction. It would seem from the rates charged that nothing less than one hundred dollar ore would pay for shipment, which is comment enough to induce capitalists to build furnaces here, owing to the fact that there is a large amount of ore already taken out which will pay from sixty-five to seventy dollars per ton. There is still another fact which should be remembered by those visiting this camp with a view of investing, which is, that contracts will be made to furnish any amount of ore that will pay the above named sums per ton.

The following rates, free of smelting charges, will be paid for gold and silver bearing ores at the Eureka Atlas smelting works:

Ores assaying 60 dollars per ton, 16 per cent. of value.	
Ores assaying 60 dollars per ton, 25 per cent. of value.	
Ores assaying 70 dollars per ton, 35 per cent. of value.	
Ores assaying 80 dollars per ton, 45 per cent. of value.	
Ores assaying 90 dollars per ton, 46 per cent. of value.	
Ores assaying 100 dollars per ton, 50 per cent. of value.	
Ores assaying 150 dollars per ton, 55 per cent. of value.	
Ores assaying 200 dollars per ton, 60 per cent. of value.	
Ores assaying 225 dollars per ton, 60 per cent. of value.	
Ores assaying 250 dollars per ton, 62 per cent. of value.	
Ores assaying 300 dollars per ton, 63 per cent. of value.	

For higher grade ores, rates by special agreement. Lead, over 20 per cent. will be paid for at the rate of 40 cents a unit, until further notice.

Good Health.

A New Medicinal Plant.

A Brazilian plant bearing the savage name of "Jaborandi" appears to be the coming drug. It was first introduced into Europe about one year ago, but has grown rapidly in estimation with the medical fraternity since that time, so much so that the English wholesale drug houses are ordering immense quantities of it from Pernambuco, near which port it abounds. It is a shrub which grows about five feet high, with a cylindrical, tapering root, very springily branched, the bark of a pale yellowish color and very brittle.

Experiments with this drug suggest a curious relation, partly of analogy but mainly of opposition, between jaborandi and belladonna. It resembles atropia in quickening the pulse, flushing the face, and exerting a more decided influence on adults than on children. On the other hand, it is diametrically opposed to atropia in its actions on the salivary, sudoral, and mammary secretions, on the pupil, and on the minute arteries. Further, the tendency of belladonna to cause delirium contrasts with that of jaborandi to cause prostration and apoplexy. It has been proved that atropia is able to arrest the flow of saliva caused by jaborandi; and Ringer found that a dose of the latter drug speedily removed the dryness of the month in a case of accidental poisoning by atropia. Sweating after jaborandi may be prevented or checked by the subcutaneous injection of one-hundredth of a grain of atropia.

As a sudorific the drug is likely to prove of great value. It may also turn out to be a trustworthy antidote in poisoning by belladonna; and other virtues, unsuspected as yet, may be found to exist in the plant when it becomes better known. Hence pharmaceutical, medicinal, and chemical investigators are turning their attention to jaborandi. Dr. Ringer and some of his associates at the London University College hospital have been experimenting with this medicine therapeutically. To adults they have administered doses of from sixty to ninety grains in the form of infusion, and in nearly all cases profuse perspiration and most enormous salivation ensued very rapidly. The saliva collected from the patients averaged about an Imperial pint, and in one instance amounted to twenty-seven fluid ounces. Evidently the medicine is possessed of very important properties, and it now becomes a question of considerable interest to ascertain the precise principle of the plant to which these effects are due. Several chemists are working at the subject, and this doubt will therefore probably be soon cleared up.

Don't Eat Mathematically.

Persons in good health should not eat any article of food simply because it is "healthy," nor avoid any article because some one says it is "unhealthy;" nature's instincts are a better and safer guide, for she craves food, the distinctive elements of which are needed in the system; hence no man likes or dislikes of an article of diet should be the guide of another, any more than all soils should require the same fertilizer, in quality and quantity.

Sometimes, indeed—but rarely in good health—a man may crave earnestly an article of food, and after eating it feel uncomfortable; yet, rather than conclude it did not agree with him, and discard it, a smaller quantity should be taken next time, and very often that smaller quantity, well divided, prepared properly and eaten slowly will "agree" simply because the system needed only that smaller quantity.

Brown bread is said to be good for many persons by its keeping the system open and free; but if a man is well enough in that respect, he would do well not to eat brown bread, unless he was fond of it, so as to have it to fall back upon, should he need its medicinal effect. In short, eat according to the natural appetite as to quantity and quality, and not according to artificial rules and regulations.

If a man is an invalid and has a family physician, it is safer and better to put himself under that physician's guidance; if he has no physician, let him feel his own way, taking small quantities at regular intervals, and closely observe the effects. But for both sick and well, it is just as unwise to measure and weigh each meal day after day, as it would be to wear the same amount of clothing and consume the same amount of fuel every day in the year, winter and summer. In mature life we eat for two reasons, to repair waste and to keep the body warm; the waste is in proportion to the preceding exercise, and the internal warmth needed is in proportion to the temperature of the atmosphere about the body. If you eat to-day while idle, and the thermometer is at sixty, as much as you did yesterday, when it was at zero, and you worked hard, you will certainly be sick to-morrow. After all, don't make a god of your belly, but accustom yourself to think of eating and what you shall eat, only when the time for eating comes; a beast or a glutton may do otherwise, a man will not. —Hall's Journal.

THE EAR.—Mr. James Hinton, in his "Physiology," affirms that the passage of the ear does not require cleaning by us. Nature undertakes that task, and in this healthy state fulfills it perfectly. Her means for cleansing the ear is the wax, which drips up into thin scales, and peels off and falls away imperceptibly. In health the passage of the ear is never dirty, but an attempt to clean it will infallibly make it so. Washing the ear out with soap and water is bad; it keeps the wax moist when it ought to become dry and scaly, and makes it absorb dust. But the most hurtful thing is the introduction of the corner of a towel screwed up and twisted around. This proceeding irritates the passages and presses down the wax and flakes of skin upon the membrane of the tympanum, producing pain and inflammation and deafness. Washing should only extend to the outer surface, as far as the finger can reach.

THE EFFECT OF EMOTION.—It is related by Sprengel in his "Geschichte der Arzneikunde," that the Arabian physicians sometimes relied with great success on moral means, of which the following is a striking instance: One of Haroun Al-Raschid's wives suffered from paralysis of both arms. Dschibrail, the court physician, induced the caliph to summon all the leading nobles to a large hall in his palace, and then introduced the lady to the assembled multitude. Without a word of preface he raised her veil, when feelings of shame and fear restored strength to the palsied arms. The lady hastily drew her veil down again, and was cured from that hour.

THE EFFECT OF BUCKWHEAT ON THE BLOOD.—Does it drive the impurity of the blood to the outside, or does it make the blood more impure and, by reason of excess, causes impurities to come to the surface? Ans.—The harm is not due to any injurious ingredient in the buckwheat. It is to be ascribed to the large amount of butter and fatty matters eaten at the same time.

USEFUL INFORMATION.

Black Walnut Finishing.

The fashionable finish for black walnut work, particularly chamber sets, is what is known to the trade as the "dead oil finish." It is admired, perhaps, because it has a gloss, rather than a shine of the varnish stamp. There is no more labor required upon it than upon a bright finish, but the process of manipulation is different, and harder upon the fingers.

It should be premised that the walnut work of the day bears upon its surface, to a greater or less extent, raised panels covered with French burr veneer. And upon this fact depends the beauty of the production to a very great extent. And the effort is, to so finish the article that there shall be a contrast between the panel and the ground work on which it is placed. In other words, the former should be of a light color, while the latter is of a darker shade. In that view the palest shellac should be used on the panels and darker pieces, liver colored, etc., on the body of the work. The darker grades of shellac are the cheaper and will answer for the bulk of the work, but the clearest only for the panels.

In commencing to finish a job direct from the cabinet maker's hand, rough, and innocent of any knowledge of sandpaper, the panel should first be covered with a coat of shellac to prevent the oil in the filling from coloring them dark. Next, cover the body of the work with a wood filling composed of whiting and plaster of paris, mixed up with japan, benzine and raw linseed oil, or the lubricating oil made from petroleum; the whole colored withumber, to which, in rare cases, if a reddish shade is wanted, venetian red is also added. This filling is then rubbed off with cloths, and by this process tends to close up the grain of the wood and produce an even surface. More or less time should be allowed after each of the several steps in the finishing process for the work to dry and harden, though much less is required in working with shellac than with varnishes composed of turpentine, oil and gums. But the time allowed is often hurried by the desire to get the work through as soon as possible, so that no standard can be set up as to the number of hours required between each of the several processes. It would be well if twelve hours intervened, but if the work must be hurried through in three days, which can well be devoted to, obviously, the processes must follow each other in a corresponding haste.

A coating of shellac is then given the whole work, light on the panels and dark on the body work, and when it has dried and hardened, which it does very soon, it may be rubbed down. This process of "rubbing down" should be done evenly and carefully, so as not to rub through the shellac at any point, and is done with the finer grades of sandpaper for the cheaper class of work, particularly at first, but at a later period of the process, and for the better class of articles in all cases, hair cloth should be used; the material for the "rubbing down" should be pumice stone moistened with raw linseed oil for the best work, and the lubricating oil, before mentioned, for cheaper work or the covered parts of the better grades. This rubbing down involves labor, wear of

fingers and finger nails, and is carried on with an ordinary bit of hair cloth, the smooth surface next the wood, and not made in any particular shape, such as a wad, or ball, or otherwise. In the corners and crevices where the hair cloth will not enter it will be necessary to sandpaper; the finest grades, and worn pieces only.

Three coats of shellac are put on, followed each time by this "rubbing down" process, each one giving the work a smoother feeling and a more perfect appearance. Afterward, to complete the whole, a coating of japan, thinned with benzine, is applied, which gives a clean appearance to the work, and the dead glossy finish.

There is this objection to the above style of finish, that the japan catches all the dust which touches it and holds it permanently, so that many of the best workmen will not have work finished in this way for their own private houses, preferring the brighter look made by shellac and varnish without rubbing down the last coat, and saying that the work can be kept much cleaner.

The large oval panels of desks, etc., covered with French veneer, are generally taken out and finished by themselves. The process is similar to that above given, excessive coats of shellac, and varnish also, with the oil and pumice stone "rubbing down"; but the final part of this latter process is a "rubbing down" with rotten stone; then a very trifling of sweet oil is applied all over the surface and wiped off. —Cabinet Maker.

Glazing of Pottery Without Lead.

A mixture of feldspar, silica, kaolin and fluor-spar may be used to glaze bricks and pottery in a manner as perfect as the common lead glazing, and much more safe in a sanitary point of view. When the ingredients are once mixed, they are ground in cylinders to a powder, which is passed through a very fine sieve. This powder, of which the natural color is white, but to which all the tints can be given, is mixed with water in a tub, till it presents nearly the consistency of molding plaster.

The brick, or piece of pottery which is to be glazed, is then plunged into this mixture. It adheres, on account of the porosity of the material, with which it incorporates while drying. Being placed in earthen forms, they are exposed in ovens to 1,500° Fahrenheit. The heat melts the preparation, and the glazing spreads uniformly over the surface of the objects, which only have to be taken out of the oven to cool.

Bricks treated in this way have great advantages. They are of an unusual strength, and resist as well the influence of the atmosphere as the action of the acids. They can successfully be employed to cover walls on the inside or outside, which they preserve completely from dampness. This method of glazing may be made available for many industrial applications.

REPAIRING RUBBERS.—Rubber, or even leather boots, may be repaired by using the following cement: Take gum shellac three parts, india rubber one part, by weight. Dissolve these ingredients in separate vessels, in ether free from alcohol, applying a gentle heat. When thoroughly dissolved, mix the two solutions, and keep in a bottle tightly stoppered. This glue resists the action of water, both hot and cold, and most of the acids and alkalis. Pieces of wood, leather, or other substances, joined together by it, will part at any other point than at the joint thus made. If the glue be thinned by the admixture of ether, and applied as a varnish to leather, it renders the joint of seam water tight, and almost impossible to separate. By cementing a piece of thin leather or rubber over a crack, a neat and durable patch may be made. The soles of leather boots may be made more durable and perfectly waterproof by soaking them thoroughly, before a fire, with common pine tar. Three or four repeated applications are necessary to saturate the leather, when it completely absorbs the tar, and the soles are dry and hard as horn, but quite flexible.

COPYING MANUSCRIPT.—The following is a simple way of obtaining copies of writing without the use of a copying press: Mix white sugar with the ink; one and a half drams sugar to one ounce ink. Use this with an ordinary pen, and place over the writing a moistened sheet of unsized paper. Lay both leaves between two layers of carpet; put the whole under a piece of board large enough to cover. Then stand on the board for a few seconds. An excellent impression will be found on the copying paper.

TO FIT A KEY.—When it is not convenient to take a lock apart to fit a new key, the key blank should be smoked over a candle, inserted in the keyhole, and pressed firmly against the opposing wards of the lock. The indentations in the smoked portion made by the wards will show where to file.

The best pine wood evaporates five pounds of water per pound of wood consumed in a steam boiler furnace. One cord of wood can be consumed per hour on sixty square feet of grate. One pound carbon burnt to carbonic acid requires the oxygen of 153 cubic feet of atmospheric air.

GLYCERINE added to paper stock increases the flexibility of the paper.

DOMESTIC ECONOMY.

Summer Salad.

At our leading hotels and restaurants, indosed on the tables of the distinguished, it is very rare, says the Germantown Telegraph, to find lettuce, as a salad, worthy of the name. Green and bitter, by the aid of mustard, eggs, oil, or occasionally a scald, it is rendered just passable, but as unlike what cool delicious salad ought to be as is possible. It seems practically to be forgotten by those who grow salad that lettuce was never intended to be eaten unless blanched. In Europe they grow a long broad-leaved kind, called the Roman or Cos lettuce, which, after having attained considerable development, has the leaves drawn up and tied together at the top. The interior continuing to grow, and of course in the dark, by the tying up of the outer leaves, makes a hard mass like an elongated cabbage, which cuts up as white and crisp and sweet as a stick of celery. This kind has never found a place in American gardens, because our climate induces it to run to seed too quickly. The various kinds of cabbage lettuce are preferred, because they close in their leaves naturally, and are supposed to blanch themselves. But this is, as we have shown, a pleasant fiction, as there is very little of the white about any that we see, except where there is great care in the culture.

Of course our country is not so well adapted to the growth of good lettuce as England is. It will not stand extreme cold, nor does it like warm days and hot suns. It wants to go to seed as soon as the temperature goes over sixty-five degrees. But we could have much better than we do. In this spring we sometimes get a tolerable article. Started by a little protection from frames, it is brought to perfection before the warm weather comes. To have it good later is not difficult, by employing very rich land and as cool a spot as can be obtained. All vegetables that we value for their succulence require a rich soil to their best development, but it is an essential to good summer lettuce.

Of course varieties will assist. Some of American origin have been found to stand our heats without running to seed much better than the English varieties, which are better suited to that cooler summer climate. Of these the Indian lettuces are examples. Some of these have been improved, and of these the Hanson bears a good reputation.

COOKING RHUBARB.—Rhubarb is best cut in lengths, boiled in water and sugar and served with boiled rice round the dish; or, it may be treated like "gooseberry fool." A little good cream gives it a delicate taste, which it never has in a pudding or tart. The following are excellent recipes for making rhubarb jam and marmalade: Cut the rhubarb as if for tarts, and to every quart give one pound of good moist sugar; put the sugar over the rhubarb and leave it twenty-four hours to draw out the juice. By this method the pieces of rhubarb remain separate from each other when the preserve is done. It keeps good a year if kept in jars well dried, and in a dry place. For the marmalade procure six oranges, peel them and take away the white rind and pips, then elice the pulp into a stewpan along with the peel; cut very small; add thereto one quart of rhubarb cut finely, and from one pound to one pound and a half of sugar. Boil the whole down in the usual way as for other preserves. Made in this manner it is nearly equal to Scotch marmalade, which is regarded on all hands to be the finest anywhere made.

DRINK MILK AND GROW FAT.—Livingstone found that in Africa the use of sour milk promoted the growth of the muscle and fatty matters, and it also appeared to be a preventive of biliousness, while sweet milk had the opposite effect. It is stated that a pinch of salt in sweet milk will prevent any disordered stomach, drowsiness or other ailment, and that if any one wishes to grow fleshy, a pint, slightly salted, taken before retiring at night, will soon cover the scrawniest bones. In cases of fever and summer complaint milk is now given with excellent results. The idea that milk is "feverish" has exploded, and it is now the physician's great reliance in bringing through typhoid patients, or those in too low estate to be nourished by solid food.

SARATOGA POTATOES.—The following is said to be all there is of the cook's secret in producing those world-renowned potatoes served at Moon's Lake House, Saratoga Springs, every summer: Peel good sized potatoes, and slice them as evenly as possible; drop them into ice water. Have a kettle of lard, as for fried cakes, and very hot. Put a few at a time into a towel, shake them about to dry them, and then drop into the hot lard. Stir them occasionally; and when of a light brown take them out with a skimmer. If properly done, they will not be at all greasy, but crisp without, and meaty within.

ASPARAGUS AND BEANS.—Cut the tender parts of the asparagus into quarter inch lengths, boil in an equal quantity of water, adding about an equal amount of well cooked Lima beans. Cook until the asparagus is tender, and serve warm. Instead of the beans the asparagus may be thickened with flour or with cracker crumbs.



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San Francisco:

Saturday Morning, June 26, 1875.

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Miners, Help Your Paper!

Write for it. Subscribe for it. Speak of its merits. Influence others to subscribe for it. Are we not doing an important work for the prosperity of our mining districts? Are we not adding, by our steady work, millions of dollars to the product of our mines? Are we not disseminating that intelligence to miners, mechanics, and mine operators which prevents the ignorant squandering of millions of dollars? Are we not storing the minds of active professional men, and thousands of intelligent sons of toil, with more refined and lasting treasures than silver or fine gold?

The publication of scientific journals is not proverbially profitable in any part of the world. They are more costly than ordinary journals. Engravings are expensive—especially so in a new country. We have striven to make a valuable journal, an enterprising sheet, a reliable issue. We need the hearty support of the classes the MINING AND SCIENTIFIC PRESS especially represents; we ask it now. We thank old subscribers for their patronage; we solicit all to promptly renew.

ONE of Baker's Rotary Blowers (advertised in another column) has been running for five months at McCormick, Lewis & Co.'s Industrial Iron Works, 233 Beale street, in this city, where it can be seen and examined.

CONNECTION by rail with San Bernardino will soon be completed. Twenty miles have just been finished, out from Spadra.

Fryer's Process.

We see by the Grass Valley papers that Mr. Fryer, the inventor of the much talked of new process for working gold bearing quartz, has arrived in Grass Valley from the East. He will soon commence work on a large scale. He is sure that his process is a perfect success and that he can work ore to within 95 per cent. of its assay value, and at a cost not exceeding \$5 per ton. Base metals, of any kind, in the ores do not prevent successful working. The Union says the process has been tried without costing anybody anything, excepting Mr. Fryer and his associates. These gentlemen will also run the extended operations on the same principle, hearing all the expenses thereof and allowing no one on the outside to lose anything if a failure should occur.

In view of the fact that the new process will cause ledges to be worked more profitably than heretofore, the miners in the vicinity have increased their activity. The Transcript says that there are dozens of mines that have heretofore been extensively worked, but failed to pay as largely as owners desired, and have for some time been shut down. The owners believe with the Fryer process they will pay first-rate. There are also some mines that always paid well, but by mismanagement became involved and were shut down. The Banner mine will, it is thought, be opened before long. There has been over \$800,000 taken out of it, and not one assessment levied during the time. The ledge at the point last worked was, we believe, eight feet in width, and if it can be reduced as cheaply as Mr. Fryer proposes to work, it would pay a clear profit of between ten and fifteen dollars, even if the process only saved as much gold as the old mill process, which in that case did not secure over 30 to 35 per cent.

As the new process will shortly be tried on an extensive scale, we hope soon to be able to lay the results before our readers, together with some description of the process itself.

Ourselves.

This issue of the MINING AND SCIENTIFIC PRESS closes Volume XXX. We hope we have given satisfaction to our readers and intend trying to continue to do so. The mining interests of the coast were never before in so prosperous a condition as now, and never were so many engaged in it as a legitimate business. It is our endeavor to represent this important class of the community, and collect all the information of interest to them. Leaving aside the weekly mining news given in each issue, we have paid close attention to all new processes or improvements which are of value to miners and published them in a compact condensed form. The double sheet issue of this week alone is worth more than a year's subscription. The valuable and exhaustive article on lead, with the tables of lead minerals, prepared expressly for the Press by Mr. Hanks, is itself of great value. The paper this week also contains the United States Statutes relating to mining, which every miner should read closely, as they are of great importance. Our increasing list of practical correspondents who write on mining matters is a source of benefit to our readers and gratification to us. We do not consider it necessary to call attention to the work we have done for the mining community during the year, as it speaks for itself; but we desire to impress it upon miners generally that they cannot afford to do without a paper devoted to their special interests, and they should do all in their power to enhance its value and usefulness. Bring it to the attention of other miners, and assist it in any manner you can. The information in its columns, collected from all sources, is of far more value than the price of subscription. Those who are identified with the mining or industrial interests of the coast, who are not already subscribers, should become so now at the commencement of a new volume, and we promise them they shall not be disappointed in their investment.

LIVERPOOL COPPER MARKET.—We see by James Lewis & Sons' monthly report on ores and metals on the 1st inst., that owing to the uneasy feeling created by rumors of probable war on the continent, the copper market was in a very dull and apathetic state during the first half of May, and in the almost total absence of buyers, values of bars gradually receded from \$83 to \$81 6s. When the stocks of Chile copper were made up on the 14th ult., they were found to have decreased 898 tons. On the fear of war being allayed, an improved demand sprung up, and holders being firm, prices have gradually advanced to \$83 for good ordinary brands, and \$83 10s for picked brands to arrive, the sales being estimated at about 2,000 tons. Latest quotations were: Bars, \$82 10s. to \$83 cash; \$83 to \$83 10s. to arrive for good ordinary brands. Ore 16a 6d per unit. Regulars 17a., and Barilla 18a. 3d per unit.

Removing Broken Drills from Holes.

John W. Platt, of Mineral City, Nevada, has recently patented through the agency connected with this office a device for removing stubs and broken pieces of drills from holes, which is of interest to the mining community. It consists in the employment of a pair of jaws so shaped that they can be introduced around the stub and then firmly closed so as to hold and withdraw it. The operating mechanism is enclosed and protected by a case. Two gripping jaws are so curved as to form cylindrical sections, with roughened inner faces. The ends of these jaws are tapered to a blunt apex, and they are scarfed to an edge also, this being for the purpose of making it easy to work the jaws down through the rock and dirt that may be in the hole surrounding the stub. The sides of the jaws taper toward each other at the top, and unite so as to form a transverse cylindrical head. This head is fitted into a hole bored transversely through the lower end of the stem and a slot opens downward from the hole to allow the sides of the jaws to pass in. The stem passes up through a cylindrical sleeve, or case, within which it is protected, and the upper end of the stem has a screw cut upon it, so that the handle or elongated nut can be turned up or down as desired. A stationary handle is fixed to the top of the stem, and by this it is held while the nut is being turned.

This device is operated as follows: If a drill becomes broken in the hole the nut is turned back, and the elasticity of the sides of the jaws causes them to spread apart, and draw out of the case until they are sufficiently well opened to pass down upon each side of the drill. The stem is now twisted from side to side by means of its handles and the jaws will be worked down upon each side of the broken stub so as to clasp it. Now by turning the nut or handle, the cylindrical case will be forced down over the jaws, thus forcing them together and causing them to compress the steel firmly, so that the whole can be withdrawn, the operation not occupying more than a minute or two, even in holes three or four feet deep.

If the jaws should become broken or injured it will be only necessary to remove the handle and nut so as to allow the stem to be slipped out, when the head will easily slide from its socket, and can be replaced by another.

Work at the Foundries.

There seems to be no abatement in the continued demand upon the capacity of our foundries. The amount of business brought to our city by the mining interests of California and Nevada is made peculiarly evident in the flourishing state of business at these establishments.

Pacific Iron Works.

At these works the immense hoisting apparatus for the California and Consolidated Virginia shaft has been completed and was shipped on Tuesday of this week. The apparatus is the largest of the kind ever manufactured in this country. It has a hoisting capacity of 4,000 feet. There are two engines, twenty-six inch bore, six feet stroke, fitted with balance poppet valves and cross cut-off. The cylinders weigh 16,000 pounds each. There is to be one engine on each end of the shaft, the distance between being twenty-four feet from center to center. Double reels for flat wire rope are to be used. The engines are to be fitted with two steam brakes, one for each reel, with an independent hand brake for each reel. Six tubular boilers go with the machinery, fifty-four inches in diameter and sixteen feet long.

These hoisting works are fitted up with the latest improvements, finished in the best style, and will reflect credit not only upon the works constructing them, but upon the mechanical skill of the Pacific coast.

The managers of the Pacific Iron Works have lately contracted to build a pair of engines, 10x20 inch, for a mine in Sonora, Mexico, together with a ten stamp mill, pans, settlers, etc.

Nanaimo Coal.

Mr. Selwyn, F. R. S., Director of the Geological Survey of Canada, writes to the American Journal of Science and Arts on the age of the lignite coal formation of Vancouver island. He says: "I wish to record my dissent from the statement made by Professor Lesquereux, page 365 of Dr. Hayden's Report on the United States Geological and Geographical Survey of Colorado, 1873, to the effect that the coal of Nanaimo, Vancouver island, is referable to the lower American loocene. Careful surveys have now been made by the Canadian Geological Survey of the Nanaimo coal basin, and it is proved beyond the possibility of a doubt that the coal beds there are overlaid by a succession of strata, shales, sandstones and conglomerates, having a thickness of nearly 4,000 feet, and holding from base to summit marine cretaceous fossils, ammonites, baculites, inocerami and others. Maps and sections, showing the relative position of these beds and of the coal seams are given in the Report of the Geological Survey of Canada, 1872-1873; and I would beg to refer Prof. Lesquereux to them for information concerning the coal rocks of Vancouver island. As he makes no reference to the Report named I conclude he has not seen it."

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS American and Foreign Patent Agency, the following are worthy of mention:

IMPROVED POTATO DIGGER.—Jas. J. McKinnon, San Francisco, Cal. The rear end of the frame of this improved implement (supported on bearing wheels in the usual way) is in the form of an inverted U, and the rear leg of the inverted U extends down to the ground so as to form a standard for the shovel or plow which lifts the potatoes out of the ground. Hauls are secured to the rear end of the frame, by means of which a person walking on the rear of the plow can raise or lower the rear end of the frame at will in order to force the plow into the ground or force it out. The plow is made in the form of a shovel or scow, with a curved upper surface. A bevel wheel is secured to the axle inside of the frame, so that it turns with the axle. A shaft has its rear end supported on the standard above the plow and extends along under the frame to a cross bar of the frame in which its forward end is supported. To the forward end of this shaft a bevel pinion is secured, so as to engage with the bevel wheel. To the rear end of the shaft inside of the inverted U, is secured a four-armed wheel, the arms of which are long enough to pass close to the upper concave surface of the shovel. When the machine moves forward this shaft is rotated by the bevel gears, and consequently the wheel is caused to rotate above the plow and at right angles to the travel of the machine. When the shovel is forced into the ground under the potato hills, and drawn along the row, it will lift the hills of potatoes and carry them up over the rear end of the shovel, but the revolving arms of the wheel will strike the furrow as it is lifted into the hollow of the shovel and thus throw the potatoes and dirt out to one side of the furrow, leaving the potatoes upon the surface of the ground so that they can be easily picked up. The inventor states that this machine has proved very effective for unearthing potatoes and leaving them in a position ready to be picked up.

FEEDERS FOR THRESHING MACHINES.—Byron Jackson, Woodland, Yolo county, Cal. This is an improvement for delivering unthreshed straw to the cylinder of threshing machines, and is based more especially on a patent granted to W. J. Sloan, Sept. 3d, 1867, in which a moving belt or carrier conveys the grain to the cylinder, and a revolving shaft or drum armed with teeth is intended to regulate the delivery of the straw. It is found, however, that when a large bunch strikes the picker, it will remain until forced onward by other straw from behind, when it will pass through without being separated, and when the machine is operating where there are prevalent high winds, as in some parts of California, the straw will be blown upon the picker, around which it becomes twisted so that the machine must be stopped to disentangle it. In order to obviate this difficulty Mr. Jackson constructs his feeder with a short inclined belt, which stands above the discharge end of the feeding belt in place of the picker, and assists in guiding the direction of the straw to the cylinder.

DISTRIBUTOR FOR STRAW CARRIERS.—This is another improvement by the above named inventor, relating to straw carriers such as are employed to bring straw from the stack to the feeder, which is attached to the machine to supply the cylinder. The improvement consists in the use of a short belt standing at an angle above the main carrying belt, and made to revolve in an opposite direction. This belt may be adjusted up and down, and is provided with points or pickers which serve to catch and force back any masses of straw, until they fall into some place where there is little straw, and thus the straw which is thrown upon this belt in bunches, or forks, will be properly distributed before it reaches the feeder, and will be delivered to the latter in a comparatively even flow.

VACUUM RELIEF VALVE FOR WATER PIPES.—Philip Hinkle, San Francisco, Cal. This invention relates to a novel relief valve for water pipes, by which the inventor is enabled to prevent the heavy jar caused by the sudden shutting off of running water in pipes, where a vacuum is produced by its running. The invention consists of an inwardly opening valve, snitely attached, which is kept closed by a light spring and the pressure of water inside the pipe. When this latter pressure is removed by the vacuum caused by the flow of the water, the pressure of air outside of the valve will open it and allow air to enter and relieve any jar.

THE San Vicente lime company, at Santa Cruz, are building a new wharf 1,000 feet long, for the purpose of shipping the lime, and they propose using the new steamer *San Vicente* for carrying it to market. They think that when they get to working well that they will turn out from 9,000 to 10,000 barrels of lime per month.

ANTIMONY is selling in Liverpool at £58 to £60 per ton for French Star regulars.

DOUBLE SHEET—24 PAGES.

Portable Sawmill.

No machine has done more for the rapid development of this country than the portable circular sawmill. These are made in large numbers throughout the Central States, some of which are, however, of ordinary construction, others, the product of leaders in this line, are very superior and embrace features which by patent are controlled exclusively. Such a mill as this is made by Messrs. Lane & Bodley, of Cincinnati, and is represented in the accompanying fine engraving.

This firm makes iron frame mills only, contending that their first cost need not greatly exceed that of wood frames, while the advantage of solidity and durability, the absence of joints and the consequent impossibility that the bearings should become misplaced and out of their true lines, are so evident to the mechanic that more than a mention of this construction is unnecessary.

Other important features we will notice on leaving the frame in the order of their position. All bearings are filled with anti friction metal, those of the mandrels being self-lubricating,

and of such simple construction as to run constantly so long as supplied with oil, no wick, cotton or wool being used.

The saw mandrels are of the best iron or steel and are held in position laterally by a patented semi-elastic collar bearing.

The friction feed is here shown in its simplicity and strength. One belt only is required, that to drive the feed; the friction faces are ample and all shafts have long bearings. A control of the carriage is given by this arrangement that is not found elsewhere—the motion of a lever forward or backward moves the carriage at a speed governed by the will of the Sawyer, allowing the feed to be slackened as a knot is reached, and permitting a very fast return of the carriage for a new board set.

This firm by preference run the carriages of their best mills over rollers lying on chains upon the sills. This gives a large bearing surface, has a bearing always under the portion of the log being cut, and entirely avoids the jumping of the track because of sawdust or chips.

The setting works or head blocks are of a peculiar construction, yet so simple as to be readily understood. This portion of a sawmill is generally of the greatest interest, as it is by defective construction of these that the user is most seriously annoyed.

Lightness and strength are desirable; this is attained by the use of wrought iron as a base for the block, this by preference is in the strong-

est form known. The knees or standards are moved by coarse thread screws, power on which is obtained by a pair of gear wheels at one end, of suitable proportions.

The advantages of a screw set is its accuracy, and the objection only the supposed lack of speed. A springing log cannot draw forward a knee on a screw block, yet can on any other.

Upon the mill shown the speed of movement is greatly increased by the manner of connecting the blocks and of converting the reciprocating motion of the setting bar with a rotary motion upon the screws. This is accomplished by an upper and lower set of pawls attached to a reciprocating bar working alternately upon a ratchet wheel of coarse pitch, of which one tooth represents one-sixteenth of an inch upon the knee.

The automatic dog is a novel in form, the hook is swiveled so that it can be made to enter the log upon either side of the knee, these will hold securely the largest log or the last fitch, and will permit the saw to cut within one-half an inch of the knee. When once inserted the dog can not back out. When the hook is released the dog immediately returns to a secure position entirely out of the way of the saw or the fresh log.

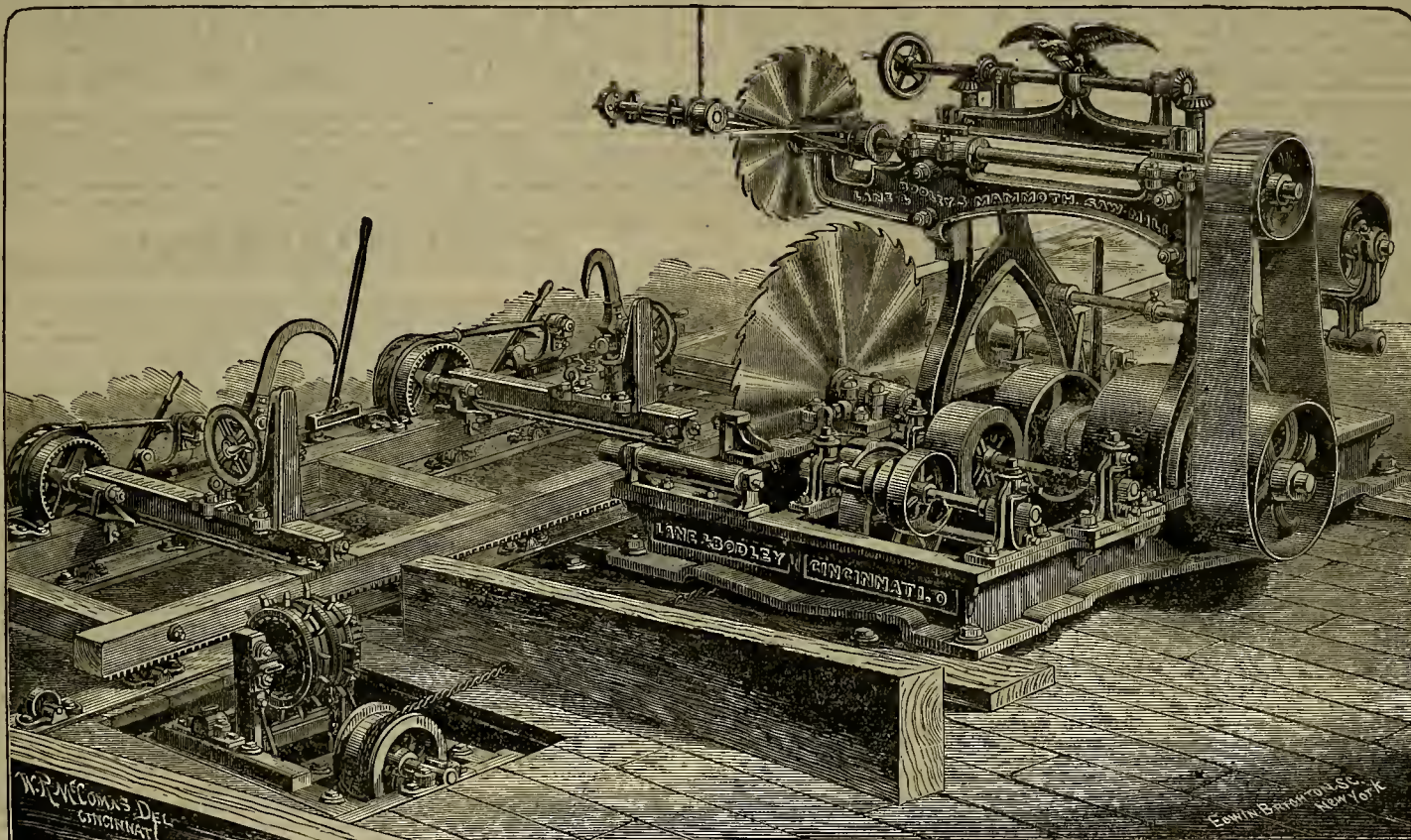
It will be noticed that nowhere on the setting apparatus is metal used torsionally, although the practice is common. Messrs. Lane & Bodley consider that the use of metal in this way

on a head block is as much out of place as upon a pair of scales, in fact they consider that their blocks might be likened to a pair of scales in their accuracy.

The mill shown will carry a seventy-two-inch lever and a thirty-inch top saw. The yoke carrying the top saw is adjusted vertically by a single hand wheel, the convenience of this where saws are changed instead of filed upon the mandrel is very great. The length of the head blocks generally used on this mill permit an opening of forty-eight inches between the knee and saw, but can be made greater if desirable—an accommodation which the wrought iron beam permits.

The log trusser shown in the engraving is a new idea which is now undergoing a thorough test before being put upon the market; the results now reached are so highly satisfactory that they have no doubt of the future success of the device.

Altogether this mill is well adapted to the wants of the Pacific coast, where large logs abound and a great demand for bill timber exists. The suitability of this mill for the latter purpose is most apparent in the setting works, which the makers guarantee to be as accurate on a sixty-foot carriage as on a twenty-foot one. Parties interested will receive prompt attention to the correspondence they may address the firm at Cincinnati. Circulars sent upon application.



LANE & BODLEY'S IMPROVED SAW-MILL.

Revised Statutes of the United States, Relating to Mineral Lands and Mining Resources.

EXPLANATION.—RELATION OF THE REVISED STATUTES TO REPEALED LAWS.

In the recently issued Revised Statutes of the United States, all the laws relating to mineral lands are brought together in chapter six of title thirty-two (Public Lands), and all those portions of the Acts of July 26th, 1866, July 9th, 1870 and May 10th, 1872, which had not been repealed previously, together with the Coal Land Act of March 3d, 1874, are consolidated in the chapter referred to, as herewith reprinted. We have also, in examining the Revised Statutes, selected such collateral sections as have reference to mineral lands and print them here under the title of "Miscellaneous Provisions."

In order that the reader may distinctly understand the relations which these Revised Statutes bear to the Acts previously in force, we give the following extract from the "Repealing Provisions," approved June 22d, 1874. This provision will be found on page 1091 of the Revised Statutes, section 5596, and repeals certain Acts passed prior to December 1st, 1873.

"SECTION 5596. REPEAL OF ACTS ENACTED IN REVISED STATUTES.—All Acts of Congress passed prior to said 1st day of December, one thousand eight hundred and seventy-three, any portion of which is embraced in any section of said revision, are hereby repealed, and the action applicable thereto shall be in force in lieu thereof; all parts of said Acts not contained in such revision, having been repealed or superseded by subsequent Acts, or not being general or permanent in their nature. *Provided*, That the incorporation into said revision of other provisions of a private, local, or temporary character, shall not repeal or in any way affect any appropriation, or any provision of a private, local, or temporary character, contained in any of said Acts, but the same shall remain in force; and all Acts of Congress passed prior to said last named day, no part of which are embraced in said revision, shall not be affected or changed by its enactment."

This section, of course, virtually repeals the Acts of July 26th, 1866, July 9th, 1870 and May 10th, 1872, as well as all miscellaneous provisions except such as are specified in the above provision. No changes, however, were made in existing laws, the different provisions in force merely being re-arranged under proper titles. The arrangement and classification of the several sections of the Revised Statutes have only been made for the purpose of more convenient and orderly arrangement of the same. The repeal of the several Acts embraced in said revision does not affect any act done or any right accruing or accrued, or any suit or proceeding had or commenced in any civil cause before the said repeal, but all rights and liabilities under said Acts continue, and may be enforced in the same manner as if said repeal had not been made. The revision does not affect or repeal any Act of Congress passed since December 1st, 1873, and all Acts passed since that date are to have full effect as if passed after the enactment of the revision, and so far as any such Acts vary from or conflict with any provision contained in said revision, they are to have effect as subsequent Statutes, and as repealing any portion of the revision inconsistent therewith. It will be seen from this the "Revised Statutes," which are now in force simply embrace the Statutes of the United States, general and permanent in their nature, in force on the 1st day of December, 1873, as revised and consolidated by Commissioners appointed under an Act of Congress.

We have placed a short explanatory note, in brackets, over each section of the Revised Statutes, showing the difference, where there is any, in the wording of the particular section of the Revised Statutes and the corresponding section of the original Act of Congress from which it is derived.

Mineral Lands Reserved.

Sec. 2318. In all cases, lands valuable for minerals shall be reserved from sale, except as otherwise expressly directed by law.

Mineral Lands Open to Purchase by Citizens.

[This section is identical with Sec. 1 of the Act of May 10th, 1872, and almost identical with Sec. 1 of the Act of July 26th, 1866, which latter section was repealed by the Act of May 10th, 1872.]

Sec. 2319. All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, and the lands in which they are found to occupation and purchase, by citizens of the United States and those who have declared their intention to become such, under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States.

Length of Mining Claims Upon Veins or Lodes.

[This section is the same as Sec. 2 of the Act of May 10th, 1872.]

Sec. 2320. Mining claims upon veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits, heretofore located, shall be governed as to length along the vein or lode by the customs, regulations, and laws in force at the date of their location. A mining claim located after the tenth day of May, eighteen hundred and seventy-two, whether located by one or more persons, may equal, but shall not exceed, one thousand five hundred feet in length along the vein or lode; but no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located. No claim shall extend more than three hundred feet on each side of the middle of the vein at the surface, nor shall any claim be limited by any mining regulation to less than twenty-five feet on each side of the middle of the vein at the surface, except where adverse rights existing on the tenth day of May, eighteen hundred and seventy-two, render such limitation necessary. The end-lines of each claim shall be parallel to each other.

Proof of Citizenship.

[This is the same as the last clause in Sec. 7 of the Act of May 10th, 1872, except that that clause had an addition which has been incorporated in Section 2326 of the Revised Statutes. The first part of Sec. 7 of the Act of May 10th, 1872, will also be found incorporated in section 2326.]

Sec. 2321. Proof of citizenship, under this chapter, may consist, in the case of an individual, of his own affidavit thereof; in the case of an association of persons unincorporated, of the affidavit of their authorized agent, made on his own knowledge, or upon information and belief; and in the case of a corporation organized under the laws of the United States, or of any State or Territory thereof, by the filing of a certified copy of their charter or certificate of incorporation.

Locators' Rights of Possession and Enjoyment.

[This is identical with Sec. 3 of the Act of May 10th, 1872.]

Sec. 2322. The locators of all mining locations heretofore made, or which shall hereafter be made, on any mineral vein, lode, or ledge, situated on the public domain, their heirs and assigns, where no adverse claim exists on the tenth day of May, eighteen hundred and seventy-two, so long as they comply with the laws of the United States, and with State, Territorial, and local regulations not in conflict with the laws of the United States governing their possessory title, shall have the exclusive right of possession and enjoyment of all the surface included within the lines of their locations, and of all veins, lodes, and ledges throughout their entire depth, the top or apex of which lies inside of such surface-lines extended downward vertically, although such veins, lodes, or ledges may so far depart from a perpendicular in their course downward as to extend outside the vertical side-lines of such surface locations. But their right of possession to such outside parts of such veins or ledges shall be confined to such portions thereof as lie between vertical planes drawn downward as above described, through the end-lines of their loca-

tions, so continued in their own direction that such planes will intersect such exterior parts of such veins or ledges. And nothing in this section shall authorize the locator or possessor of a vein or lode which extends in its downward course beyond the vertical lines of his claim to enter upon the surface of a claim owned or possessed by another.

Owners of Tunnels, Rights of.

[This section is the same as Sec. 4 of the Act of May 10th, 1872.]
 Sec. 2323. Where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owners of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the line of such tunnel of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid; but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of such tunnel.

Miners' Regulations; Expenditures and Improvements.

[This section is the same as Sec. 5 of the Act of May 10th, 1872, except that in the clause relating to expenditures in that Act, the words "each year for each hundred feet" were used instead of the words "by the 10th day of June, 1874, and each year thereafter." It will be remembered that on March 1st, 1873, Congress passed an Act amending that of May 10th, 1872, so that the time for the first annual expenditures on claims located prior to the passage of the Act, was extended to June 10th, 1873. Again on June 6th, 1874, Congress again amended the 6th section of the Act so that the time for the first annual expenditure on such claims was extended to January 1st, 1875.]
 Sec. 2324. The miners of each mining district may make regulations not in conflict with the laws of the United States, or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground so that its boundaries can be readily traced. All records of mining-claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located by reference to some natural object or permanent monument as will identify the claim. On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until a patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made by the tenth day of June, eighteen hundred and seventy-four, and each year thereafter, for each one hundred feet in length along the vein, until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and upon a failure to comply with these conditions, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made, provided that the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements, may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if, at the expiration of ninety days after such notice in writing or by publication, such delinquent should fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditures.

The following Act of Congress, which was passed since the revision of the Statutes, being approved February 11th, 1875, is introduced here, as it affects the above section:
 An Act to amend Section 2324 of the Revised Statutes, relating to the development of the mining resources of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled: That Section two thousand three hundred and twenty-four of the Revised Statutes be, and is hereby, amended so that where a person or company has or may run a tunnel for the purposes of developing a lode or lodes, owned by said person or company, the money so expended in said tunnel shall be taken and considered as expended on said lode or lodes, whether located prior to or since the passage of said Act; and such person or company shall not be required to perform work upon the surface of said lode or lodes in order to hold the same as required by said Act.

After the passage of this Act, the Commissioner of the General Land Office ordered that "the expenditures required upon mining claims may be made from the surface or in running a tunnel for the development of such claims."

Patents for Mineral Lands, How Obtained.

[This section is the same as Sec. 6 of the Act of May 10th, 1872. See also Sections 2 and 3 of the Act of July 26th, 1866.]

Sec. 2325. A patent for any land claimed and located for valuable deposits may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this chapter, having claimed and located a piece of land for such purposes, who has, or have, complied with the terms of this chapter, may file in the proper land-office an application for a patent, under oath, showing such compliance, together with a plat and field-notes of the claim or claims in common, made by or under the direction of the United States Surveyor General, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat, previous to the filing of the application for a patent, and shall file an affidavit of at least two persons that such notice has been duly posted, and shall file a copy of the notice in such land-office, and shall thereupon be entitled to a patent for the land, in the manner following: The register of the land-office, upon the filing of such application, plat, field-notes, notices, and affidavits, shall publish a notice that such application has been made, for the period of sixty days, in a newspaper to be by him designated as published nearest to such claim; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter, within the sixty days of publication, shall file with the register a certificate of the United States Surveyor General that five hundred dollars' worth of labor has been expended, or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description, to be incorporated in the patent. At the expiration of the sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the register and the receiver of the proper land-office at the expiration of the sixty days of publication, it shall be assumed that the applicant is entitled to a patent, upon the payment to the proper officer of five dollars per acre, and that no adverse claim exists; and thereafter no objection from third parties to the issuance of a patent shall be heard, except it be shown that the applicant has failed to comply with the terms of this chapter.

Adverse Claim, Proceedings on.

[This corresponds with Sec. 7 of the Act of May 10th, 1872, except that the provision relating to rights of citizenship is taken out and is now a separate section, 2321, of the Revised Statutes.]

Sec. 2326. Where an adverse claim is filed during the period of publication, it shall be upon oath of the person or persons making the same, and shall show the nature, boundaries, and extent of such adverse claim, and all proceedings, except the publication of notice and making and filing of the affidavit thereof, shall be stayed until the controversy shall have been settled or decided by a court of competent jurisdiction, or the adverse claim waived. It shall be the duty of the adverse claimant, within thirty days after filing his claim, to commence proceedings in a court of competent jurisdiction, to determine the question of the right of possession, and prosecute the same with reasonable diligence to final judgment; and a failure so to do shall be a waiver of his adverse claim. After such judgment shall have been rendered, the party entitled to the possession of the claim, or any portion thereof, may, without giving further notice, file a certified copy of the judgment-roll with the register of the land-office, together with the certificate of the Surveyor General that the requisite amount of labor has been expended, or improvements made thereon, and the description required in other cases, and shall pay to the receiver five dollars per acre for his claim, together with the proper fees, whereupon the whole proceedings and the judgment-roll shall be certified by the register to the Commissioner of the General Land Office, and a patent shall issue thereon for the claim, or such portion thereof as the applicant shall appear, from the decision of the court, to rightly possess. If it appears from the decision of the court, that several parties are entitled to separate and different portions of the claim, each party may pay for his portion of the claim, with the proper fees, and file the certificate and description by the Surveyor General, whereupon the register shall certify the proceedings and judgment-roll to the Commissioner of the General Land Office, as in the preceding case, and patents shall issue to the several parties according to their respective rights. Nothing herein contained shall be construed to prevent the alienation of the title conveyed by a patent for a mining claim to any person whatever.

Description of Vein Claims on Surveyed and Unsurveyed Lands.

[Same as Sec. 8 of Act of May 10th, 1872.]

Sec. 2327. The description of vein or lode claims, upon surveyed lands, shall designate the location of the claim with reference to the lines of the public surveys, but need not conform therewith; but where a patent shall be issued for claims upon unsurveyed lands, the surveyor-general, in extending the surveys, shall adjust the same to the boundaries of such patented claim, according to the plat or description thereof, but so as in no case to interfere with or change the location of any such patented claim.

Pending Applications; Existing Rights.

[This formed part of Sec. 9 of the Act of May 10th, 1872, the paragraph which is left out here, simply repealing Sections 1, 2, 3, 4 and 6 of the Act of July 26th, 1866, the repeal not affecting existing rights. The words

"patents for mining claims" in the 9th section of the Act of May 10th, 1872, are here changed to "patents for mining claims on veins or lodes."]

Sec. 2328. Applications for patents for mining claims, under former laws now pending, may be presented to a final decision in the General Land-Office; but in such cases where adverse rights are not affected thereby, patents may issue in pursuance of the provisions of this chapter; and all patents for mining claims upon veins or lodes heretofore issued shall convey all the rights and privileges conferred by this chapter, where no adverse rights existed on the tenth day of May, eighteen hundred and seventy-two.

Conformity of Placer Claims to Surveys; Limit of.

[This section corresponds to the first clause of Sec. 12, Act of July 9th, 1870.]

Sec. 2329. Claims usually called "placers," including all forms of deposit, excepting veins of quartz, or other rock in place, shall be subject to entry and patent, under like circumstances and conditions, and upon similar proceedings, as are provided for vein or lode claims; but where the lands have been previously surveyed by the United States, the entry in its exterior limits shall conform to the legal subdivisions of the public lands.

Subdivision of Ten-Acre Tracts; Limit of Placer Locations.

[This section is substantially the same as the latter part of Sec. 12, Act of July 9th, 1870.]

Sec. 2330. Legal subdivisions of forty acres may be subdivided into ten-acre tracts; and two or more persons, or associations of persons, having contiguous claims of any size, although such claims may be less than ten acres each, may make joint entry thereof; but no location of a placer claim, made after the ninth day of July, eighteen hundred and seventy, shall exceed one hundred and sixty acres for any one person or association of persons, which location shall conform to the United States surveys; and nothing in this section contained shall defeat or impair any bona-fide pre-emption or homestead claim upon agricultural lands, or authorize the sale of the improvements of any bona-fide settler to any purchaser.

Survey of Placer Claims; Limitation of.

[The basis of this section may be found in Sec. 10, Act of May 10th, 1872, and Sec. 16, Act of July 9th, 1870.]

Sec. 2331. Where placer claims are upon surveyed lands, and conform to legal subdivisions, no further survey or plat shall be required, and all placer mining claims located after the tenth day of May, eighteen hundred and seventy-two, shall conform as near as practicable with the United States system of public-land surveys, and the rectangular subdivision of such surveys, and no such location shall include more than twenty acres for each individual claimant; but where placer claims cannot be conformed to legal subdivisions, survey and plat shall be made as on unsurveyed lands; and where by the segregation of mineral land in any legal subdivision, a quantity of agricultural land less than forty acres remains, such fractional portion of agricultural land may be entered by any party qualified by law, for homestead or pre-emption purposes.

Evidence of Possession to Establish Right to Patent.

[This section is the same as Sec. 13 of the Act of July 9th, 1870, except that the words "this chapter" are inserted instead of "this Act."]

Sec. 2332. Where such person or association, they and their grantors, have held and worked their claims for a period equal to the time prescribed by the statute of limitations for mining claims of the State and Territory where the same may be situated, evidence of such possession and working of the claims for such period shall be sufficient to establish a right to a patent thereunder this chapter, in the absence of any adverse claim; but nothing in this chapter shall be deemed to impair any lien which may have attached in any way whatever to any mining claim or property thereto attached prior to the issuance of a patent.

Proceedings for Patent for Placer Claim, Etc.

[This is the same as Sec. 11 of the Act of May 10th, 1872, except that the words "subject to the provisions of this chapter," are inserted instead of the words "subject to the provisions of this Act and an Act to amend, etc., approved July 9th, 1870."]

Sec. 2333. Where the same person, association or corporation is in possession of a placer claim, and also a vein or lode included within the boundaries thereof, application shall be made for a patent for the placer claim, with the statement that it includes such vein or lode, and in such case a patent shall issue for the placer claim, subject to the provisions of this chapter, including such vein or lode, upon the payment of five dollars per acre for such vein or lode claim, and twenty-five feet of surface on each side thereof. The remainder of the placer claim, or any placer claim not embracing any vein or lode claim, shall be paid for at the rate of two dollars and fifty cents per acre, together with all costs of proceedings; and where a vein or lode, such as is described in section twenty-three hundred and twenty, is known to exist within the boundaries of a placer claim, an application for a patent for such placer claim, which does not include an application for the vein or lode claim shall be construed as a conclusive declaration that the claimant of the placer claim has no right of possession of the vein or lode claim; but where the existence of a vein or lode in a placer claim is not known, a patent for the placer claim shall convey all valuable mineral and other deposits within the boundaries thereof.

Surveyor-General to Appoint Surveyors of Mining Claims.

[This is the same as the first half of Sec. 12, of the Act of May 10th, 1872. The remainder of Sec. 12 of the Act of May 10th, 1872 referred to the fees of registers and receivers, which subject is more fully detailed in Sec. 2335, given under the head of "Miscellaneous Provisions." The remainder of Sec. 12 also specified that nothing in that Act should be construed to enlarge or affect the rights of either party at the time of the passage of the Act of May 10th, 1872, or Act of July 26th, 1866; also that nothing in the Act be construed to repeal, impair or in any way affect the Act passed July 25th 1866, granting a. Suto the right of way and other privileges to aid in the construction of a draining and exploring tunnel to the Comstock lode, in the State of Nevada.]

Sec. 2334. The Surveyor General of the United States may appoint in each land-district containing mineral lands as many competent surveyors as shall apply for appointment to survey mining claims. The expenses of the survey of vein or lode claims, and the survey and subdivision of placer claims into smaller quantities than one hundred and sixty acres, together with the cost of publication of notices, shall be paid by the applicants, and they shall be at liberty to obtain the same at the most reasonable rates, and they shall also be at liberty to employ any United States deputy surveyor to make the survey. The Commissioner of the General Land-Office shall also have power to establish the maximum charges for surveys and publication of notices under this chapter; and, in case of excessive charges for publication, he may designate any newspaper published in a land-district where mines are situated, for the publication of mining-notices in such district, and fix the rates to be charged by such paper; and to the end that the Commissioner may be fully informed on the subject, each applicant shall file with the register a sworn statement of all charges and fees paid by such applicant for publication and surveys, together with all fees and money paid the register and the receiver of the land-office, which statement shall be transmitted with the other papers in the case to the Commissioner of the General Land-Office.

Verification of Affidavits, Etc.

[This is the same as Sec. 13, Act of May 10th, 1872, except that the words "this chapter" are inserted instead of "this Act," etc.]

Sec. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths within the land-district where the claims may be situated, and all testimony and proofs may be taken before any such officer, and when duly certified by the officer taking the same, shall have the same force and effect as if taken before the register and receiver of the land-office. In cases of contest as to the mineral or agricultural character of land the testimony and proofs may be taken as herein provided, on personal notice of at least ten days to the opposing party; or if such party cannot be found, then by publication of at least once a week for thirty days in a newspaper, to be designated by the register of the land-office as published nearest to the location of such land; and the register shall require proof that such notice has been given.

Where Veins Intersect, Etc.

[This is the same as Sec. 14, Act of May 10th, 1872, except that the word "but" is substituted for "provided."]

Sec. 2336. Where two or more veins intersect or cross each other, priority of title shall govern, and snoh prior location shall be entitled to all ore or mineral contained within the space of intersection; but the subsequent location shall have the right of way through the space of intersection for the purposes of the convenient working of the mine. And where two or more veins unite, the oldest or prior location shall take the vein below the point of union, including all the space of intersection.

Patents for Non-Mineral Lands, Etc.

[This is the same as Sec. 16, Act of May 10th, 1872, except that the word "but" is substituted for "provided."]

Sec. 2337. Where non-mineral land not contiguous to the vein or lode is used or occupied by the proprietor of such vein or lode for mining or milling purposes, such non-adjacent surface ground may be embraced and included in an application for a patent for such vein or lode, and the same may be patented therewith, subject to the same preliminary requirements as to survey and notice as are applicable to veins or lodes; but no location hereafter made of such non-adjacent land shall exceed five acres, and payment for the same must be made at the same rate as fixed by this chapter for the superficies of the lode. The owner of a quartz-mill or reduction-works not owning a mine in connection therewith may also receive a patent for his mill-site, as provided in this section.

State or Territorial Legislation Concerning Mineral Lands.

[Same as Sec. 5 of Act of July 26th, 1866.]

Sec. 2338. As a condition of sale in the absence of necessary legislation by Congress, the local legislature of any State or Territory may provide rules for working mines, involving easements, drainage, and other necessary means to their complete development; and those conditions shall be fully expressed in the patent.

Vested Rights to Use of Water; Right of Way for Canals, Etc.

[Same as Sec. 9 of Act of July 26th, 1866.]

Sec. 2339. Whenever, by priority of possession, rights to the use of water for mining, agri-

cultural, manufacturing, or other purposes, have vested and accrued, and the same are recognized and acknowledged by the local customs, laws, and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed; but whenever any person, in the construction of any ditch or canal, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

Patents, Etc., Subject to Vested Water-Rights.

[Same as part of Sec. 17 of Act of July 9th, 1870.]

Sec. 2340. All patents granted, or pre-emption of homesteads allowed, shall be subject to any vested and accrued water-rights, or rights to ditches and reservoirs used in connection with such water-rights, as may have been acquired under or recognized by the preceding action.

Non-Mineral Lands Open to Homesteads.

[This is substantially the same as Sec. 10, Act of July 26th, 1866, except that after the words "160 acres," the following words are omitted: "Or said parties may avail themselves of the provisions of the Act of Congress of May 20th, 1862, entitled an Act to secure homesteads to actual settlers on the public domain, and Acts amendatory thereof." The laws referred to in the last two lines of Sec. 2341, may be found under chapter 5, title 32, pages 423, 424, 425, and 426, Revised Statutes of United States.]

Sec. 2341. Wherever, upon the lands heretofore designated as mineral lands, which have been excluded from survey and sale, there have been homesteads made by citizens of the United States, or persons who have declared their intention to become citizens, which homesteads have been made, improved, and used for agricultural purposes, and upon which there have been no valuable mines of gold, silver, cinnabar, or copper discovered, and which are properly agricultural lands, the settlers or owners of such homesteads shall have a right of pre-emption thereto, and shall be entitled to purchase the same at the price of one dollar and twenty-five cents per acre, and in quantity not to exceed one hundred and sixty acres; or they may avail themselves of the provisions of chapter five of this title relating to "Homesteads."

Mineral Lands, How Set Apart as Agricultural.

[Same as Sec. 11 of Act of July 26th, 1866.]

Sec. 2342. Upon the survey of the lands described in the preceding section, the Secretary of the Interior may designate and set apart such portions of the same as are clearly agricultural lands, which lands shall thereafter be subject to pre-emption and sale as other public lands, and be subject to all the laws and regulations applicable to the same.

Power of the President to Provide Districts and Officers.

[Same as Sec. 7, of Act of July 26th, 1866, the words "this chapter" being substituted for "this Act."]

Sec. 2343. The President is authorized to establish additional land-districts, and to appoint the necessary officers under existing laws, wherever he may deem the same necessary for the public convenience in executing the provisions of this chapter.

Provisions of this Chapter not to Effect Certain Rights.

[Sec. 8 of Act of July 26th, 1866, says: "That the right of way for the construction of highways over public lands, not reserved for public uses, is hereby granted." Last clause of Sec. 16, Act of May 10th, 1871, says: "Nothing in this Act shall be construed to impair in any way, rights or interests in mining property acquired under existing laws." Sec. 6 of Act of March 3d, 1873 (Coal Land Law), says: "Nothing in this Act shall be construed to destroy or impair any rights which may have attached prior to its passage, or to authorize the sale of lands valuable for mines of gold, silver, or copper."]

Sec. 2344. Nothing contained in this chapter shall be construed to impair, in any way, rights or interests in mining property acquired under existing laws; nor to affect the provisions of the act entitled, "An act granting to A. Sotro the right of way and other privileges to aid in the construction of a draining and exploring tunnel to the Comstock lode, in the State of Nevada," approved July twenty-fifth, eighteen hundred and sixty-six.

Mineral Lands in Certain States Excepted.

Sec. 2345. The provisions in the preceding sections of this chapter shall not apply to the mineral lands situated in the States of Michigan, Wisconsin, and Minnesota, which are declared free and open to exploration and purchase, according to legal subdivisions in like manner as before the tenth day of May, eighteen hundred and seventy-two; and any bona-fide entries of such lands within the States named, since the tenth day of May, eighteen hundred and seventy-two, may be patented without reference to any of the foregoing provisions of this chapter. Such lands shall be offered for public sale in the same manner, at the same minimum price, and under the same rights of pre-emption as other public lands.

What Grants Not to Include Mineral Lands.

Sec. 2346. No act passed at the first session of the Thirty-eighth Congress, granting lands to States or corporations to aid in the construction of roads or for other purposes, or to extend the time of grants made prior to the thirtieth day of January, eighteen hundred and sixty-five, shall be so construed as to embrace mineral lands, which, in all cases are reserved exclusively to the United States, unless otherwise specially provided in the act or acts making the grant.

Entry of Coal Lands.

[Sec. 1 of Act of March 3d, 1873 (Coal Land Law), is identical with this section.]

Sec. 2347. Every person above the age of twenty-one years, who is a citizen of the United States, or who has declared his intention to become such, or any association of persons severally, qualified as above, shall, upon application to the register of the proper land-office, have the right to enter by legal subdivisions any quantity of vacant coal-lands of the United States not otherwise appropriated or reserved by competent authority, not exceeding one hundred and sixty acres to each individual person, or three hundred and twenty acres to such association, upon payment to the receiver of not less than ten dollars per acre, for such lands where the same shall be situated more than fifteen miles from any completed railroad, and not less than twenty dollars per acre for such lands as shall be within fifteen miles of such road.

Pre-emption of Coal Lands.

[Sec. 2 of Act of March 3d, 1873, is identical with this section.]

Sec. 2348. Any person or association of persons severally qualified as above provided, who have opened and improved, or shall hereafter open and improve any coal mine or mines upon the public lands, and shall be in actual possession of the same, shall be entitled to a preference-right of entry under the preceding section, of the mines so opened and improved: *Provided*, That when any association of not less than four persons, severally qualified as above provided, shall have expended not less than five thousand dollars in working and improving any such mine or mines, each association may enter not exceeding six hundred and forty acres, including such mining improvements.

Pre-emption of Coal Lands; When Claims to be Presented.

[Sec. 3 of Act of March 3d, 1873, is the same as this except that the words "under the preceding section" are substituted for the words "under section two of this Act."]

Sec. 2349. All claims under the preceding section must be presented to the register of the proper land-district within sixty days after the date of actual possession and the commencement of improvements on the land, by the filing of a declaratory statement therefor; but when the township plat is not on file at the date of such improvement, filing must be made within sixty days from the receipt of such plat at the district office; and where the improvements shall have been made prior to the expiration of three months from the third day of March, eighteen hundred and seventy-three, sixty days from the expiration of such three months shall be allowed for the filing of a declaratory statement, and no sale under the provisions of this section shall be allowed until the expiration of six months from the third day of March, eighteen hundred and seventy-three.

Only One Entry Allowed.

[Same as Sec. 4 of Act of March 3d, 1873, except that the words "the three preceding sections" are substituted for "that this Act."]

Sec. 2350. The three preceding sections shall be held to authorize only one entry by the same person or association of persons; and no association of persons, any member of which shall have taken the benefit of such sections, either as an individual or as a member of any other association, shall enter or hold any other lands under the provisions thereof; and no member of any association which shall have taken the benefit of such section shall enter or hold any other lands under their provisions; and all persons claiming under section twenty-three hundred and forty-eight shall be required to prove their respective rights and pay for the lands filed upon within one year from the time prescribed for filing their respective claims; and upon failure to file the proper notice or to pay for the land within the required period, the same shall be subject to entry by any other qualified applicant.

Conflicting Claims.

[Same as Sec. 5, Act of March 3d, 1873.]

Sec. 2351. In case of conflicting claims upon coal lands where the improvements shall be commenced after the third day of March, eighteen hundred and seventy-three, priority of possession and improvement, followed by proper filing and continued good faith, shall determine the preference-right to purchase. And also where improvements have already been made prior to the third day of March, eighteen hundred and seventy-three, division of the land claimed may be made by legal subdivisions, to include as near as may be the valuable improvements of the respective parties. The Commissioner of the General Land-Office is authorized to issue all needed rules and regulations for carrying into effect the provisions of this and the four preceding sections.

Existing Rights.

[Same as Sec. 6, Act of March 3d, 1873.]

Sec. 2352. Nothing in the five preceding sections shall be construed to destroy or impair any rights which may have attached prior to the third day of March, eighteen hundred and seventy-three, or to authorize the sale of lands valuable for mines of gold, silver, or copper.

MISCELLANEOUS PROVISIONS.

Possessory Actions Concerning Mining Titles.

Sec. 910. No possessory action between persons, in any court of the United States, for the recovery of any mining title, or for damages to any such title, shall be affected by the fact that the paramount title to the land in which such mines lie is in the United States; but each case shall be adjudged by the law of possession.

Registers' and Receivers' Fees and Commissions.

Sec. 2238. Registers and receivers, in addition to their salaries, shall be allowed each the following fees and commissions, namely:

1. A fee of one dollar for each declaratory statement filed and for services in acting on pre-emption claims.
2. A commission of one per centum on all moneys received at each receiver's office.
3. A commission to be paid by the homestead applicant, at the time of entry, of one per centum on the cash price, as fixed by law, of the land applied for; and a like commission when the claim is finally established, and the certificate therefor is issued as the basis of a patent.
4. The same commission on lands entered under any law to encourage the growth of timber on western prairies, as allowed when the like quantity of land is entered with money.
5. For locating military bounty land warrants, issued since the eleventh day of February, eighteen hundred and forty-seven, and for locating agricultural-college land-scrip, the same commission, to be paid by the holder or assignee of each warrant or scrip, as is allowed for sales of the public lands for cash, at the rate of one dollar and twenty-five cents per acre.
6. A fee, in donation cases, of five dollars for each final certificate for one hundred and sixty acres of land, ten dollars for three hundred and twenty acres, and fifteen dollars for six hundred and forty acres.
7. In the location of lands by States and corporations under grants from Congress for railroads and other purposes, (except for agricultural colleges,) a fee of one dollar for each final location of one hundred and sixty acres; to be paid by the State or corporation making such location.
8. A fee of five dollars per diem for superintending public land sales at their respective offices; and, to each receiver, mileage in going to and returning from depositing the public moneys received by him.
9. A fee of five dollars for filing and acting upon each application for patent or adverse claim filed for mineral lands, to be paid by the respective parties.
10. Registers and receivers are allowed, jointly, at the rate of fifteen cents per hundred words for testimony reduced by them to writing for claimants, in establishing pre-emption and homestead rights.
11. A like fee as provided in the preceding subdivision, when such writing is done in the land office, in establishing claims for mineral lands.
12. Registers and receivers in California, Oregon, Washington, Nevada, Colorado, Idaho, New Mexico, Arizona, Utah, Wyoming, and Montana, are each entitled to collect and receive fifty per centum on the fees and commissions provided for in the first, third, and tenth subdivisions of this section.

Lands not Subject to Pre-emption.

Sec. 2258. The following classes of lands, unless otherwise specially provided for by law, shall not be subject to the rights of pre-emption, to wit:

1. Lands included in any reservation by any treaty, law, or proclamation of the President, for any purpose.
2. Lands included within the limits of any incorporated town, or selected as the sites of a city or town.
3. Lands actually settled and occupied for purposes of trade and business, and not for agriculture.
4. Lands on which are situated any known salines or mines.

Title to Town Lots subject to Mineral Rights.

Sec. 2386. Where mineral veins are possessed, which possession is recognized by local authority, and to the extent so possessed and recognized, the title to town-lots to be acquired shall be subject to such recognized possession and the necessary use thereof; but nothing contained in this section shall be so construed as to recognize any color of title in possessors for mining purposes, as against the United States.

Geological Surveys.

Sec. 2406. There shall be no further geological survey by the Government, unless hereafter authorized by law. The public surveys shall extend over all mineral lands; and all subdividing of surveyed lands into lots less than one hundred and sixty acres may be done by county and local surveyors at the expense of claimants; but nothing in this section contained shall require the survey of waste or useless lands.

Penalty for the False Making, Altering, etc., of any Instrument or Writing, etc., Concerning Lands, etc., in California.

Sec. 2471. Every person who falsely makes, alters, forges, or counterfeits; or causes or procures to be falsely made, altered, forged or counterfeited; or willingly aids and assists in the false making, altering, forging, or counterfeiting any petition, certificate, order, report, decree, concession, denouncement, deed, patent, confirmation, diseño, map, expediente, or part of an expediente, or any title-paper, or evidence of right, title, or claim to lands, mines, or minerals in California, or any instrument of writing whatever in relation to lands or mines or minerals in the State of California, for the purpose of setting up or establishing against the United States any claim, right, or title to lands, mines, or minerals within the State of California, or for the purpose of enabling any person to set up or establish any such claim; and every person who, for such purpose, utters or publishes as true and genuine any such false, forged, altered, or counterfeited petition, certificate, order, report, decree, concession, denouncement, deed, patent, confirmation, diseño, map, expediente or part of an expediente, title-paper, evidence of right, title, or claim to lands or mines or minerals in the State of California, or any instrument of writing whatever in relation to lands or mines or minerals in the State of California, shall be punishable by imprisonment at hard labor not less than three years and not more than ten years, and by a fine of not more than ten thousand dollars.

Penalty for Falsely Dating any Evidence of Title under Mexican Authority, etc., to Lands in California.

Sec. 2472. Every person who makes, or causes or procures to be made, or willingly aids and assists in making any falsely dated petition, certificate, order, report, decree, concession, denouncement, deed, patent, confirmation, diseño, map, expediente or part of an expediente, or any title-paper, or written evidence of right, title, or claim, under Mexican authority, to any lands, mines, or minerals in the State of California, or any instrument of writing in relation to lands or mines or minerals in the State of California, having a false date, or falsely purporting to be made by any Mexican officer or authority prior to the seventh day of July, eighteen hundred and forty-six, for the purpose of setting up or establishing any claim against the United States to lands or mines or minerals within the State of California, or of enabling any person to set up or establish any such claim; and every person who signs his name as governor, secretary, or other public officer acting under Mexican authority, to any instrument of writing falsely purporting to be a grant, concession, or denouncement under Mexican authority, and during its existence in California, of lands, mines, or minerals, or falsely purporting to be an informe, report, record, confirmation, or other proceeding on application for a grant, concession, or denouncement under Mexican authority, during its existence in California, of lands, mines, or minerals, shall be punishable as prescribed in the preceding section.

Penalty for Presenting False Evidences of Title, etc., to Lands in California, and Prosecuting Suits Thereon.

Sec. 2473. Every person who, for the purpose of setting up or establishing any claim against the United States to lands, mines, or minerals within the State of California, presents, or causes or procures to be presented, before any court, judge, commissioner, or commissioner, or other officer of the United States, any false, forged, altered, or counterfeited petition, certificate, order, report, decree, concession, denouncement, deed, patent, diseño, map, expediente or part of an expediente, title-paper, or written evidence of right, title, or claim to lands, mines, or minerals in the State of California, knowing the same to be false, forged, altered, or counterfeited, or any falsely dated petition, certificate, order, report, decree, concession, denouncement, deed, patent, confirmation, diseño, map, expediente, or part of an expediente, title-paper, or written evidence of right, title, or claim to lands, mines, or minerals in California, knowing the same to be falsely dated; and every person who prosecutes in any court of the United States, by appeal or otherwise, any claim against the United States for lands, mines, or minerals in California, which claim to be founded upon, or evidenced by, any petition, certificate, order, report, decree, concession, denouncement, deed, patent, confirmation, diseño, map, expediente, or part of an expediente, title-paper, or written evidence of right, title, or claim, which has been forged, altered, counterfeited, or falsely dated, knowing the same to be forged, altered, counterfeited, or falsely dated, shall be punishable as prescribed in section twenty-four hundred and seventy-one.

TABLE OF THE LEAD MINERALS.

Those of use in Metallurgy for the production of Lead are printed in "CAPITALS," those of rarer occurrence are in "lower case," those so rare as to be interesting only to science are in "italics."

No.	NAME.	HARD- NESS.	SPECIFIC GRAV.	CRYSTALLINE FORM.	PHYSICAL CHARACTER.	CHEMICAL CHARACTER.	COLOR.	STREAK.	COMPOSITION.	PER CT. OF LEAD
1	<i>Albite</i> , syn. Telluride of Lead. Elasmose. Named from the Altai Mountains in Asia, where it was first found.	3. 3.5	8.159	Isometric. Usually massive; rarely in cubes.	Cleavage cubic, luster metallic, sectile, often rich in silver.	In open tube fuses and gives fumes of tellurous acid, forming a white sublimate, which, when strongly heated B. B. fuses into colorless drops; on Ch. in reducing flame colors the flame bluish, fuses to a globule, coating the charcoal near the assay with a metallic ring, outside of which is a brownish coating, entirely volatile, except a trace of silver.	Tin White.		Tellurium 38.3 Lead 61.7	61.7
2	ANGLESITE, syn. Sulphate of Lead. Lead vitriol. Bleivitriol. Sardinian.	2.75 3.	6.12 6.35	Orthorhombic, also massive, granular, and sometimes stalactitic.	Luster highly adamantine. In some specimens resinous and vitreous. In Inyo Co., Cal., occurs laminated and concretionary. Transparent, opaque, conchoidal. Very brittle.	B. B. decrepitates. Fuses in the flame of a candle. On Ch. in O. F. fuses to a clear pearl, which on cooling becomes milk white. R. F. reduces to metallic lead, with effervescence. Fuses with soda, gives beads of lead; the fused soda when placed on bright silver and wet, gives a black stain. Soluble in citrate of ammonia.	White, tinged Yellow, Gray, Green, Blue, nearly Black.	Uncolored.	Sulphuric Acid 28.4 Oxide of Lead 73.6 100.0	68.32.
3	<i>Bismutite</i> , syn. Antimonite of Lead. Bleinerite.	4.	4.60 4.76	Amorphous, reniform, spheroidal, earthy or as an incrustation.	Luster resinous, dull or earthy, opaque. Is of varying composition, and is supposed to result from the decomposition of antimonial ores.	In closed tube gives water. B. B. on Ch. reduced to metallic globules of antimony and lead, coating the Ch. near the assay lemon yellow, beyond which is seen the white coating of antimony.	White, Gray, Brownish, Yellowish.	White, Grayish, Yellowish.	Antimonio acid 31.71 Oxide of Lead 61.98 Water 6.46 99.66	56.97
4	Sulphuret of Antimony and Lead. Embritite.	3.	5.75 6.	In plumose masses, showing in the fracture a crystalline structure. Granular, compact.	Luster metallic.	When heated decrepitates. Fuses very easily. In closed tube gives a faint sublimate. In open tube gives sulphurous fumes and a white sublimate of oxide of antimony. B. B. on Ch. nearly all volatilizes. With soda yields beads of lead.	Bluish Lead Gray, often covered with Yellow spots.		Sulphur 18.9 Antimony 23.1 Lead 58.7 100.0	58.7
5	Caledonite, syn. Cupreous Sulphate-Carbonate of Lead.	2.5-3	6.4	Orthorhombic. Crystals generally small.	Translucent. Fracture uneven, brittle.	B. B. on Ch. easily reduced to the metallic state. Partly soluble in nitric acid, with slight effervescence, leaving residue of sulphate of lead.	Verdigris Green, Bluish Green	Greenish White.	Sulphate of Lead 56.8 Carbonate of " 32.8 " of Copper 11.4 100.00	68.44
6	CERUSITE, syn. Carbonate of Lead. This mineral results from decomposition of galena. The first change being to sulphate by oxidation of the sulphur, then to carbonate by action of carh. of lime	3. 3.5	6.48	Orthorhombic, often found showing the cubic form of galena.	Occurs sometimes granular, massive, compact, rarely fibrous sometimes stalactitic. Luster adamantine, inclining to vitreous or resinous, sometimes pearly, transparent, sub-transparent. Fracture conchoidal, brittle.	In closed tube decrepitates and turns yellow, at a high heat becomes red but changes to yellow again on cooling. B. B. on Ch. fuses easily and yields malleable globules of lead, coating the coal yellow. Dissolves in nitric acid, with effervescence.	White, Gray, Grayish Blk often tinged Green or Blue, by Copper.	Uncolored.	Oxide of Lead 83.5 Carbonic Acid 16.5 100.0	77.51
7	<i>Clausthalite</i> , syn. Selenide of Lead.	2.6-3	7.6-8.3	Isometric.	Occurs commonly in fine granular masses, sometimes foliated, cleavage cubic, luster metallic, opaque, fracture granular and shining, looks much like free grained galena, but bluer.	Decrepitates in a closed tube. In open tube gives odor of selenium, (horse radish) and red sublimate. B. B. on Ch. strong odor of selenium, coating coal near assay gray, with red border, (selenium,) and after longer heating yellow, (lead). When pure volatilizing entirely.	Bluish Lead Gray.	Darker.	Selenium 27.6 Lead 72.4 100.0	72.4
8	<i>Cotunnite</i> , syn. Chloride of Lead.	easily scratched by the nail	5.238	Orthorhombic.	In acicular crystals. Luster adamantine, inclining to silky or pearly.	B. B. on Ch. melts easily, spreads out on the coal and volatilizes, giving a coating which is white, tinged with yellow at the inner edge. In R. F. coating disappears, tingling flame blue, with soda gives beads of lead, if added to a bead of microcosmic salt, saturated with oxide of copper, tinged flame blue, soluble in 22 parts hot water.	White.	Whits.	Chlorine 25.5 Lead 74.5 100.0	74.5
9	CORNEOUS LEAD, syn. Phosgenite of Dana. Chloro-Carbonate of Lead.	2.76-3	6.31	Tetragonal.	Luster adamantine, transparent. Translucent, sectile.	B. B. melts easily to a yellow globule, which on cooling becomes white and crystalline. On Ch. in R. F. gives beads of metallic lead and white coating of chloride of lead. In bead of microcosmic salt, saturated with oxide of copper, gives blue color to flame, (chlorine.) Dissolves with effervescence in nitric acid.	White, Gray, Yellow.	White.	Carbonate of Lead 49 Chloride of Lead 61 100	75.93
10	CROCOITE, syn. Chromate of Lead. Crocoisite.	2.5-3	5.9-6.1	Monoclinic.	Luster adamantine. Vitreous, translucent, sectile.	In closed tube decrepitates and discolors, but recovers its color again on cooling. B. B. fuses easily on Ch., is reduced to metallic lead, with degradation, leaving a green residue of oxide of chromium and coating the Ch. yellow, with microcosmic salt, gives a green bead in both flames, fused with bi-sulphate of potash in a platinum spoon, gives a dark purple mass.	Various shades of Orange Yellow.	Orange Yellow.	Oxide of Lead 68.9 Chromic Acid 31.1 100.0	68.95
11	<i>Dufrenoyite</i> .	3.	5.849 5.862	Orthorhombic.	Luster metallic, opaque, brittle.	Fuses easily, and gives a sublimate of sulphur and arsenic. In an open tube smells of sulphur only, with a sublimate of sulphur in the upper part of the tube and one of arsenic acid below. On Ch. decrepitates, melts, yields fumes of arsenic and a globule of lead, the lead sometimes gives silver on cupellation.	Blackish Lead Gray.	Reddish Brown.	Sulphur 22.10 Arsenic 20.72 Lead 57.18 100.00	57.18
12	GALENA, syn. Sulphuret of Lead.	2.5 2.76	7.25 7.7	Isometric.	Luster metallic. Fracture sub-conchoidal. Frangible. One of the most abundant ores of lead.	In open tube gives sulphurous fumes. B. B. on Ch. fuses, emits sulphurous acid, coats the Ch. yellow, and yields a globule of lead, soluble in nitric acid, often contains silver.	Lead Gray.	Lead Gray.	Sulphur 13.4 Lead 86.6 100.0	86.6
13	Geocronite, syn. Sulphuret of Lead and Antimony. Occurs in Inyo County, Cal. with Galena and Cerusite.	2.3	6.4 6.6	Orthorhombic.	Luster metallic. Fracture uneven.	Decrepitates and fuses easily. In a closed tube gives a faint sublimate of sulphur and sulphide of antimony. In open tube gives fumes of sulphurous acid, and white sublimate of oxide of antimony. B. B. almost entirely volatilizes, coating Ch. white on the outer edge, and dark yellow near the assay, with soda in R. F. gives beads of lead, soluble in hot muriatic acid, fumes smelling of sulphuretted hydrogen. Chloride of lead forms in cooling.	Light Lead Gray.	Light Lead Gray.	Sulphur 16.5 Antimony 16.7 Lead 66.8 100.0	66.8
14	<i>Jamesonite</i> , syn. Heteromorphite. Plumose Antimony. Sulphuret of Lead, Antimony and Iron.	2.3	5.5 5.8	Orthorhombic. Usually in acicular crystals, also amorphous, massive.	Luster resinous. Sub-transparent. Translucent. Laminæ flexible as in gypsum.	Same as Geocronite.			Sulphur 21.1 Lead 49.7 Antimony 32.2 Iron 8.0 100.0	49.7
15	<i>Kobellite</i> , syn. Sulphuret of Lead, Antimony and Bismuth.	Soft.	6.29 6.32		Resembles gray antimony, but brighter in luster. Structure radiated.	B. B. in a closed tube fuses and gives a faint sublimate of sulphur, in open tube sulphurous fumes and sublimate of oxide of antimony. On Ch. fuses, gives coating of lead and antimony. Dissolves in concentrated muriatic acid, giving off at the same time fumes of sulphuretted hydrogen.	Blackish Lead Gray, Steel Gray.	Black.	Sulphur 16.8 Lead 54.4 Bismuth 18.2 Antimony 10.6 100.0	64.4
16	<i>Lanarite</i> , syn. Sulphate and Carbonate of Lead.	2.6	6.3 7	Monoclinic.	Luster of cleavage face pearly, other parts adamantine, inclining to resinous. Transparent, translucent. Laminæ flexible as in gypsum.	B. B. on Ch. easily reduced. Partly dissolves in nitric acid, with effervescence, leaving a residue of sulphate of lead.	Greenish White, Pale Yellow or Gray.	White.	Sulphate of Lead 53.15 Carb. of Lead 46.85 100.00	72.71
17	<i>Leadhillite</i> , syn. Sulpho-Carbonate of Lead.	2.5	6.26 6.44	Orthorhombic.	Luster pearly, resinous, adamantine. Transparent, translucent. Rather sectile.	B. B. intumesces, fuses easily and turns yellow, but white on cooling, easily reduced on Ch. With soda gives reaction of sulphuric acid. Partly soluble in nitric acid, with effervescence, leaving white residue of sulphate of lead.	White, Yellow, Green or Gray.	Uncolored.	Sulphate of Lead 27.45 Carbonate of lead 72.55 100.0	74.93
18	<i>Linarite</i> , syn. Cupreous Sulphate of Lead.	2.5	5.3 5.45	Monoclinic.	Luster vitreous or adamantine. Translucent. Fracture conchoidal. Brittle.	In closed tube gives water and loses its blue color. B. B. on Ch. fuses easily to a pearly head and in reducing flame yields a metallic bead, which if fused with boracic acid gives a bead of copper, with soda and silver gives the reaction of sulphuric acid, decomposed by nitric acid, leaving a white residue of sulphate of lead.	Deep Azure Blue.	Pale Blue.	Sulphate of Lead 74.8 Oxide of Copper 19.7 Water 6.5 100.0	61.08
19	<i>Melanochroite</i> , syn. Phosphokochroite of Dana.	3.5	5.75	Orthorhombic. Crystals usually tabular.	Luster resinous or adamantine. Glimmering, translucent, opaque.	B. B. on Ch. fuses easily to a dark mass, which is crystalline when cold. In R. F. on Ch. yields globules of lead and green oxide of chromium, coating the charcoal at the same time with oxide of lead.	Between Cobaltine and Hyacinth Red.	Brick Red.	Chromic Acid 23.1 Protoxide of Lead 76.9 100.0	71.38
20	<i>Mimeticite</i> , syn. Campylite. Arsenate of Lead. Green Lead ore.	3.5	7.25	Hexagonal.	Luster resinous. Sub-transparent. Translucent.	In closed tube gives a white sublimate of chloride of lead. B. B. fuses easily, and on Ch. gives in R. F. odor of arsenic and is easily reduced to a bead of lead, coating the Ch. first with chloride of lead and afterwards with oxide of lead, and arsenious acid, gives a reaction of chlorine with microcosmic salt, and oxide of copper, soluble in nitric acid.	Pale Orange Yellow, White or colorless.	White.	Arsenate of Lead 90.66 Chloride of Lead 9.34 100.00	62.26
21	<i>Mintum</i> , syn. Red Oxide of Lead. Occurs in several localities in California.	2-3	4.6	Pulverulent. Under microscope, crystalline scales.	Luster faint greasy, dull, opaque.	B. B. yields heads of lead.	Vivid Red.	Orange Yellow.	Lead 90.65 Oxygen 9.34 100.00	90.66
22	<i>Matlockite</i> .	2.5 3.	7.21	Tetragonal crystals, generally tabular.	Transparent, translucent. Luster adamantine, sometimes pearly.	In a closed tube decrepitates and becomes more yellow. B. B. on Ch. fuses easily and is reduced to metallic lead, acid fumes being at the same time given off. A white coating of chloride of lead forms on the coal, the inner edge of which is yellow. Gives a reaction of chlorine, soluble in nitric acid.	Clear Yellowish Greenish.		Chloride of Lead 55.5 Oxide of Lead 44.5 100.0	82.87
23	<i>Mendipite</i> , syn. Chloride of Lead.	2.6 3.	7. 7.1	Orthorhombic. Occurs in fibrous masses, often radiated.	Luster pearly and somewhat adamantine upon cleavage faces. Feebly translucent, opaque.	The same as Matlockite.	White, tinged Yellow Red or Blue	White.	Chloride of Lead 88.4 Oxide of Lead 61.6 100.0	84.77

NO.	NAME.	HARD- NESS.	SP. GR. QUAL.	CRYSTALLINE FORM.	PHYSICAL CHARACTER.	CHEMICAL CHARACTER.	COLOR.	STREAK.	COMPOSITION.	PER CT. OF LEAD
24	Nagayagite, syn. Black Tellurium.	1. 1.5	5.85 7.2	Tetragonal, generally foliated.	Luster metallic. Splendored, opaque, sectile, flexible, in thin laminae.	In open tube gives a sublimate, which when strongly heated, fuses into colorless drops, (tellurium.) B. B. on Ch. forms two coatings, one white and volatile, composed of telluride and sulphate of lead, the other less volatile and of a yellow color, (oxide of lead). If the mineral is heated for some time in the O. F., a globule of gold is left, which, cupelled with lead, assumes a brilliant gold color. Decomposed by nitro-muriatic acid.	Blackish, Lead Gray.	Blackish Lead Gray.	Lead 50.78 Gold 9.11 Silver .53 Copper .99 Sulphur 8.07 Tellurium 30.52 100.00	50.78
25	Plagioclase.	2.5	5.4	Monoclinic, crystals thick, tabular, also massive and granular.	Luster metallic, opaque, brittle.	Same as Geocronite.	Blackish, Lead Gray.		Sulphur 21.3 Antimony 38.2 Lead 40.5 100.0	40.5
26	Massicot, syn. Lead Ochre. Plumbic Ochre. Oxide of Lead.	2.	8. 7.88 9.2	Massive, structure scaly, crystalline, earthy.	Luster dull, opaque, does not soil.	B. B. fuses easily to a yellow glass. On Ch. easily reduced to a metallic lead globule.	Between Sulphur & Orpiment Yellow.	Lighter than color.	Oxygen 7.17 Lead 92.83 100.00	32.83
27	Plumbogummite, syn. Plumbic resinite, Aluminate of Lead.	4-5	6.4	Reniform, globular, botryoidal. In thin crusts, also compact, massive.	Luster resinous or gum-like, translucent, fragile. This rare mineral looks like drops of gum.	In closed tube decrepitates and yields water. B. B. in forceps swells and colors the flame blue, with soda gives a bead of lead. If the assay is first wet with a solution of nitrate of cobalt, and then strongly heated, it becomes blue (alumina), soluble in nitric acid.	Yellowish Gray, Reddish Brown, also, Yellowish White.	Uncolored.	Composition varies. Example as follows: Phosphoric Acid 15.16 Sulphuric Acid .40 Alumina 2.88 Oxide of Lead 70.85 Water 1.24 Chloride of Lead 9.18 99.73	73.12
28	Pyromorphite, syn. Phosphate of Lead.	3.5 4.	6.5 7.1	Hexagonal, often globular, reniform and botryoidal, also fibrous and granular.	Luster resinous, sub-translucent, fragile, fracture sub-conchoidal, uneven, brittle.	In a closed tube gives a white sublimate (chloride of lead). B. B. in forceps fuses easily, coloring flame greenish blue, with soda on Ch. yields metallic lead in a head of microcosmic salt, saturated with oxide of copper colors flame intense blue, (chlorine). Soluble in nitric acid.	Green, Yellow, Brown, sometimes Wax Yellow, to Orange, sometimes Orange Yellow.	White.	Composition varies, sometimes contains lime or arsenic. When pure: Phosphate of Lead 89.27 Chloride of Lead 9.65 Phos & Flu of Lead 1.07 100.00	
29	Stilbite, syn. Scheelite. Tungstate of Lead.	2.75 3.	7.87 8.13	Tetragonal.	Luster resinous, sub-adamantine, faintly translucent.	B. B. decrepitates and easily fuses to a crystalline, lustrous metallic pearl. With soda a lead bead is obtained, with microcosmic salt in O. F. a colorless glass, which in R. F. becomes blue on cooling. Decomposed by nitric acid, leaving a yellow residue of tungstic acid.	Green, Yellowish Gray, Brown, Red.	Uncolored.	Tungstic Acid 51.60 Oxide of Lead 49.00 100.00	45.57
30	Vanadinite, syn. Vanadate of Lead.	2.75	6.55 7.23	Hexagonal, usually in implanted globules or locust-tails.	Luster of surface of fracture resinous, faintly translucent, opaque, fracture uneven or flat, conchoidal, brittle.	In closed tube decrepitates and yields a faint white sublimate. B. B. fuses easily, on Ch. to a black lustrous mass, which in R. F. yields a metallic lead and a coating of chloride of lead. After perfectly oxidizing the lead in O. F. the black residue gives with microcosmic salt an emerald green bead, which in R. F. becomes bright yellow. In O. F. gives chlorine reaction. Fused with three parts of bisulphate of potash, forms a clear yellow mass, which on cooling reddens, becoming finally a pomegranate yellow color. Decomposed by muriatic acid. If nitric acid be dropped on the crystals they become first a deep red, and when dissolved, yellow.	Light Brownish, Yellowish, Straw Yellow, Reddish Brown.	White or Yellowish.	Vanadate of lead 90.3 Chloride of Lead 9.7 100.00	68.61
31	Vanadinite, syn. Chromate of Lead and Copper.	2.5 3.	5.5 5.78	Monoclinic. Crystals usually minute and irregularly aggregated, also reniform, botryoidal, granular and amorphous.	Luster adamantine to resinous, transparent, fracture conchoidal, brittle.	B. B. on Ch. decrepitates and easily fuses to a gray sub-metallic globule, yielding at the same time globules of metal. With borax or microcosmic salt yields a green transparent glass in the outer flame, which in the inner, after cooling, is red or black, according to the quantity of the mineral used. Red color more distinct if a little tin is added to the bead. Partly soluble in nitric acid.	Greenish Brown, Apple Green, Siskin Ore'n Olive Green ochre brown nearly black.	Greenish Brownish.	Vanadate of lead 90.3 Oxide of Copper 10.4 Chromic Acid 27.7 100.0	66.55
32	Wulfenite, syn. Molybdate of Lead. Yellow Lead Spar. This is not a rare mineral on the Pacific Coast, but is not found in sufficient quantity to be of economic value.	2.75 3	5.93 7.01	Tetragonal.	Luster resinous or adamantine, transparent, fracture conchoidal, brittle.	B. B. decrepitates and easily fuses. With borax in O. F. gives a colorless glass. In R. F. it becomes opaque, black or dirty green, with black flocks. With microcosmic salt in O. F. gives a yellowish green glass, which in R. F. becomes green. With soda on Ch. gives metallic lead. Decomposed in evaporation with muriatic acid, forming molybdic acid and chloride of lead, on moistening the residue with water and adding metallic zinc, an intense blue color appears, which does not fade when diluted with water.	White.	White.	Oxide of Lead 35.5 Oxide of Lead 61.5 100.0	56.65
33	Zinkenite, syn. Sulphide of Lead and Antimony.	3. 3.5	5.30 5.35	Orthorhombic, sometimes columnar, fibrous or massive.	Luster metallic, opaque, fracture slightly uneven.	Decrepitates and fuses very easily. In closed tube gives faint sublimate of sulphur and sulphide of antimony. In open tube sulphurous fumes and white sublimate of oxide of antimony. B. B. on Ch. is almost entirely volatilized, giving a coating which on the outer edges is white and near the assay dark yellow. With soda in R. F. yields globules of lead. Soluble in hot muriatic acid, sulphuretted hydrogen being given off, and chloride of lead separating on cooling.	Steel Gray.	Steel Gray.	Sulphur 22.1 Antimony 42.6 Lead 35.3 100.0	35.1

Lead.

[Written for the Press by HENRY G. HANES.]

Metallic lead has a bluish gray color. It is usually tarnished, in which case it has no luster, but when freshly cut shows a surface highly metallic and brilliant. It is a soft metal, very malleable, easily fusible, and volatile at a white heat. It is scarcely acted on by hydrochloric acid or dilute sulphuric acid; but moderately dilute nitric acid dissolves it, more readily if heat is applied.

The presence of lead in any substance containing it may with certainty and ease be determined by heating the sample on a piece of well burned willow charcoal, in one portion of which—nearest the flame—a small cavity or depression has been made, in which the assay may be placed, a little carbonate of soda added and the flame of an oil lamp or large candle turned upon it by means of the mouth blow-pipe. The direction of the flame at first should be downwards until the assay begins to melt, after which it should be blown softly and nearly horizontally across the charcoal. If lead is present in the assay a coating will form on the charcoal which is lemon yellow when hot, and sulphur yellow when cold. Other volatile substances which may be present will also form coatings, but they will be distinct, and at distances more remote from the assay, nor will they be the same color. Zinc, like lead, gives a yellow coating, which to the inexperienced might lead to mistakes, but if the charcoal is allowed to cool the zinc coating will become white, by which reaction it may be distinguished.

The following are the reagents used in the determination of lead in the wet way, and the reactions which occur:

Hydro-sulphuric acid or sulphide of ammonium added to solutions of lead salts gives black precipitates of sulphide of lead which are not soluble in cold dilute acids, alkalies, alkaline sulphides or cyanide of potassium, but the precipitate may be decomposed by boiling nitric acid. The acid must be dilute or a part of the lead will be changed to the sulphate and remain insoluble.

Soda, potassa and ammonia throw down basic salts of lead in the form of white precipitates which are insoluble in ammonia. The

exception is solution of acetate of lead, from which pure ammonia (free from carbonate) does not immediately produce a precipitate, a soluble triacetate of lead being formed.

Carbonate of soda produces a white precipitate of basic carbonate of lead, when added in solution to the solution of any lead salt. This precipitate is not soluble in excess of the precipitant nor in cyanide of potassium.

Hydrochloric acid or the soluble chlorides produces in solutions of the lead salts, if concentrated, a heavy precipitate of chloride of lead, which is soluble in a large quantity of warm water.

Sulphuric acid and sulphates throw down from lead solutions a heavy precipitate of sulphate of lead, which is nearly insoluble in water and dilute acids, but dissolves readily in solution of citrate of ammonia.

Chromate of potassa when added to solution containing lead throws down a beautiful yellow precipitate of chromate of lead, which dissolves in potassa, but which is nearly insoluble in nitric acid.

It should be understood that the above reagents are in solution, and are to be added in every case to solutions of substances containing lead.

Lead occurs in nature in a variety of forms, but most of the metal furnished to commerce is from galena or sulphuretted lead. Native lead is reported as occurring in globules at Alston Moor, and at the mine near Caribagua, Spain, but never in sufficient quantity to work, or even to furnish specimens for the cabinet of the mineralogist.

Galena, the most abundant ore of lead, has a metallic luster. Its color and streak are pure lead gray. When broken it is still cubic in form, even when reduced to the finest powder. It always contains silver and sometimes selenium, zinc, cadmium, manganese, gold, antimony, copper and iron. Even platinum is said to be found in galena in France.

It is a mistake to suppose that any external appearance indicates the quantity of silver in a sample of galena.

There is a variety of galena which is called sparsenphuretted lead. The excess of sulphur results from the decomposition of a portion of the galena, setting the sulphur free.

There are several minerals which resemble galena, and may easily be mistaken for it. The most common is micaceous iron, a variety of hematite. The resemblance of this mineral to galena is sometimes so striking as to deceive the inexperienced. It may, however, be distin-

guished by the following tests: When heated on charcoal it gives off no odor of sulphur, nor can it be fused before the blow-pipe. No metallic beads are formed when carbonate of soda is added. After strong heating it becomes red, and on cooling is found to be attractable by the magnet.

Galena in Missouri and Illinois has been extensively worked. The largest deposits in the world are in the Western States, and that ore is there found associated with limestone, blende, carbonate and sulphate of lead, pyrites, and often an ore of copper and cobalt.

The lead region of Wisconsin comprises sixty-two townships, eight in Iowa, ten in Illinois, being eighty-seven miles in diameter, from east to west, and fifty-four miles from north to south. Throughout this region there is scarcely a square mile in which traces of lead may not be found. From a single spot not exceeding fifty yards square, three million pounds of ore have been raised, and in one of the townships two men have raised 16,000 pounds in a day. The mines of the upper Mississippi afford about 760,000 pigs annually, and those of Missouri about 150,000 pigs.

In 1874 the production of lead in California more than doubled, while in the same year that of England decreased 17,000 tons.

For making white lead Eastern corrodors prefer the Missouri lead to any other.

To give the reader some idea of the production of lead in the United States, the following statistics for the year 1874 have been compiled:

TONS.	TONS.
Missouri.....15,000	Chicago.....2,200
California.....8,000	
New York.....	46,500
Newark.....	6,500
Philadelphia.....	
Iowa.....	Imported.....18,000
Illinois.....5,500	U. S. Sales.....4,000
Wisconsin.....	
Omaha.....5,800	
Salt Lake.....3,500	68,500

In 1874 the Union Pacific railroad carried East 3,500 tons refined lead and 15,000 tons blende, by which is meant lead carrying more or less of the precious metals.

Explanation of the Accompanying Table.

Abbreviations: syn.—synonym; all the names following this abbreviation allude to the same mineral, being names given by different authors; B. B.—before the blow-pipe; Ch.—charcoal; O. F.—oxidizing flame; R. F.—reducing flame. This table gives the reactions of pure minerals. What is meant by a mineral is an inorganic substance, every portion of which has the same chemical composition. Ores may be pure miner-

als, or may be aggregations of minerals. The definition of "ore," being any mineral substance which is mined and worked for the production of one or more metals, no matter what its constituents may be. Thus a mixture of gangue with one or more lead minerals interspersed through it, would be called "lead ore." If it contained sufficient silver or minerals containing silver, to be more valuable for the production of that metal, it would be called "silver ore," although it contain lead. This being understood an example will fully illustrate the use of the table.

The substance (which must be as found in nature), is tested for lead in the manner before described. If it is found to contain lead, it must be examined carefully to see if it is uniform, and not a mixture. The eye alone cannot be trusted, a fragment must be broken from the specimen and examined by a good microscope, a portion must then be pulverized and again magnified and examined. If found to be homogeneous, the table may be consulted. Suppose the color to be orange yellow; by looking in the column devoted to the color of minerals, it will be found that, although a number of minerals are yellowish, yet only four are found to be orange yellow. It may be explained here that where several colors are mentioned, following each other, it should be understood that the mineral has been found possessing these colors, of course in different specimens.

The orange yellow minerals are massicot, pyromorphite, wulfenite, and mimette. With the almost certainty that the mineral is one of these, the columns headed Physical Character and Chemical Character may be consulted, and a few experiments will lead to its identification.

By "streak" is meant the color of the mark made by some scratching instrument; for example, a piece of slate is black, but if a scratch is made on it with a hard substance, the streak will be white. In many minerals the color and streak are the same.

In the column headed "Physical Character," descriptive words follow each other in most cases as, "transparent," "opaque." This means that the mineral is sometimes transparent, while in other specimens it is opaque.

Assays in the Dry and Wet Way.

The assay of lead in the dry way is never absolutely correct, for several reasons. 1st. From the volatile nature of all lead compounds, making the result too small. 2d. From the tendency of other metals to alloy with the lead, as gold, silver, copper, antimony, etc., giving

results too great. 3d. When sulphur is present some of the lead sulphide is liable to form a slag or "matte" without being decomposed, and thus to escape determination. Notwithstanding these sources of error, yet such assays approximate to the working of the ores in a large way, and when carefully made and verified by proofs, are generally accepted as correct.

The wet assay, although attended with some difficulties, is by far the most accurate and reliable.

Before lead ores are prepared for assay in the dry way, regard must be had to their chemical character. It is best to divide them into classes, each of which must be treated by a different process.

Class 1. Ores containing either sulphur or selenium, or both.

Example: Galena, clausthalite, lead matte or regulus, furnace products, etc.

Class 2. Ores containing oxide of lead combined with various mineral acids, sulphuric acid, chromic acid, phosphoric acid, arsenic acid, carbonic acid, etc.

Example: Anglesite, cerussite, pyromorphite, etc.

Class 3. Metallic lead alloyed with other metals.

Distinguishing Minerals.

It is easy to distinguish to which class a specimen of lead mineral belongs. It has already been shown how to test a mineral for lead. After doing so observe if it has a metallic luster and a certain degree of malleability, showing a bright metallic streak when freshly cut. It will not be difficult to determine if it is an alloy by these tests. If so, it evidently belongs to class 3. If not, fuse a small piece with carbonate of soda on charcoal; when cold remove the slaggy mass and place it on a clean silver coin and add a few drops of water. If the silver is blackened so that the stain cannot be washed off with water, the mineral contains sulphur or selenium in some form. Before testing for sulphur with carbonate of soda and silver, the purity of the soda must be proved by wetting a small portion of it and laying it on the bright silver. If pure, no blackening will appear. If the reverse should be the case, the reagent is worthless and should not be used; such soda can be purified, but the process cannot be explained here. As sulphate of lead belonging to class 2 gives the same reaction, a second piece of the ore must be placed in a clean glass tube, four or five inches long, open at both ends, and heated while holding the tube in an inclined position. If sulphur is present as a sulphide, or if selenium is present, the smell can easily be recognized if the upper end of the tube is held near the nose. If sulphur, the smell of burning sulphur will be observed. If selenium, that of rotten horseradish will be distinguished. If no sulphur is detected (class 1) the substance belongs to class 2.

Having decided to which class the substance belongs, it may be pulverized, passed through a sixty mesh sieve and thoroughly mixed. If in a metallic state (class 3) a portion may be cut off with a cold chisel, rolled out thin and out into shreds with a pair of scissors, or may be drilled and the borings taken for assay.

Assaying Average Samples.

It is often required to sample a number of lead bars, and to make an assay representing the average of them all. The best method of proceeding is to drill a hole into each bar deep enough to obtain borings sufficient for duplicate assays. To insure a correct result it is best to take a portion from several parts of each bar; the samples should be numbered or marked to correspond with a similar mark or number on the bar. The bars are then weighed. If of uniform weight, equal portions by weight of the borings are thoroughly mixed and a portion of the mixture assayed according to the directions to follow. If of unequal weights, the same weight in grammes of each, corresponding to the weight of the bar in pounds, are mixed for assay. If extreme accuracy is desired, the result may be verified by making single assays of each sample, and taking the mean of the result.

Assaying First-Class Ores.

There are a number of methods of assaying ores of the first class, each one having its own advocates.

1st. *Fusion with carbonate of potash.* In case the ore contains but little sulphurets other than those of lead, but more or less of earthy matter.

2d. *Fusion with black flux.* (Black flux is made by mixing two parts of argol and one part nitre in an iron vessel, setting the mixture on fire and allowing it to burn).

3d. *Fusion with or without fluxes in wrought iron crucibles.*

4th. *Fusion with carbonate of soda and nitre.*

5th. *Fusion in clay crucibles with fluxes and metallic iron.*

For all practical purposes the last mentioned is the best, and the modification proposed by Mitchell is simple and accurate.

For the assay, ordinary sand crucibles, triangular at the top, are used (called Hessian crucibles). The most convenient size is four and one-half inches high. It is recommended to smear them inside with plumbago, but I have never found this precaution necessary.

Twenty grammes of the ore are weighed out and placed in the crucible, five grammes of argol, twenty grammes carbonate of soda, five grammes carbonate of potash, ten grammes of pulverized borax are added, and the whole thoroughly mixed with a spoon or spatula; three large nails are then placed head downward, one in each corner. They must be

pushed down to the bottom of the crucible, and the crucible tapped on the mixing table when the mixed contents form a level surface around the nails. The surface of the assay must then be covered with common salt (twenty grammes will be about the amount required) and the crucible again tapped on the table to settle all down evenly and compactly; ten grammes of borax in lumps is put loosely on top, and the crucible is ready for the fire; a second crucible must be prepared exactly like the first for the duplicate assay. *No single assay should be trusted.*

Precautions in Fusing.

I have given the quantities of the fluxes by weight, but after practice the assayer will be able to mix the assays by using a spoon about the size of an ordinary tablespoon and judging of the quantities by his eye. A little more or less of the fluxes does not materially matter. He will soon be able to judge of the quantity required and from the appearance of his crucible in the fire know what to add to make it fuse freely. Any addition that may be required may be made by wrapping the dry flux in a piece of paper and dropping it into the hot crucible with the cupel tongs. There are certain precautions to be observed in fusing the assay. Too hot a fire is apt to volatilize a portion of the lead, causing loss, while too slow a fire does not effect the perfect fusion of the assay and the globules which form cannot gravitate to the bottom, there to form a single prill or button. It is best to commence with a good fire which has burnt rather low, but in a hot furnace. The crucibles are placed on the hot coals and fresh fuel built up around them by putting in charcoal or coke as the case may be, in lumps singly with the cupel tongs. The dampers and doors of the furnace are then arranged so as to produce the best draft. When the fresh fuel is igniting the fusion progresses slowly. The furnace soon becomes very hot, which is the exact condition required for the finishing of the fusion. The crucibles which are at first covered must toward the end be uncovered and the covers need not again be replaced. When the assays are in the most perfect state of fusion the crucibles may be removed one at a time with suitable crucible tongs. As soon as removed from the furnace a rotary motion should be given to them (soon learned by practice). This motion causes the fluid slag to sweep round the inside of the crucible, washing down to the center any stray globules. The nails are then removed by taking them out one by one with the cupel tongs, washing off any adhering lead by rinsing them in the liquid slag. When the nails are removed the crucible is tapped against the brick floor or against any hard non-inflammable substance, and set in some convenient and safe place to cool.

When cold the crucible must be broken on an anvil and the button of lead hammered into a cube and weighed. Both buttons should weigh alike or nearly so.

Calculating Percentage.

The calculation of percentage is simple. Suppose the twenty grammes of ore contained 9.462 grammes of lead; it is clear that 100 grammes of lead would contain five times as much. The number of parts in one hundred being the percentage, the result would be as follows:
 $9.462 \times 5 = 47.31$ per cent.

Antimonial Galena.

Galena often contains antimony in the form of sulphuret, in which case the method described above would not give correct results. The presence of antimony may be proved by reducing a bead with carbonate of soda on charcoal. If the ore contains antimony white fumes will be given off and a white coating on the charcoal will be seen more distant from the assay than the yellow coating of lead; or the finely pulverized ore may be shaken up with a solution of caustic potash, the solution filtered and acidulated with a strong acid; a yellow precipitate of sulphide of antimony will fall if the ore contains sulphuret of antimony.

Antimonial galenas may be treated in such a way as to obtain the lead pure, or all the antimony combined with the lead.

To obtain the lead only, the assay must be mixed with four times its weight of carbonate of soda covered with salt, lumps of borax placed on top, and treated in the furnace exactly as described in the first operation. No nails should be added.

To obtain the lead and antimony together mix the assay with equal parts by weight of cyanide of potassium and carbonate of soda.

It is sometimes found to be economical and not objectionable to pour the assay into a small concave mould instead of breaking the crucible, which may be used for subsequent assays. This should never be done unless in cases where many assays are to be made of ore from the same mine.

Wet Assays of First-Class Ores.

Assays of the ores of the first class may be made by the humid method as follows:

Pulverize the ore very finely, weigh ten grammes carefully, boil in a flask with twenty C.C. of strong nitric acid on a sand bath until the ore is completely decomposed and no more red fumes are given off. Pour out carefully into an evaporating dish and evaporate to complete dryness. Care must be taken in this operation that no violent spitting or decrepitation of the assay takes place by which any part may be lost. When the dry mass is cold it must be boiled with a strong solution of carbonate of soda. It should then be poured on a filter and well washed with distilled water. Dilute acetic acid is then cautiously ad-

ded, by which it is dissolved and passes through the filter into a clean beaker which must be placed to receive it. When the solution is complete every portion of the solution must be washed from the filter with distilled water. Earthy matters remain in the filter.

If dilute sulphuric acid is now added to the contents of the beaker the whole of the lead is thrown down as sulphate, which may be thrown on a weighed filter and thoroughly washed with distilled water and alcohol, dried at the temperature of 212 degrees Fahr., and weighed. The weight of the filter must be deducted from the weight obtained. The sulphate of lead contains 68.28 per cent. of metallic lead. There are some sources of error to be avoided in this operation. If the precipitate is not thoroughly dried in the filter correct results will not be obtained, neither will it do to heat the filter so hot as to char or partly burn it. It is better to take two filters made of the same paper, fold them together while cutting them, then separate them, place one in each pan of a balance, and carefully trim the heaviest with a pair of scissors until they weigh alike; fold them together again, put them in the funnel together, wash the precipitate on them, dry together in a steam bath, then separate them, place the one with the precipitate in one pan of the balance and the other in the other pan; the difference will be the weight of the precipitate. There is a method common with chemists of burning the filter and incinerating the ashes with the precipitate in a platinum crucible, at a red heat, but the conveniences are not found in ordinary assay offices. The details may be found in any work on quantitative analysis. With proper care correct results may be obtained by drying the precipitate on the filter. In the process given above the following reactions occur:

1st. The nitric acid attacks the ore and oxidizes both the sulphur and the lead, forming sulphate of lead.

2d. By evaporating to dryness, the excess of nitric acid is drawn off, but leaving some nitrate of lead mixed with the sulphate.

3d. The carbonate of soda decomposes the sulphate of lead, forming carbonate of lead and soluble sulphate of soda, which is washed out as directed with distilled water.

4th. The dilute acetic acid poured on the filter decomposes the carbonate of lead and forms acetate of lead, which, being soluble, passes through the filter, leaving insoluble matter, if there be any, in the filter.

5th. Sulphuric acid, being a stronger acid than acetic, combines with the lead, giving now the pure sulphate.

The calculation of the assay is made as follows:

It has been shown that sulphate of lead contains 68.28 per cent. of metallic lead; it is clear that we must find that per cent. of the sulphate of lead we obtain, which will be the amount of lead in ten grammes of the ore. Suppose we obtain 7.46 grammes of sulphate of lead in the ten grammes of ore, then $7.46 \times .6828 = 5.09$ metallic lead. Ten grammes yielding this (5.09), it is clear that 100 grammes would yield ten times as much, which is the percentage. The result would then be as follows: Lead, 50.9 per cent.

Assays of Class Two.

The assay of substances belonging to class 2 is very simple. Twenty grammes of the ore is weighed out as in the case of assay of first class, ten grammes of red argol and thirty grammes of carbonate of soda are well mixed in the crucible, the whole covered with a layer of salt and tapped on the mixing table to settle all down. Put the crucible into an increasing fire and keep at low red heat for quarter of an hour. Then increase the heat until the contents of the crucible flow freely, tap gently and set it aside to cool, break the crucible, hammer the button into a cube and weigh. If arsenic or lead or sulphide of lead are present see nails.

The humid assay of this class is made by heating ten grammes of the substance to redness, and afterwards holding it in a flask with dilute nitric acid (one part of acid to one-two of water by volume), when the action ceases pour the contents of the flask into an evaporating dish and cautiously evaporate to dryness, allow the dry mass to cool, add dilute nitric acid, gently warm for an hour, add water, boil and filter. The solution now contains all the lead as nitrate, the precipitative washing and weighing may now be conducted as directed in humid assays of ores of the first class.

Class Three—Alloys of Lead with Other Metals.

Alloys must be boiled with dilute pure nitric acid, the solution decanted from the precipitate, which must be washed with water and the washings added to the solution, which must then be filtered.

The solution may contain all the other metals likely to be present in alloys, except gold, platinum, antimony and tin.

The solution (which should never be too dilute), must be mixed with dilute sulphuric acid slightly in excess. (This may be explained by stating that "excess" means the slightest quantity of reagent in excess of what is required to precipitate all of the lead.) The dilute acid should be added slowly, and the precipitate allowed to settle before further addition is made. When the sulphate of lead has all precipitated, double the volume of alcohol is added, and the whole set aside for a few hours to settle, after which it is decanted and washed into a small filter, washed with alcohol and dried on a water bath, or in the sun. When the precipitate on the filter is perfectly dry, a clean piece of writing paper is spread on a table and a small

clean porcelain cup set in the center of it. The precipitate must then be carefully detached from the filter, and transferred to the cup. The dry filter is then held in a pair of small pliers over the cup, and burned by applying a match or candle flame; the ashes which fall on the paper must be brushed into the cup. The cup may then be placed on a piece of wire gauze placed on the ring of a retort-stand and heated from below with a spirit lamp to a red heat. When cold, the cup and contents are weighed and the tare of the porcelain cup deducted, the remaining weight will be that of the sulphate of lead obtained from the alloy.

The weight of the alloy taken for assay and the calculation are the same as in the last example.

When great accuracy is not required the use of alcohol may be dispensed with, but more excess of sulphuric acid must be used for precipitation and the washing water must contain some dilute sulphuric acid.

The Manufacture of Solder.

The alloys of metals are frequently more useful than either of the substances used in combination, and often exceed them in respect to some quality which is of great importance. Brass is much more used than zinc, and the alloys of lead are fully as valuable as the metal uncombined. The union of lead with tin is of immense value in the arts. It enables rough surfaces to be joined in a way that could not otherwise be done, except at immense expense. The solder melts at a low temperature, and can be applied with the utmost ease.

The most common compound of these metals is 70 parts of tin to 130 parts of lead, and is generally known as No. 1, or hard solder. Other substances are frequently incorporated, such as bismuth, antimony, and even copper. This is done for the purpose of increasing the hardness, fusibility or tenacity, and each firm has its own combination for this purpose. Made, as we have stated, it is the alloy generally used for joining articles of tin, fusing at 360 deg. Fahrenheit.

But for plumbers it is necessary to use another article which shall remain firm and solid when exposed to heat. A pan or basin of tin must frequently be exposed to a fire, and one of the values of the compound we have mentioned is its comparative resistance to heat. But lead pipe is never exposed to any such danger, although it frequently needs to be repaired, as its contraction and elongation in consequence of temperature, the attacks of mice and rats, and the thousand and one disasters to which it is subject, requires it, and that with something which is not of high enough temperature above its own to melt the pipe, as would be the case with either zinc, copper or iron.

Plumbers' solder answers this purpose, and is, beside, cheaper than the harder compound. It fuses at a point much less than the preceding formula, and less than either of the metals when treated separately. It unites readily with a clean surface of either lead or zinc, and remains for a short time in a semi-fluid state, enabling the manipulator, by the aid of the cloth holder or pad, to mold it in any desired shape. When used by plumbers to join the portions of lead pipe, this is commonly termed a wipe joint. These two metals are not alone in making a fusible compound. There is one alloy known to the art from which teaspoons can be made, bearing much the appearance of silver when new, but so easily acted upon that the stirring of the fluid will cause the bowl and handle to melt and fall to the bottom of the cup.

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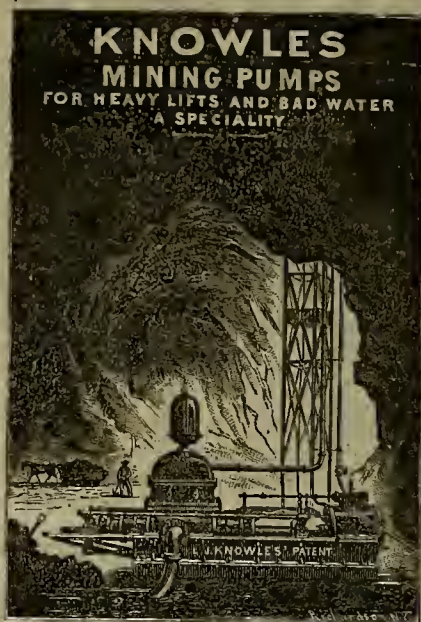
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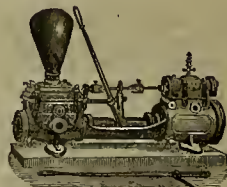
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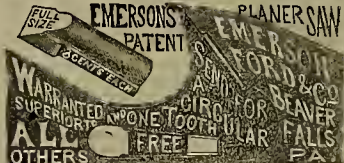
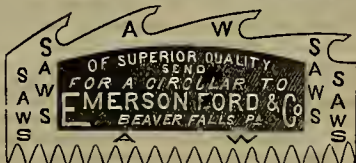


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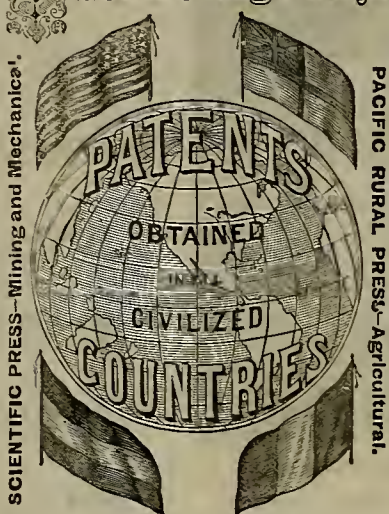
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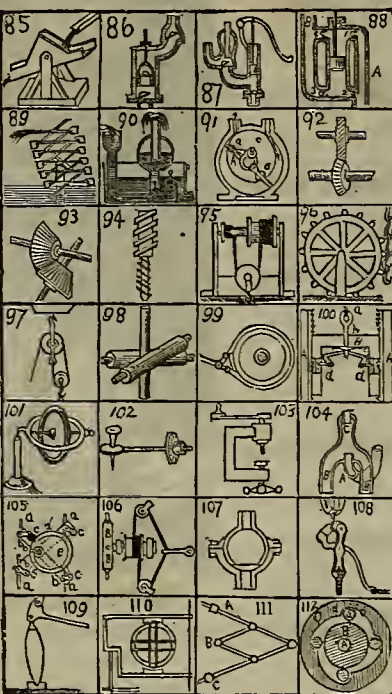
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N. B.—We have also added to the above publication, the REVISED STATUTES OF THE UNITED STATES, so far as relates to Mining Laws.

A COMPLIMENT.

PLAINSBORO, MERCER CO. CAL., June 22, 1874.
DEWEY & CO.—Gentlemen: I herewith tender my grateful acknowledgments for the energy, promptness and efficiency which you have displayed in procuring my patent.

Although you were entire strangers to me when I first communicated with you, I soon felt satisfied you were gentlemen of integrity, and shall always be happy to represent you as such. Very truly yours,

H. W. BUCKER, M. D.

SANTA CLARA, CAL., April 6th, 1875.
MESSRS. DEWEY & CO.—Gentlemen: We have just received Patent No. 160,535, for J. T. Watkins & Co's Mammoth Road Grader, which was patented through your Agency. It is the nearest and best that we have ever received. We feel proud of it and thankful to you for the care and attention that you have given it, and when we have anything to do in that line of business we will surely give you a call. Very respectfully,

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MESSRS. DEWEY & CO.—Gentlemen: My patent is just received, and is entirely satisfactory. Permit me to tender you my sincerest thanks for the care and attention, the promptness and interest you have displayed in managing my affairs. Gratefully yours,

O. F. McALLAN.

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CAMPO, SAN DIEGO CO., CAL., July 3d, 1874.
MESSRS. DEWEY & CO.—Gentlemen: To-day I received the patent and other papers of my animal trap, that you so successfully worked through the patent office for me, for which please accept my best wishes. The chances are that I will have another application for you to make for me before long. I am well satisfied with your manner of doing business, and I think inventors of this coast stand in their own light when they do not put their business into your hands.

I remain yours truly, A. M. GASS.

MESSRS. DEWEY & CO., San Francisco:—Please find enclosed post-office order, for which please send MINING AND SCIENTIFIC PRESS. I have been a close reader of the Press for three years, and regard it as the foremost mining periodical in the Union. I am glad to notice the circulation of the Press is increasing here and is highly prized by our best mining men. H. P. Central City, Colorado.

A REAL CONVENIENCE.—DEWEY & CO: Please send me the RURAL PRESS. It is a real convenience and I cannot do without it. Enclosed you will find five dollars. Fraternally, B. F. E. K. Anaheim, Cal., October 12, 1874.

GIANT POWDER.

Its Properties, Uses, and Revolutionizing Success.

Few things have contributed so much to the development of the mining interests of this coast as Giant Powder has done. It was difficult to introduce the substance in the mines here as the miners objected to its use, some on the plea of its supposed unhealthy properties, and some because they supposed it would materially reduce the force of working miners. These foolish prejudices were overcome by force of circumstances, and the process is now universally used and thoroughly appreciated. Its use has increased, as far as we can learn, in any country where it has been actively introduced. Prejudice recedes from it, and it has benefited the mining interests so much that it is now considered an indispensable requisite in all mining operations.

We have given from week to week items from various sources showing the benefits accruing from the use of giant powder of the different grades for different classes of work. It needs no recommendation from us, as its work speaks for itself and the results can be seen everywhere. It is much safer than ordinary powder and when ignited it will burn, not explode, unless exploded by the peculiar caps employed for this special purpose. It was at first supposed to be more dangerous than ordinary explosive compounds, but it is now conceded that its only danger is in its safety—a paradoxical proportion apparently. This is so, however, as some people become so familiar and careless with it as to try all sorts of useless and foolish experiments. Its characteristics are now so well known that none object to using it, and it would be difficult to go back to the old slow way of blasting.

We make some extracts on this subject from a paper on the Musconetcong Tunnel, read by Henry S. Drinker, E. M., before a recent meeting of the American Institute of Engineers, as follows:

It is worth noting what this new explosive, giant powder or dynamite, is. As to its characteristics—first it is tremendously powerful, bringing out at a blast masses of rock that black powder could not even shake, and is simply invaluable for rapid driving in hard rock. How it compares economically with pure nitro-glycerine we are not prepared to state. Containing a percentage of the latter, it is, of course, not so powerful bulk for bulk, but again it has the great advantage of distributing the force over a greater space, which is the underlying principle of much of the deep hole blasting. Again, so far as an explosive can be termed so, it is entirely safe from accident from the proverbial carelessness of workmen, undoubtedly safer by far than black powder, while many times stronger. Hardly anything short of a cap exploded in a cartridge will fire it. Alone, it may be hammered, crushed, or burnt with impunity. Thrown into a stove or set on fire, it simply burns fiercely without danger of explosion. For exploding the cartridges very strong caps of fulminate of mercury are used; those adopted at Musconetcong, we believe, were originally imported from Hamburg. These caps are prepared as electric exploders as follows: First, a small quantity of sensitive powder is dropped on the fulminate, and into this two wires (lying side by side) are inserted, and the caps then filled with melted sulphur. On the spark passing, the sensitive powder is ignited and explodes the fulminate, and the cap being inserted by the blaster into the cartridge of dynamite, the explosion of the cap fires the latter. If firing by fuse, it is simply necessary for the blaster to squeeze the end of a piece of fuse, properly rasped and sharpened, into the cap, and to place the latter in the cartridge. A good electric battery is that manufactured by the Lafin & Rand company, under, we believe, Julius Smith's patent, the condenser and generating plate being of vulcanite, and the parts of the battery so arranged as to render it compact and easily handled.

Dynamite is simply nitro-glycerine mixed with a kind of silicious earth known variously as silicious marl, tripoli, and rotten stone. The peculiar variety of this material best suited for

this use is homogeneous, has a low specific gravity, and is generally composed of the remains of infusoria. So great is the absorbent capacity of this earth that when in a pulverized condition, it is claimed by Nobel that it will take up about three times its own weight of liquid nitro-glycerine, and still retain the form of a powder. Any mineral, or indeed vegetable, substance susceptible of pulverization or comminution, and which will retain nitro-glycerine by absorption may be substituted for infusorial earth in the manufacture of dynamite but the latter has so far been found to excel all other substances tried in possessing the requirements necessary; being composed of minute tubular shells, it is light and absorbent. A mass of it is very spongy and compressible, its shells absorbing the nitro-glycerine by capillary action, and holding it with almost absolute security against filtration or compression. The secret of the safety of this powder seems to be in its soft, pulpy, and at the same time mealy consistency, which gives it a complete cushion to prevent percussion, as a blow upon it seems like a blow upon a bag of meal; the greater the quantity the more the compressibility, and the greater the safety.

In an admirable paper on dynamite, read by Captain Alex. Mackenzie, of the Corps of Engineers, before the Essayons Club, in February, 1874, he gives his experience of a visit to the works of the company in Morris county, N. J. He says: "The infusorial earth or kieselguhr was originally all imported from Germany, out beds of it were subsequently found in the vicinity of the works, in New Jersey. No. 1 powder is composed of seventy-five per cent. nitro-glycerine and twenty-five per cent. infusorial earth, made into cartridges one and three-eighths inches in diameter by eight inches long. No. 2, of thirty-six per cent. nitro-glycerine, forty-three per cent. nitrate of potash, seven per cent. rosin, seven per cent. sulphur, and seven per cent. infusorial earth, comes in cartridges one and one-half inches in diameter by eight inches long. The size of these cartridges may be varied to order. In manufacturing No. 1 powder, the kieselguhr is prepared for use by first mixing it with a little water and baking into bricks for thorough drying. The bricks are then ground and mixed with nitro-glycerine. In preparing the absorbent or dope for No. 2, the sulphur is pulverized in a revolving cylinder, at one end of which a blast of air enters, and, passing through, carries the powdered sulphur into a tight box. The nitrate, either of soda or potash, is first dried thoroughly on an iron floor, then ground in a mill and passed into a box. The rosin is pulverized in a cylinder. The sulphur, nitre, rosin and earth are then mixed in proper proportions. In making the nitro-glycerine, the following proportions are used: Two parts of anhydrous acid are mixed with one part of nitric acid. For every seven parts of the mixed acids one part of glycerine is added. One part of nitro-glycerine is expected for every four parts of the mixed acids. The relative strength of No. 1 and 2 powder has not yet been definitely determined practically by any series of experiments, but it may be calculated as follows:

No.	Composition.	Relative strength of components	Relative strength compared with nitro-glycerine.
1	75 per cent. nitro-glycerine, 25 per cent. kieselguhr.	75 per cent.	75 per cent.
		50 per cent.	
2	36 per cent. nitro-glycerine, 64 per cent. potash, sulphur.	36 per cent.	68 per cent.
		32 per cent.	

"It is claimed that, though the absorbent of No. 2 has really but little strength within itself, it develops, when fired by nitro-glycerine, about one-half the strength of nitro-glycerine pure."

With reference to the direct connection of this explosive with tunnel work, the advantage gained by its use is based especially on the great saving of time, which is an object in all work. Taking pound for pound, it is more costly than black powder; but it should be remembered that its explosive force is also many times as great. Berthelot, in his researches on explosive matters, calculates from the chemical composition of the explosive the volume of the gases produced by the explosion, and the quantity of heat produced in the reaction. The product of the two numbers, as he conceives, giving within certain limits the explosive force, Berthelot's estimate gives the

ratio of ordinary blasting powder to pure nitro-glycerine, as 83 to 939, or that nitro-glycerine is 10.7 times stronger, taken in equal weights. This estimate, applied to dynamos, would make No. 1 eight (8) times stronger than blasting powder, and, if we accept the estimate of 68 per cent. as the relative strength of No. 2, it would make No. 2 seven and three-tenths (7 3-10) times stronger than blasting powder. The questions to be considered, in reference to the adoption of dynamite, would of course be governed by considerations of time, location of work, character of rock, etc. Where the material is soft, dry rock, which can be attacked from several points at once, and in cases where the speedy completion of the work is not the most important element to be considered, probably black powder, at present prices, would be the cheaper agent; but, again, taking the case of a tunnel where the blasting, like that at Musconetcong, is for the greater part through hard, wet rock, which can only be attacked from two headings at a time, and where a heavy outlay of capital lies dead until the completion of the work, the advantage of using so speedy, and yet so safe, an agent is most manifest.

The introduction of dynamite has already revolutionized tunnelling, and, hand in hand with machine drilling, is doubling and trebling the old rates of progress attained by hand drilling and black powder.

Now, before taking up the east heading, we will consider in a few words the enlargement in rock of west heading No. 1. This "bench," as the rock enlargement is termed, was kept both on the east and west sides from four to six hundred feet back of the headings, so avoiding any interruption at the bench from heading blasts, and allowing plenty of room for handling and switching cars, also for backing the machine to a safe distance from the face when blasting, etc. In taking up the west bench there was no extraordinary detention; the work was begun January 1st, 1874. Owing to various detentions, its steady advance did not commence until July, 1874. Up to that time, though the headings were of course free from water, the flow remained so great that frequently the enlargement, on the shortest stoppage of the pumps, would become flooded several feet in depth; also, until the headings met, in December, 1874, both the west and east enlargements were detained by the time lost in removing the broken rock from the headings. This was run out from the top heading on a movable bridge extending over the men at the bench, and ending in a chute, into which the cars were dumped. From this chute the rock was again loaded on cars in the bottom and run out to the slope. Every time, therefore, that a blast was fired this bridge had to be run back, and then up again to the face as soon as the track could be cleared, much time being often lost in the operation from unavoidable detentions that frequently arose. The different stages of progress attained in running a bench with a heading in front, and after the headings are cleared, the average monthly advance was raised in the west enlargement from 87 feet, in 1874, to 188 feet, in 1875, on the meeting of the heading in December, 1874; the increase in the east enlargement being from 96 feet, in 1874, to 181 feet, in 1875.

These two sets of holes, top and bottom, will average a linear advance for the bench of 9 feet, the following being a fair estimate for that advance of the number of feet drilled and powder burnt:

	No. of Holes	Depth of Holes	Total Depth of Holes	Lb. No. 2 Dynamite.
Top Holes.....	6	12 ft.	72 ft.	62 lb.
Bottom Holes.....	4	10 ft.	40 ft.	45 lb.
Totals.....	10	21 ft.	112 ft.	107 lb.

The total height of the cross-section adopted for the tunnel through hard rock, from lower sub-grade (1.75 ft. below base of rail) to roof, was 22.15 feet; with an 8-foot heading off, this leaves about 12 feet of a bench, with an area of 306 square feet, which gives about 102 cubic yards to a linear advance of 9 feet, or 1.05 pounds No. 2 dynamite, and 1.1 feet of holes drilled to one cubic yard of rock broken, holes being drilled with from 1 1/4 to 2 3/4-inch bits, the largest bit being put in first. In general, three machines are kept in use at the bench, two on top and one below; to run them, 3 drillers and 3 helpers are needed, about 44 laborers to clear away rock, one nipper, and a boss.

Before speaking of the east end, it may be well to state that the enlargements in rock of No. 2, or the heading driven west from the slope, was not pushed during the foregoing work, there not being the same necessity for haste in pushing its progress. After passing the junction of headings No. 2 and 3, it was driven on to a point about 175 feet from the slope. There the rock giving out, the enlargement in earth, to be followed by arching, commenced.

In this tunnel at Musconetcong, giant powder was adopted as an explosive by Mr. McFadden and the blasting was done by cuts. This method of blasting by cuts is based, of course, on the extraordinary force developed by a comparatively small bulk of explosive matter. It consists in first blasting out an entering wedge or core, about 10 feet deep at the center, and subsequently squaring the sides by several rounds. To do this, first 12 holes are drilled by the six machines, three on one side. These 12 holes are drilled two and two, six on a side, with from 1 1/4 to 2 3/4-inch "bits," the two sets being started about 9 feet apart, and at such an angle as to meet or cross at the bottom, the largest bits being put in first. They are then charged with about 25 lbs. No. 1 and 59 lbs. No. 2 giant powder, and fired simultaneously by electricity. No. 1 is only used for cuts, inasmuch as in them a quick, strong powder, comprised in a small bulk at the bottom of the holes, is required, where the greatest resistance will be found, while the No. 2 added, serves in filling the holes, so starting the sides of the cut as the apex moves. The cut being out, a second round of holes is started for the first squaring up. In these, and in the subsequent rounds, the resistance is pretty equally distributed along the whole length of the holes, and is also, of course, not so great as in the cut; therefore, No. 2 is used, as in it the nitro-glycerine is mixed with a larger proportion of absorbent matter and the force is thereby distributed over a greater space.

In the first and second squaring up rounds, from fifty to sixty pounds of No. 2 are charged, and in the third, from eighty to ninety, the holes getting stronger as the arch falls at the sides; there are generally also one or two additional roof holes in the third round, their position being variable, according to the lay of the rock. The top holes in the first round are also designed to bring down any roof not shaken by the cut, and are, therefore, given a strong angle towards the center, and always drilled from twelve to fourteen feet deep. As to their relative depth, the holes of the first squaring round are always drilled a foot or more deeper than the cut holes, and when blasted they generally bring out a foot additional of shaken rock at the apex of the cut.

Allowing the cut holes to be 10 1/2 feet deep, the cut will generally blast out about 9 full feet linear, which is raised to ten in the subsequent rounds.

Assuming the average cross-section in an eight-foot heading to be about 175 feet, for a linear advance of ten feet, 65 cubic yards of rock would be broken, which would give an average of, say, four-tenths (.4) lb. No. 1, and four (4) lbs. No. 2 giant powder burnt, and a little over six feet of holes drilled, per cubic yard broken.

The agents of this powder in San Francisco, Messrs. Bandmann, Nielsen & Co., No. 210 Front street, will give any further information on the subject to those desiring it.

This, however, it should be noted, would often be increased by occasional block or side holes, and is assumed for a case in which no holes are supposed to have missed, and in which no secondary drilling and blasting is required. Proportionate amounts would have to be added for such cases.

The above estimates are based on ordinary ten feet cuts; there were, however, many instances of 12 and 13, and sometimes 14 feet cuts taken out by ambitious foremen, but even giant powder has its limit of strength, and working too deep cuts is not advisable, as they will often only blow out partially, leaving the rock in awkward shape. As to the division of time in heading work, to drill and square up a cut should take about four eight-hour shifts, with such rock as was met Musconetcong, it being, as stated, unusually hard and tough.

It will take one shift to drill and blast the cut and one shift to each of the three rounds, and this with a force of 12 machine men (one driller and one helper to each machine), 6 laborers for loading broken rock, 1 nipper for car yard tools, a boss. On an average, however, this standard will hardly be reached, as it provides for no stoppage, no missed holes, and no accidents, and unfortunately, tunnel headings, like all things earthly, are liable to occasional stoppages and accidents.

SAFE INVESTMENT.

The Pacific Coast Twelve Per Cent.
Consols.

NEW METHOD WITH ASSURED ADVANTAGES.

A rapidly growing interest is being taken in the Pacific Coast Twelve Per Cent Consols, in consequence of the many advantages offered in regard to investment, interest and dividends. So much uncertainty exists in connection with nearly all mining and other speculative companies, there is something very assuring in an incorporation which not only guarantees twelve per cent. per year to all stockholders, but provides for the honest payment of dividends. The Twelve Per Cent. Consols were incorporated on the 12th of February last, for the purpose of transacting a general business in buying and selling mining properties, city real estate, and agricultural and other lands, in the States and Territories of the Pacific Coast. Determined to do only a strictly legitimate business, the Directors rejected the old method in vogue by mining companies generally, and adopted a new one which secures to all parties who become shareholders, equal advantages in the business transacted. By the provisions of the by-laws,

A Sinking Fund

Is to be made of one-half the proceeds of the total capital stock, which shall be sold on the joint account of the original co-owners. The stock will be classified as follows: Sinking Fund, mining property, city real estate and agricultural lands. Before any stock is issued in any class, the property will be appraised by the owners, and the stated value entered upon the books of the Company. Shares for not more than fifty per cent. of the valuation will be issued in any of the classes, and the amount of shares offered for sale in any one class, exclusive of the sales of stock in the Sinking Fund, will not be allowed to exceed 50,000, if sold at less than the par value of a dollar per share.

Guarantees of Safety.

In regard to the Sinking Fund, which will constitute fifty per cent. of the par value of the stock, all moneys received as the proceeds of sales of stock on account of the fund will be deposited with some solvent banking institution, which pays interest on deposits invested in interest bearing stocks, bonds and securities, which can be realized on in thirty days, and in no case will it be lawful for the directors or trustees to invest any moneys of the Sinking Fund in the purchase of stocks, bonds or other securities of any incorporation whatever, which shall have failed to pay interest or dividends for a period of six months preceding any proposed investment pertaining to the Sinking Fund of the Company.

Payment of Interest.

The by-laws further make positive provision for the payment of interest monthly on all stock issued in each class at the rate of twelve per cent. per annum, payable on the 5th day of each month. Another important concession is that any shareholder has the option to take stock in payment for interest at par value in any class that may be preferred. No assessment will be levied until the total stock of the Sinking Fund shall have been sold and paid out as provided by the by-laws. Indeed, so secure is the plan of the Company that in case the whole capital stock of the Company should be sold immediately and the Sinking Fund invested as provided, the proceeds would be sufficient to pay the interest for eight years and a half on the total capital stock. Perhaps no other company in the world has ever been able to present so brilliant a certainty.

Dividends.

Stockholders will not only be sure of their twelve per cent. per annum, but will share in all the surplus profits. The dividends will be paid from the profits and assets of property, and only on shares of consols that have been issued for property valued and entered on the books of the Company. As there can be very little question that the transactions of the Company will be very extensive, and that the profits will rapidly reach something handsome, the dividend prospect should serve as a strong inducement to stock purchase, for perhaps in no other direction can they be positive of receiving one per cent. a month for money invested, and almost a certainty of large yearly dividends in addition.

A further provision can be made at any time by the Company by setting aside the percentage agreed upon of the sales of the properties of the Company. The main object of the directors is to incorporate a more legitimate and assured method of transacting business in mining and property than has hitherto obtained on this coast. They are therefore resolved to touch nothing but bona fide investments, and to make it a rule to have nothing to do with speculative values. Every possible care will be taken to protect the interests of shareholders, and in order that they may be constantly posted in the transactions of the Company, a monthly statement of affairs will be prepared by the officers, and the books will be at all times open for inspection. Shares for the first series issued for mining property in Washoe, Storey and Lyon counties, and on the Consolidated Nevada, and for account of Sinking Fund, will be ready for delivery to shareholders and purchasers to-morrow, at Greenbaum & Co.'s, 306 Montgomery street. The set selling rate will be one-twenty, and the buying rate one-nineteen. The principal office of the Company is at 506 Montgomery street. T. Phelps is the President, and W. S. Reynolds the Secretary.

my226owhp

Brass Foundry & Pump Factory.

A. J. SMITH, Plumber,

Sole Proprietor and Manufacturer of the Celebrated Hudson Force Pumps, Atwood & Bodwell Windmill Brass Pumps, Smith's Copper-Lined Pumps, Plumbers' Force Pumps.

Special attention paid to Breweries, Distillers', Beer and Hot Liquor Pumps, and Wines Pumps. Particular attention paid to AIR PUMPS, also to

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QUICKSILVER.
UNITED STATES PATENT OFFICE.

The Quicksilver Mining Company of New Almaden, California—Trade-mark for Quicksilver Flasks. Statement of trade-mark No. 1499, registered October 19, 1873; application filed September 29, 1873. Specification describing a trade-mark, used by the Quicksilver Mining Company, a company chartered by the State of New York, and working and operating quicksilver mines at New Almaden, Santa Clara county, State of California, for Quicksilver Flasks.

Our trade-mark consists of the letter "A" straddling a circle. This letter has generally been painted upon the upper end of each flask, bottle, or jar in which the quicksilver is contained, its usual position being such that the opening or mouth in the upper end of the flask, bottle or jar will be between the spreading angular sides of the letter, the cross-mark of the letter passing along close to the edge of the hole.

This trade-mark we have used in our business for ten years last past. The particular goods upon which we have used it are quicksilver flasks, and it has always been applied as above described.

THE QUICKSILVER MINING COMPANY.

By J. B. RANDOL, Manager.

This trade-mark is also registered in the office of the Secretary of State, Sacramento, California, and all producers and dealers in quicksilver are cautioned not to use the said trade-mark.

For New Almaden Quicksilver, apply to THOMAS BELL, Sole Agent, Over Bank of California, San Francisco.

NEW ALMADEN QUICKSILVER.

TRADE MARK.

The well known full weight and superior quality of the quicksilver produced at the New Almaden Mines having induced certain unscrupulous persons to offer their inferior productions in flasks having our trade-mark, "A," notice is given to consumers and shippers that quicksilver, "A" brand, guaranteed weight, can be purchased only from THOMAS BELL, San Francisco, or his duly appointed sub-agents.

J. B. RANDOL, Manager, New Almaden, April 5, 1875.

AMMONIA!

For Washing and Cleaning Purposes.

For Sale by all Grocers.

This article is universally used in Europe, and recently introduced for general family use in San Francisco and neighborhood, is already in great demand. It is now the intention of the manufacturers to introduce it all over the Pacific Coast, at prices which will bring it within the reach of every household.

It is unequalled for dissolving Woolen Fabrics, Cottons, Carpets or Crockery; for scrubbing Floors, Washing Paint, Removing Grease Spots, Shampooing or Sizing.

It renders water soft, and imparts a delightful sense of coolness after washing.

DIRECTIONS.—For Laundry, use two to four table-spoonfuls to a wash tub of water. For bathing, use one table-spoonful in the bath tub. For removing grease spots, apply with a brush, undiluted, and wash with water afterward. For stimulating the growth of plants, use a few drops in every pint of water used in watering.

PRICE.—Per Pint Bottle, 25 cents; per quart Quart Bottle, 40 cents; per Half Gallon, 75 cents. Also, BULPHATE OF AMMONIA, for chemical purposes, fertilizing, and the preparation of artificial manures, AMMONIACAL PREPARATION, for the prevention and removal of boiler scale. CRUDE AMMONIA, for general manufacturing, and FUR LICKER AND ADON, AMMONIA for chemical and pharmaceutical purposes.

Manufactured by the

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The undersigned, owners of LESCHOT'S PATENT for DIAMOND-POINTED DRILLS, now brought to the highest state of perfection, are prepared to fill orders for the IMPROVED PROTECTING and TUNNELING DRILLS, with or without power, at short notice, and at reduced prices. Abundant testimony furnished of the great economy and successful working of numerous machines in operation in the quartz and gravel mines on this coast. Circulars forwarded, and full information given upon application.

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Having been engaged in furnishing these supplies since the first discovery of mines on the Pacific Coast.

Our Gold and Silver Tables, showing the value per ounce Troy at different degrees of fineness, and valuable tables for computation of assays in Grains, Grammes, will be sent free upon application.

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JOHN TAYLOR & CO.

Varney's Patent Amalgamator.

These Machines Stand Unrivaled.

For rapidly pulverizing and amalgamating ores, they have no equal. No effort has been, or will be spared to have them constructed in the most perfect manner and of the great number now in operation, not one has ever required repairs. The constant and increasing demand for them is sufficient evidence of their merits. They are constructed so as to apply steam directly into the pulp, or with steam bottoms, as desired.

This Amalgamator Operates as Follows.

The pulp being filled, the motion of the miller forces the pulp to the center, where it is drawn down through the aperture and between the grinding surfaces. Thence it is thrown to the periphery into the quicksilver. The curved plates again draw it to the center, where it passes down, and to the circumference as before. Thus it is constantly passing a regular flow between the grinding surfaces and into the quicksilver, until the ore is reduced to an impalpable powder, and the metal amalgamated.

Settlers made on the same principle excel all others. They bring the pulp so constantly and perfectly in contact with quicksilver, that the particles are rapidly and completely absorbed.

Mill-men are invited to examine these pans and settlers for themselves, at the office, 229 Fremont Street, San Francisco

Nevada Metallurgical Works,

21 First street.....San Francisco.

Ores worked by any process.
Ores sampled.
Assaying in all its branches.
Analysis of Ores, Minerals, Waters, etc.
Plans furnished for the most suitable process for working Ores.
Special attention paid to the Mining and Metallurgy of Quicksilver.

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ADVANCES MADE

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Instructions in Assaying,

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HENRY G. HANKS

Will receive a few pupils at his new laboratory, 517 Montgomery street, up-stairs. TERMS MODERATE

LEOPOLD KUH,

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Persons engaged in the following business can have their Signs Painted at contract prices, for goods or articles in which they trade, viz:

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Dewey & Co. { 224 } Patent Agt's.
{ SANBOME ST }

Short Lectures on Patents.

No. 10.—By J. L. BOONE, of Dewey & Co's. MINING AND SCIENTIFIC PRESS Patent Agency.

Copyrights.

Our patent laws are based upon the proposition that the originator or producer of anything new is entitled to a certain proportion of the benefit to be derived from his production. This rule is also applicable to literary productions, and the term which is employed to designate this class of protection is called a copyright.

Copyrights are only granted to citizens of the United States or residents therein. A foreigner cannot secure the copyright protection in the United States, neither does any foreign country grant the right of a copyright to citizens and residents of the United States. The only way for an American citizen to secure his right to a literary production in a foreign country is to engage some resident of that country to secure the protection and hold it for him. Many attempts have been made to inaugurate an international copyright law, or system by which the producers and authors of literary productions could secure universal protection for their works, but as yet all attempts to accomplish this result have failed.

The copyright protection is granted to "the author, inventor, designer, or proprietor of any book, map, chart, dramatic or musical composition, engraving, cut, print or photograph or negative thereof, or of a painting, drawing, chromo, statue, etatuary, and of models and designs intended to be perfected as works of the fine arts," and the law adds that the executors, administrators or assigns of the author, originator or designer shall have the sole liberty, upon complying with the law, "of printing, reprinting, publishing, completing, copying, executing, finishing and vending the same; and in the case of a dramatic composition, of publicly performing or representing it, or causing it to be performed or represented by others, and authors may reserve the right to dramatize or translate their own works."

Thus the protecting arm of the law is thrown around men of genius and literary attainments, and they are allowed the benefit of whatever merit they possess, in return for the benefit which they confer upon the public. Many a well deserved fortune has resulted from the possession of a copyright.

In Order to Secure a Copyright

The proprietor is required by law to mail a printed copy of the title of the book, or a written description of the thing to be copyrighted, to the Librarian of Congress at Washington before the publication of the work. And within ten days after publication he is required to mail to the Librarian of Congress two complete copies of the work to be protected. The word "publication" has been held to mean "sale" in this connection, so that the two copies must be deposited in the mail within ten days after one of the copies is disposed of by sale.

In many cases copyrights have been secured without the preliminary step of mailing to the Librarian of Congress the title page or a description of the work. We doubt whether such a copyright would be legal. The Librarian of Congress issues the usual certificate upon the payment of the proper fee and the deposit of two copies of the work, but the fact that a certificate has been issued is not a proof that the proprietor has complied with all points of the law and that the copyright is complete and legal.

If it be established in any suit which involves the validity of a copyright that this preliminary title page or description was not properly placed on file before publication of the work, I do not see how the courts can fail to pronounce the copyright as incomplete and therefore void.

If a person places on file the title page or description of a work and fails to complete the copyright by filing two sample copies of the same as required by law, he is liable to a penalty of twenty-five dollars.

The preliminary filing of the title page or description of the work to be copyrighted is intended to serve as a caveat to protect the proprietor while he is engaged in perfecting and publishing his work. Several notable instances have occurred where a written article or poem was published anonymously and it was afterwards found almost impossible to prove who the author was amidst a number of claimants all of whom had equal grounds upon which to establish their claims. The author can now easily avoid such trouble by filing his intention before he gives his work to the public. Every copy of the copyrighted work must contain a conspicuous notice that a copyright has been secured, and this may be done by either printing, engraving or stamping upon each copy the words "copyright secured by A. B. in 1875" or "copyrighted by A. B. in 1875." The law of 1870 made it the duty of every proprietor of a copyrighted work or article to place upon each article the words, "Entered according to the act of Congress in the year — by A. B., in the office of the Librarian of Congress, quicksilver, also, as I believe, by chemical action. And I might mention other chemical reactions, causing loss of quicksilver. Hence the importance of keeping the pan as clean as

possible of quicksilver in the first half of the at Washington." This notice, however, was found to be cumbersome and its use in many instances impracticable.

The law was therefore amended in 1874 so as to render the words "copyrighted" or "copyright secured" legal. They are certainly as explicit and much more convenient than the former lengthy notice.

A copyright can be assigned by any instrument of writing in the same manner that patents are assigned, and all assignments of copyrights must be recorded in the office of the Librarian of Congress within sixty days, in order to protect the assignee from subsequent purchasers.

Copyrights are granted for a term of twenty-eight years from the time the title is recorded in the office of the Librarian of Congress, and at the expiration of this term, the copyright can if he be living, or if he be dead his widow or children can, have the right extended for a further period of fourteen years.

It is a public offence for any person to mark any production or work with the words "copyrighted" or other words of like import, which has not been secured by a copyright, and the law in regard to the infringement of a copyright, either by copying, printing or making a fac-simile of the thing copyrighted or so close an imitation thereof as would be calculated to deceive the public, or with intent to evade the right of the proprietor, is very strict, and the rights of proprietors are carefully guarded.

Labels.

This term label is intended to include printed instructions, wrappers of articles upon which descriptions are printed and the ordinary labels which are permanently secured to or upon articles of merchandise. The principal use of labels is upon bottles containing patent medicines or composition articles. Heretofore this class of printed matter has been copyrighted in order to secure its protection, but the law in relation to labels which went into effect in August, 1874, provided for the issue of a patent or certificate of registration for their protection, in the same manner that trademarks are protected. Applications for patents on labels must now be made to the Commissioner of Patents.

NOTE.—These lectures will be issued in cheap book form by the publishers of this journal.

Fatal Mining Accident.

On the 21st inst. a frightful accident occurred at the Murohie mine near Nevada City. About half past three o'clock the roof of the hoisting works of the mine was discovered to be on fire, just above the engine. John Shaw and another man were the only men on the top at the time. There were six men at work in the shaft, which is 400 feet deep; their names were Samuel Hecker, John McCourt, Jack Stephens, Thomas Jenkins, Daniel O'Donnell and a Chinaman. Mr. O'Donnell made his escape. He says the Chinaman told him that he was wanted above. He asked the Chinaman why the ore was not hoisted. The latter said he did not know. The rope kept jerking, which was a sign that there was something the matter. O'Donnell started to go to the surface, and thinks the others attempted to follow about 100 feet behind him. When he got in sight of the top, he saw men beckoning him to come up. He hallooed to the others and moved on himself. When he reached the top, the building was all on fire, and the three sets of timbers in at the mouth of the shaft also on fire. Pieces of the burnt shingles were falling thickly in the building, but he pushed through the hot flame and smoke and reached the outside, completely exhausted. There was a large pile of timber around the building, which also took fire and made the heat intense for a hundred feet around. There was no water nearer than the V flume, a half mile or more distant. Men were sent to that place, and at about half past four o'clock it reached the fire.

As soon as it came, men took pails, pans and everything within reach, and commenced to dash water on the pile of wood and down the shaft. The fire at the mouth of the shaft was soon extinguished, and O'Donnell, the man who had escaped, put a rope around him and descended into the smoking mine underground. He went down about twenty feet and found McCourt with his feet caught in the ladder. He at length released him and was drawn out, about smothered himself. McCourt was breathing when brought to the surface, but died in a minute after. O'Donnell said there was not a particle of air at the depth of twenty feet when he was down there, but the shaft was full of smoke.

After the fire had been partially extinguished, a hells was obtained, and air pumped down. O'Donnell, who was the hero of the hour, again descended, with others, and found Hecker and Jenkins about one hundred and ten or twelve feet down the shaft. Hecker was dead, and Jenkins nearly so. They were taken to the surface, and it was hoped that Jenkins might recover, although the chances were slight. Stephens and the Chinaman had got up to the same point, but finding the air stifling, got down the pump rod until they found good air, where they were found all right.

It is reported that about the 1st of July a cargo consisting of 12,000 ties and the first consignment of railroad iron will arrive at Santa Monica.

Hints on the Washoe Process.

(Continued from last week.)

The Loss of Quicksilver.

Every piece of wood that has come in contact with quicksilver, the canvas straining secks, the worn out pan shoes and dies, even after careful washing and breaking, the thoroughly washed and shaken quicksilver flasks, the used up kettles and dippers, the floors, &c., all have quicksilver sticking to them; the men carry quicksilver on their boots and clothes, and it is found scattered in very small quantities outside of the mill. It goes everywhere. Drop a globule on the floor, you cannot entirely recover it. Climb up forty or fifty feet to the cross timbers in the top of the mill, collect some dust on top of the timbers, examine it with a glass or wash it, and you will find quicksilver. Some is lost every time crude bullion is melted. Every pound of quicksilver is banded probably forty times a day, and every time there is a little loss. (Quicksilver should be handled as much as possible mechanically, being raised by steam in pipes or some other arrangement.) Quicksilver not covered with water or other liquid evaporates in the air. These losses can only be prevented partially by the greatest cleanliness and care.

Again, quicksilver charged with copper readily becomes coated with small particles of iron. In the pulp, it is readily coated by iron pyrites, greese, elimes, etc., or reduced to great fineness by grinding. In these "flooded" and coated conditions much of it will float away and be lost, unless means are employed to collect it. I have found cyanide of potassium very effective for this purpose. Thorough settling also collects a good deal. Ores containing much tale likewise act unfavorably on quicksilver. As soon as quicksilver is flooded, and becomes sluggish, it not only loses to a large extent its amalgamating power, but also is easily cut up and flooded.

In addition to the sources of mechanical loss above mentioned, much of the quicksilver is lost chemically. The water from the settlers, if filtered and concentrated, will show quicksilver present in solution. Sulphate of copper in solution is decomposed by quicksilver, some of the quicksilver becoming sulphate of mercury, while the precipitated copper forms a copper amalgam with the remaining quicksilver. Chloride of silver also can be decomposed by quicksilver, chloride of mercury being formed. If binoxide of manganese is present in the ore, it occasions a heavy loss of period of working the charge. The grinding in the first half will not cut up and flour the quicksilver; the chemicals can act on the ore and not on the quicksilver; and the silver minerals will be reduced by the chemicals, instead of having the expensive quicksilver consumed by reducing some of the minerals or combinations. By observing this simple rule, by using chemicals for saving quicksilver at the end of the charge, and by subsequent careful settling, I have found it possible to diminish very much the loss of quicksilver that would otherwise occur.

In conclusion I have only to say, that, in my opinion, even base and refractory ores can frequently be worked more profitably by this process than by the vastly more expensive methods of dry crushing, roasting, smelting, etc.

Much of the credit to be given for many points brought forward in this paper is due to Mr. William F. Carter, mechanical engineer, who has worked with me constantly for several years past.

PATENTS & INVENTIONS.

A Weekly List of U. S. Patents Issued to Pacific Coast Inventors.

(FROM OFFICIAL REPORTS FOR THE MINING AND SCIENTIFIC PRESS, DEWEY & CO., PUBLISHERS AND U. S. AND FOREIGN PATENT AGENTS.)

By Special Dispatch, Dated Washington, D. C., June 22d, 1875.

FOR WEEK ENDING JUNE 8TH, 1875.

DYNAMO WRENCH.—Sebastian Plym, Portland, Oregon.

FIRE ESCAPE.—Franklin P. Berney, San Quentin, Cal.

MANUFACTURE OF NITRO-SULPHURIC ACID FOR MANUFACTURING NITRO-GLYCERINE.—Prudencio Castellanos, S. F., Cal.

RECOVERING ACIDS FROM RESIDUUM OF NITRO-GLYCERINE MANUFACTURE.—Prudencio Castellanos, S. F., Cal.

APPARATUS FOR RECOVERING ACIDS FROM THE RESIDUUM OF NITRO-GLYCERINE MANUFACTURE.—Prudencio Castellanos, S. F., Cal.

EXPLOSIVE COMPOUNDS.—Prudencio Castellanos, S. F., Cal.

EXPLOSIVE COMPOUNDS.—Prudencio Castellanos, S. F., Cal.

LOCK MORTISING MACHINE.—Charles J. Hndee, S. F., Cal.

HYDRAULIC ELEVATOR.—Philip Hinkle, S. F., Cal.

WAGON BRAKE.—John C. Trullinger, Portland, Oregon.

TRADE-MARK.

FOR PREPARED SALMON.—James Quinn, Portland, Oregon.

Academy of Sciences.

The regular semi-monthly meeting of the California Academy of Sciences was held on Monday evening last, Vice President Gibbons in the chair. The donations to the museum consisted of specimens of teal duck, pine cones, minerals from Governor Purdy, and several valuable specimens of wood from Professor Davidson, in Japan; quicksilver and other mineral specimens from gentlemen whose names were not ascertained. Dr. Gibbons, of Alameda, read a paper on a specimen of the trout fish found in Mendocino county. Judge Hastings submitted three papers: "A Plan for the Reclamation of Swamp and Overgrown Lands," "Artificial Rains," and the "San Francisco Observatory." Dr. Kellogg read a brief paper on "The Oregon Lily."

Mr. Amos Bowman read a paper on "The Great Plunge of the Tertiary," which is given in another column.

It was announced that the proceedings of the Society for last year were published and ready for distribution.

Work on the Nevada County narrow gauge railroad is progressing rapidly. When completed it will be one of the best of narrow gauge railroads—first-class in all respects. Mr. J. F. Kidder, the engineer of construction, states that the tunnel between Bear river and Greenhorn creek will be completed by the middle of August.

THE *Argus* thinks that Petaluma presents great inducement for the establishment of extensive tanneries. There is an inexhaustible supply of bark in the county, a near market, cheap transportation, excellent climate and all the facilities and advantages that could be desired.

THE grading of the Ruby Hill and Enreka railroad has been completed to the Lawton dump of the Enreka Consolidated line. The surveyors are now engaged in running track centers, and will soon finish their part of the work. Iron and ties are arriving daily and being laid.

A \$4.00 BOOK FOR \$1.50.

The People's Common Sense Medical Adviser, in plain English, or Medicine Simplified, by R. V. Pierce, M. D., Counsellor-in-Chief of the Board of Physicians and Surgeons at the World's Dispensary, Buffalo, N. Y. The above work—a book of about nine hundred large pages, profusely illustrated with wood engravings and colored plates, and well and strongly bound—will be sent postpaid to any address for One Dollar and Fifty Cents, making it the cheapest book ever offered to the American people. Other books treating of domestic medicine, of like size and style of binding, and not nearly as well illustrated, with no colored plates, and some of them containing no prescriptions, and making known no means of self cure for the diseases which they discuss, sell for from three dollars and a half to five dollars. Were Dr. Pierce's Work not published by the author, printed and bound with his own machinery, and were it sold through agents, as other like works are, the price of it would have to be not less than four dollars. For when the publisher pays the author a fair price for his production, then adds a profit to his investment large enough to satisfy himself and compensate him, not only for his labor, but also for the risk of pecuniary loss which he assumes, in taking the chances of the enterprise proving a success, and when the State, county and canvassing agent has each received his profit, they have added to the expense of a book, that originally cost about \$1.25, so much that the people have to pay not less than \$4.00 for it. The People's Medical Adviser, on the contrary, is placed within the pecuniary reach of all classes by the author, who adopts the plan of the Grangers, depending with middlemen and giving the benefit of their profits to the people, offering his book at a price little above actual cost of publication. That those desiring the book may run no risk of losing their money, in sending it through the mails, the author advertises that money addressed to him at Buffalo, N. Y., and enclosed in registered letters, may be at his risk of loss. The author's large correspondence with the people upon medical matters, which we are credibly informed frequently exceeds three hundred letters a day, and requires several trained and skillful medical assistants and short-hand reporters to enable him to entertain and answer them, as well as his large daily dealings with disease at the World's Dispensary, appear to have peculiarly fitted him for writing the work, by rendering him very familiar with the every day medical needs of the people. He endeavors in this work to answer all the numerous questions relating to health and disease that have been addressed to him by the people from all parts of the land, and hence it contains important information for the young and old, male and female, single and married, nowhere else to be found. All the most prevalent diseases of both sexes are also plainly and fully considered and means of self cure made known. Unlike other works on Domestic Medicine, it includes the subjects of Biology, Cerebral Physiology, Hygiene, Temperaments, Marriage, Reproduction, etc., all of which are treated in an original and interesting manner. It is a compendium of Anatomical, Physiological and Medical Science, and embodies the latest discoveries in each department.—*Com.*

METALS.

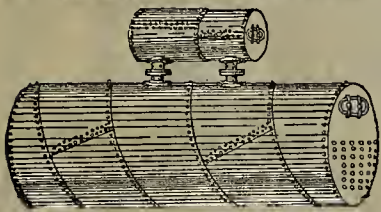
[WHOLESALE.]

WEDNESDAY M., June 23, 1875.

American Pig Iron, 10 ton	46 00	46 00
British Pig Iron, 10 ton	46 00	46 00
White Pig, 10 ton	46 00	46 00
Oregon Pig, 10 ton	46 00	46 00
Refined Bar, good assortment, 10 ton	46 00	46 00
Sheet, No. 10 to 14	46 00	46 00
Sheet, No. 16 to 20	46 00	46 00
Sheet, No. 22 to 24	46 00	46 00
Sheet, No. 26 to 28	46 00	46 00
Horse Shoes, per pair	46 00	46 00
Nail Rod	46 00	46 00
Norway Iron	46 00	46 00
Roller Iron	46 00	46 00
Other Irons for Blacksmiths, Miners, etc.	46 00	46 00
Copper	46 00	46 00
Brass	46 00	46 00
Opener Tind	46 00	46 00
U. S. Pat.	46 00	46 00
Sheathing, Yellow	46 00	46 00
Sheathing, Old Yellow	46 00	46 00
Composition Nails	46 00	46 00
Composition Bolts	46 00	46 00
STEEL—English Cast, 10 ton	46 00	46 00
Andersson & Woods' American Cast	46 00	46 00
Drill	46 00	46 00
Flat Steel	46 00	46 00
Pile Steel	46 00	46 00
TIN PLATE—	46 00	46 00
10x14 1/2 Charcoal	46 00	46 00
10x14 1/2 X Charcoal	46 00	46 00
Roofing Plate 10 Charcoal	46 00	46 00
Rancho Tie	46 00	46 00
Anchor Bolt	46 00	46 00
ZINC—By the Case	46 00	46 00
Zinc, Russet 7x3 ft. No 7 to 10	46 00	46 00
do do 7x3 ft. No 11 to 14	46 00	46 00
do do 7x3 ft. No 15 to 18	46 00	46 00
do do 7x3 ft. No 19 to 22	46 00	46 00
do do 7x3 ft. No 23 to 26	46 00	46 00
do do 7x3 ft. No 27 to 30	46 00	46 00
do do 7x3 ft. No 31 to 34	46 00	46 00
do do 7x3 ft. No 35 to 38	46 00	46 00
do do 7x3 ft. No 39 to 42	46 00	46 00
do do 7x3 ft. No 43 to 46	46 00	46 00
do do 7x3 ft. No 47 to 50	46 00	46 00
do do 7x3 ft. No 51 to 54	46 00	46 00
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do do 7x3 ft. No 59 to 62	46 00	46 00
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do do 7x3 ft. No 75 to 78	46 00	46 00
do do 7x3 ft. No 79 to 82	46 00	46 00
do do 7x3 ft. No 83 to 86	46 00	46 00
do do 7x3 ft. No 87 to 90	46 00	46 00
do do 7x3 ft. No 91 to 94	46 00	46 00
do do 7x3 ft. No 95 to 98	46 00	46 00
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do do 7x3 ft. No 575 to 578	46 00	46 00
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do do 7x3 ft. No 895 to 898	46 00	46

Iron and Machine Works.

San Francisco Boiler Works,
N. W. Cor. Harrison and Main.
Late 125 Beale Street. SAN FRANCISCO.



F. I. CURRY,
Late Foreman of the Vulcan Iron Works, Proprietor
High and Low Pressure Boilers of all
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SOLE MANUFACTURERS OF THE CELEBRATED
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LEWIS R. MEAD.....Secretary

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COLLECTOR

Dunbar's Patent Self-Adjusting Steam Piston
PACKING, for new and old Cylinders.

And all kinds of Mining Machinery.

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SHEET IRON PIPE.

THE

Risdon Iron and Locomotive Works

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Are prepared to make SHEET IRON and ASPHALTUM
PIPE, of any size and for any pressure, and contract to
lay the same where wanted, guaranteeing a perfect
working pipe with the least amount of material.

Standard sizes of railroad Car Wheels, with special
patterns for Mining Cars. These small wheels are made
of the best Car Wheel Iron, properly chilled, and can be
fitted up with the improved axle and box—introduced by
this company, and guaranteed to outlast any other
wheels made in this State.

All kinds of Machinery made and repaired.

24v22-3m JOSEPH MOORE, Superintendent.

G. W. PRESCOTT. W. R. ECKART.

Marysville Foundry,

MARYSVILLE, - - - - - OAL.

PRESCOTT & ECKART,

Manufacturers of Quartz and Amalgamating Machinery.
Hoisting Machinery, Saw and Grist Mill Irons, House
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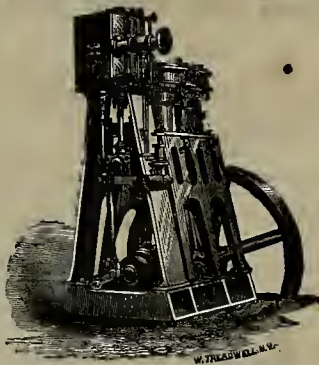
T. A. MCCORMICK. ODEAN LEWIS. J. MCCORMICK

McCormick, Lewis & Co.,

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Also, Farmers' Dynamic Electric Machine and Hill's Exploder for Blasting, Put-
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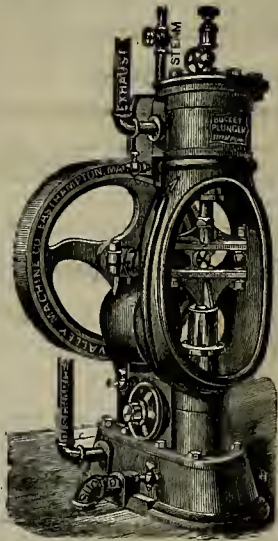
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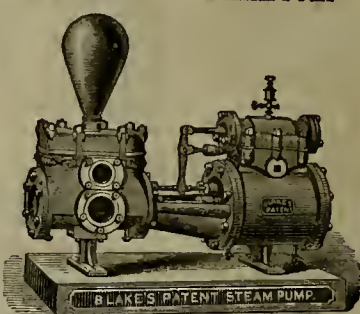
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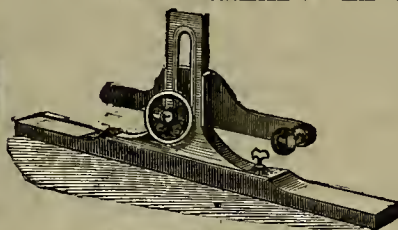


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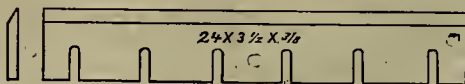
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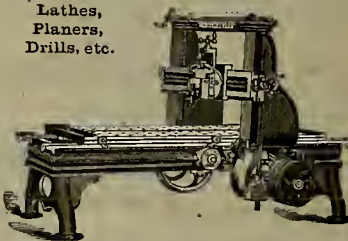


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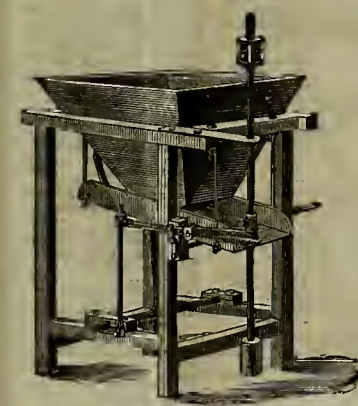
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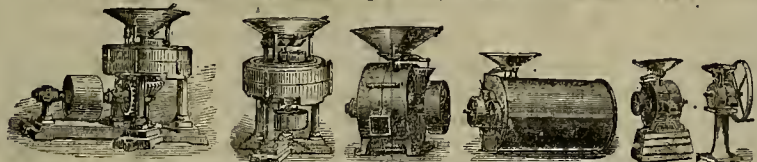
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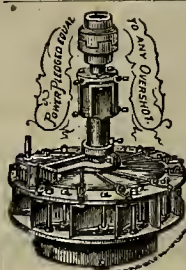
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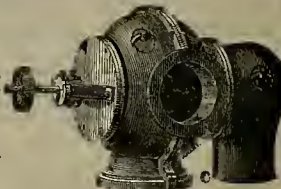
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